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Dempsey, N.; Brown, Caroline; Bramley, Glen

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The key to sustainable urban development in UK cities? The influence of density on social sustainability

N. Dempsey [a,*], C. Brown [b], G. Bramley [b]

[a] *Department of Landscape, University of Sheffield, Sheffield, UK*
[b] *School of the Built Environment, Heriot-Watt University, Edinburgh, UK*

Abstract

High residential density is an important element of the compact city concept alongside mixed land uses, well-connected urban layouts, and easily accessible public transport networks. However, there is little consensus on how dense 'high-density' residential development should be, nor on what are the impacts of such urban environments on residents. This paper attempts to address this gap in knowledge by exploring the concept of density within the context of sustainability, calling on empirical evidence conducted in the UK by the CityForm research project. This research examined the relationship between elements of urban form (including density) and sustainability. This paper specifically makes reference to the relationship between density and aspects of social sustainability, specifically social equity (i.e. access to services and facilities), environmental equity (i.e. access to and use of green/open space) and sustainability of community (including perceptions of safety, social interaction and community stability). An extensive postal questionnaire survey and series of follow-up in-depth focus groups were conducted in a number of neighbourhoods in five UK cities to examine the hypothesis that high-density neighbourhoods were less likely to support socially sustainable behaviour and attitudes than low-density ones.

The paper starts with an introductory account of density in the UK to provide the context of the study. It then defines density and the aspects of social sustainability under scrutiny and discusses the claimed relationships as well as the implications that such claims have for policy and practice. The paper then reports on the empirical research findings which examine the extent to which density has any influence on residents' propensity to engage in socially sustainable activities. The paper concludes by critically reflecting on how the findings fit more broadly into the 'compact city' debate in the 21st century, where urban, and not rural, environments are home to ever-increasing populations around the world.

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Keywords: Density; Compact city; Social sustainability; Environmental equity; Neighbourhood

Contents

* Corresponding author.
 E-mail address: N.Dempsey@sheffield.ac.uk (N. Dempsey).

1. Introduction

UK policymakers and practitioners have had a long-standing and complex relationship with density as a planning tool. As industrialisation took hold in the 19th century, rural migrants flocked to urban areas, increasing the proportion of people living in urban areas from 24% in 1750 to over 50% a century later (Lees & Hollen Lees, 2007). Housing courts and back-to-backs emerged as the prevailing form of mass housing – characterised by their high-density, overcrowding, poor sanitation and being bad for human health. In the 1830s, life expectancy in cities of over 100,000 was just

29 years of age (Hunt, 2005). Accounts of the plight of the urban poor by Engels (1845 [1987]), Booth (1889) and others helped to cement the implicit link between high-density dwellings, poor living conditions and poor health. This paper explores how this link arguably continues to influence commentators, practitioners and policymakers today.

1.1. A historical account of density in the UK urban context

From the mid-1800s onwards, Victorian social reformers fought for the provision of urban green

space to help alleviate side-effects of industrialisation such as air pollution and overcrowding (Laurie, 1979). In France, Georges-Eugène Haussmann was hired to modernise Paris, clearing the unsanitary high-density housing of the small, winding streets to make way for broad, tree-lined boulevards and gardens (Weeks, 1999). In the UK Joseph Paxton designed the first publicly funded municipal park: Birkenhead Park on Merseyside. Opened in 1847, it inspired Frederick Law Olmsted to design New York's Central Park (Schuyler, 1986) and was the first of many urban parks to be created in Britain's industrial towns and cities. When Birkenhead Park was opened, Manchester – with a population of over 235,000 – had no accessible parks (Conway, 1991); but by the 1920s the city had almost sixty (Lasdun, 1991). Concerns about public health and the impact of overcrowding did not just inspire the creation of new parks and gardens. More prosaically, the 1875 Public Health Act gave powers to local authorities in urban areas to remove poor quality housing (Miller, 1992) and enforce minimum widths of streets. The result was 'by-law housing': lines of uniform terraced housing on straight streets in grid formation which spread out to the suburbs (Jenks & Dempsey, 2005). When the by-laws were introduced, the housing ranged from 33 dwellings per hectare (dph) to a high of 110 dph, much lower than the 385 dph found in the pre-1875 back-to-back housing (ibid.).

In the late 19th century, Ebenezer Howard promoted garden cities as an ideal form of urban development. The central ideals of low-density healthy environments had already been promoted by philanthropists like Robert Owen in New Lanark and the Lever Brothers in Port Sunlight (Barber, 2005). Such housing models were popular (while not actually always put into practice as intended) with densities ranging from 12 to 20 dph in model villages and 15–30 dph in the garden cities, indicating a trend of significantly lowering densities in the pre-First World War period (Jenks & Dempsey, 2005). After the First World War, Raymond Unwin, a leading garden city architect, became a central figure in the design of state housing. Thanks to the 1919 Housing and Town Planning Act and the *Homes Fit for Heroes* campaign (Swenarton, 1981), public housing was built on a scale never seen before. The Tudor Walter Report in 1918 had called for densities of 30 dph in urban areas which became the statutory norm by 1924 (Local Government Board, 1918). While this policy improved living conditions and reduced overcrowding, the resulting terraced housing was widely criticised. Long lines of parallel terraced housing with backyards (Ravetz & Turkington, 1995) separated by streets and

alleyways permitted the highest densities possible by law, but were seen by housing reformers as having little aesthetic value and being socially monotonous (Swenarton, 1981). The Central Housing Advisory Committee of 1944, chaired by the then Minister for Health Lord Dudley, highlighted the mistakes of the inter-war housing form which followed the Tudor Walters Report: they included 'too rigid an interpretation of density zoning [which resulted] in insufficient variety of types of dwelling and...a lack of smaller open spaces and playgrounds', the separation of private and municipal housing, poorly designed neighbourhoods and little attention to the provision of services and facilities, resulting in homes being located far away from work (1944, p. 11). The Committee came to the conclusions that higher-density development (up to 100 dph in urban areas) was required which would provide good access to shops, schools and other everyday facilities (Jenks & Dempsey, 2005). While the Committee acknowledged that 'flats are unpopular with large sections of the community, due to noise, lack of privacy [and] absence of garden' they also pointed out that a 'considerable proportion of community does not have children so there is a preference for flats here' (1944, p. 11).

While post-Second World War suburbs continued to be dominated by relatively low-medium density urban form influenced by the garden city model, in inner-city areas poor quality (and war-damaged) housing and slums continued to be cleared and the replacement form was heavily influenced by modernist architects such as Le Corbusier who envisaged a 'modern city of tower blocks which arose from the rubble' (Taylor, 1998, p. 24). Flats were increasingly popular as a new and high-density housing form for a number of reasons: the increasing amount of housing that was required; their low cost compared to houses and because of strong policy support (Ministry of Housing and Local Government, 1952, 1962).

Utopian ideas such as Le Corbusier's Radiant City and Howard's Garden Cities were hailed as not only providing the solution to the problem of poor quality housing, but as a means of solving the social and health problems of the industrial city (Dempsey, 2009). However, a growing body of research reports probed and called these assumptions into question. The chief objection was that the high-rise tower block had been constructed without reference to what works well in practice or what residents wanted (Coleman, 1985). Underlying the stark criticisms was the observation that the utopian models of Howard, Le Corbusier, and of course the philanthropists (although they fare much better in critiques), are based on environmental

determinism. Put simply, if the environment is changed, or – in the eyes of the architect/planner – 'improved', then human behaviour and residents' lives would also be changed and improved.

Research which asked residents about their perceptions of living in high-rise dwellings pointed to levels of dissatisfaction (Ministry of Housing and Local Government, 1952, 1962). However, this was often interpreted not as an issue of environmental determinism, which was rejected outright by policymakers (ibid.), but as a problem to do with the residents rather than the urban form. In this way, environmental determinism was substituted for environmental possibilism – the idea that it is entirely possible for people to live happily in an environment (e.g. planned modernist housing) as long as they are not 'problem people' (ibid., p. 20) and environmental probabilism – the idea that a physical environment can be designed so that 'some choices are more likely than others' (Carmona, Heath, Oc, & Tiesdell, 2003, p. 106). For example, a report by the Department of the Environment in 1975, *The Social Effects of Living Off the Ground*, concluded that different people are affected in different ways and that certain household types are better suited to flat life than others, i.e. families with young children should not be housed in higher-floor flats. Further report findings stated that a wide range of housing needs was not met well by flats, and that, on the whole, these residents preferred houses to flats. Despite these findings, an overriding conclusion of the report was that flats could be successfully designed for a range of household types but only if those who provide such residential environments are 'sensitize[d]…to the needs of those who live there' (DoE, 1975, p. 9).

Concern about living standards and the design of new housing led to the development of the Parker-Morris space standards in the 1960s. These standards were mandatory for all housing built in new towns from 1967 onwards and from 1969 they applied to all council houses. The standards set out minimum floor space and storage requirements for properties of different sizes. After their repeal in 1980, house sizes decreased and there was a subsequent rise in housing density (Ravetz & Turkington, 1995). At the same time, urban (higher density) living became less and less popular, and the demand for suburban and semi-rural development ever greater. Criticisms of the style and location of new housing developed in England during the 1980s and 1990s, led directly to the Labour government's Urban Task Force, and its Urban Task Force report in 1999. Led by the architect Richard Rogers (Punter, 2011), the report argued that city centres should not only include high-density housing, but through design such housing could support the everyday needs of a socially diverse population (Urban Task Force, 1999). These ideas of compact city living (discussed in more detail in the next section) influenced housing policy, shifting the focus to higher (than current) density housing development in order to regenerate urban areas. Underlying this was a return to the unsubstantiated assumption that higher residential densities enhance social capital and reduce isolation (Design for London, 2007). The focus of this paper is the extent to which the compact city ideal contributes to equitable access to services and facilities, or residents' sense of community or safety or social networks and interaction – all defined here as contributing to social sustainability. This paper also forms one output from the CityForm: Sustainable Urban Form Consortium project, discussed in more detail below.

1.2. CityForm, the project and the research aims

This paper arises from research conducted as part of the '*City Form: Sustainable Urban Form Consortium*' (Grant No. GR/520529/0) which ran from 2003 to 2007 and was funded by the Engineering and Physical Sciences Research Council's (EPSRC) Sustainable Urban Environments (SUE) programme. The consortium was made up of researchers from the Oxford Institute for Sustainable Development at Oxford Brookes University; the Institute for Energy and Sustainable Development at De Montfort University; the Department of Animal and Plant Sciences at the University of Sheffield; the School of the Built Environment, Heriot-Watt University; and the Department of Civil Engineering at the University of Strathclyde.

The key research question addressed by CityForm was: **in what ways and to what extent does urban form contribute to sustainability?** The impetus behind the research was the lack of empirical evidence supporting the well-rehearsed claim that compact urban development is economically, socially and environmentally sustainable. To answer the central research question, the CityForm consortium measured and analysed the sustainability of different urban forms based on a number of economic, environmental and social criteria (Jenks & Jones, 2010). Different partners within the consortium examined and tested the claims that high-density, more compact and mixed-use urban forms are more: environmentally sound; socially beneficial; economically viable; and, efficient for transport (after Jenks, Burton, & Williams, 1996; Williams, Burton, & Jenks, 2000).

This paper reports on the work of the 'CityForm: Social' researchers who attempted to answer the question: **in what ways and to what extent does urban form contribute to social sustainability?** The aim of this part of the research was to look at the ways in which urban form – the layout, density, land uses, housing and building types and transport infrastructure – can contribute to meeting social sustainability objectives: good and equitable access to good-quality services and facilities, social interaction and social networks, feelings of safety, participation in organised activities, feelings of pride/sense of place attachment, and community stability (see Section 1.4 for more details). While the paper discusses urban form broadly, the main focus here is on density.

This paper is based on both qualitative and quantitative research conducted by the 'CityForm: Social' research group, based at Heriot-Watt University and Oxford Brookes University. The paper includes findings from a series of focus groups conducted in nine of the fifteen case study neighbourhoods studied by the CityForm consortium.

1.3. Research focus and paper structure

This paper focuses on the question: **to what extent do dimensions of social sustainability occur in neighbourhoods of differing densities?** Section 2 discusses the significant body of literature which focuses on (a) dimensions of social sustainability and (b) elements of urban form, including density. However, there is little existing research which examines the relationship between the two. This paper addresses this gap in knowledge by ascertaining the extent to which social sustainability occurs among residents of a number of UK neighbourhoods of varying residential densities.

Following this introductory section, Section 2 outlines the specific aspects of urban social sustainability under examination within the UK context. There is particular focus in the research on density, social equity, environmental equity, community sustainability and well-being. The claimed effects that density has on these latter factors will be discussed here, as will the implications that such claims have for policy and practice. The gap in knowledge – i.e. the lack of empirical evidence examining these claims – is also outlined here.

In Section 3, the overall methodological approach is discussed, with details provided on the measurement of density and urban form, as well as the quantitative and qualitative methods used to measure aspects of social

sustainability. This section ends with a brief description of the characteristics of the population and the sample in the fifteen case study neighbourhoods, and the accompanying selection and analysis process.

The findings from the analysis are presented in Section 4. The focus here is on the influence density may or may not have on three associated aspects of social sustainability: social equity – equitable access to services and facilities; environmental equity – good quality living environments for all residents; and other aspects of community and well-being. This section concludes with an overall discussion of the way in which density was associated with social sustainability in the different case study neighbourhoods.

The final section provides an opportunity to step back and examine how these findings fit more broadly into the 'compact city' debate, and how they address the gap in knowledge about urban social sustainability. In doing this, the section provides some exploration of the relevance of the 'compact city' model in the 21st century, and within the different contexts in which urban populations around the globe live. The paper concludes with reflections on wider sustainability policies and practice with some discussion (and accompanying caveats) regarding urban sustainability in developing countries, including India and Africa.

1.4. Defining social sustainability

Different research teams within the consortium examined and tested the claims that high-density, more compact and mixed-use urban forms are generally more sustainable than low-density, single use forms. While an overall definition of sustainability was sought and used for the purposes of the wider research project (Jenks & Jones, 2010), the research team also developed a definition of social sustainability. This definition focuses on social sustainability in urban neighbourhoods in the UK, and specifically highlights those aspects of social sustainability claimed to be influenced by the built environment at this scale. It is not appropriate to provide an exhaustive theoretical examination of social sustainability here as this has been critically discussed and debated elsewhere (Bramley, Dempsey, Power, Brown, & Watkins, 2009; Bramley, Brown, Dempsey, Power, & Watkins, 2010; Dempsey, Bramley, Power, & Brown, 2009). However, it is useful to outline what is meant by social sustainability in this paper.

Social sustainability has been described as a nebulous concept, a 'concept in chaos' (Vallance, Perkins, & Dixon, 2011) and that there is little

consensus on how it might be defined as it is argued to encompass a range of dimensions (Davidson, 2010). Nevertheless, for the purposes of the CityForm research, social sustainability was considered to be underpinned by two broad concepts: social equity and sustainability of community.

Social equity refers to a fair distribution of resources and an avoidance of exclusionary practices, allowing all residents to participate fully in society, socially, economically and politically (Pierson, 2002). It is closely related to environmental equity, which is also relevant to this research. In relation to the built environment, social equity means paying attention to the nature and extent of accessibility to services and facilities in a given area. While accessibility is a broad concept in its own right, here it can be narrowed down to measuring the number and range of services and facilities, job opportunities, education and decent housing on offer within the neighbourhood. Accessibility also includes the *means* of reaching such services and facilities, via the public transport, walking and cycling networks within the neighbourhood and further afield (Barton, 2000). Ascertaining which are the most useful services, facilities and opportunities for scrutiny is dependent on the dominant urban scale in the research. As the focus in CityForm was on the neighbourhood scale, some items (employment opportunities, hospitals, recreation and cultural facilities as well as secondary schools) were precluded because they require large populations to support them and are not normally provided at a neighbourhood scale. A range of researchers and commentators identify services and facilities which are normally provided in a neighbourhood, including regularly used 'key' services as identified in the Poverty and Social Exclusion Survey (Gordon et al., 2000) and other services used on a less regular basis (Barton, Davis, & Guise, 1995; Winter & Farthing, 1997). They are:

- doctor/GP surgery,
- post office,
- chemist,
- supermarket,
- bank/building society,
- corner shop,
- primary school,
- restaurant/café/takeaway,
- pub,
- library,
- sports/recreation facility,
- community centre,
- facility for children,
- public open/green space.

Sustainability of community relates to the ability of society itself, or its manifestation as local community, to sustain and reproduce itself at an acceptable level of functioning in terms of social organisation (Coleman, 1985) and the integration of individual social behaviour in a wider collective, social setting (Dempsey et al., 2009). In this way, sustainability of community involves a range of social behaviours: social interaction between residents in a neighbourhood; the existence of, and participation in, local formal and informal collective institutions; the relative stability of the community, both in terms of overall numbers of residents and its residential turnover; levels of trust across the community; and a positive sense of identification with, and pride in, the community (Forrest & Kearns, 2001). This corresponds to definitions of 'sustainable communities', which – in European policy terms – have been interpreted as being healthy, active, inclusive and safe places (ODPM, 2006), indicating the close relationship between the neighbourhood itself and the people living within it: the physical and the social (after Blackman, 2006; Jenks & Dempsey, 2007). While it is clear that there are communities that do not operate within spatial boundaries (e.g. online communities, communities of interest etc.), this paper is concerned with the socio-spatial focus of 'community'.

With focus on the collective aspects of social life, five inter-related dimensions of community sustainability are examined here:

- social interaction/social networks in the community,
- participation in collective groups and networks in the community,
- community stability,
- pride/sense of place attachment,
- safety and security.

These five dimensions of community sustainability and the services/facilities measuring access to services at the neighbourhood scale, all relate to collective aspects of everyday life which are claimed to be associated with features of the built environment (Bramley & Power, 2009). These relationships are explored in the next section.

Finally, it is worth noting that while neighbourhoods can be defined in various ways (see Jenks & Dempsey, 2007 for more discussion of this), for the purposes of this research administrative boundaries – Census output areas – were used to define all case study neighbourhoods.

2. Urban form and social sustainability in UK neighbourhoods

2.1. Density and sustainable urban form

The residential and building density of a place is frequently cited as an 'ingredient' of sustainable urban form alongside mix of land uses, configuration and layout, connectivity, housing form and design quality (Jenks & Jones, 2010; Shin, 2010). When applied to human settlements, density is a numerical measure of the number of people residing, or the extent of building development, in a given area (Cheng, 2010). It can be measured in a range of different ways (DETR, 1998; Forsyth, 2003). For example, residential density may be described as the number of dwellings, bedspaces or habitable rooms per hectare, acre or sq. km; while building density may be described via plot area, floor area ratio or ratio of open to built-up space. However, while density is a well-used and complex concept, there is no consensus on which definitions of density should be used, and nations and professions take different approaches (ibid.).

While density – as defined above – is a seemingly objective measure, one might conclude that the association between density, sustainability and sustainable urban form would be a benign one. However, this is not the case. Within the UK context, density can be one of the most contentious elements in the sustainable urban form models. This is mainly because it is 'high residential density' (as opposed to 'low density') which is considered to be an important attribute in definitions of sustainable urban form (DETR, 2000b; Urban Task Force, 1999). Underpinning this is the assumption that high residential density can bring benefits for residents; an under-researched claim. It is favourably cited by proponents of various urban form concepts, including the 'compact city', multiple intensive land use (MILU), urban villages (and millennium villages) and new urbanist developments among others (e.g. Lau, Wang, Giridharan, & Ganesan, 2005; Robbins, 2004; Thompson-Fawcett, 2000).

There is no agreement in UK policy on the recommended residential density for urban areas (and Section 1 has already highlighted some of the policy changes over the last century or so). While historical patterns of development in the post-war period have been fairly low (DETR, 1998), the Urban White Paper set minimum housing densities in urban areas at 30–50 dph (DETR, 2000a), although Planning Policy Statement 3: Housing was revised six years later to reduce this minimum to 30 dph (DCLG, 2006).

Furthermore, there is currently no mention of minimum residential density standards in the Coalition Government's draft National Planning Policy Framework, and it is unclear whether they will be included in the final version (DCLG, 2011). In practice however, development densities, particularly in city centres, have been much higher. For example, some recent developments have residential densities of between 95 dph (Homes for Change, Manchester) and 119 dph (Greenwich Millennium Village). Such densities have been argued to jeopardise good urban design and sustainable communities (Punter, 2011). The picture is confused, pointing to tensions between interpretations of density in policy and practice. This is exacerbated by the lack of existing evidence exploring how density manifests itself in different contexts and the impact it may have on aspects of sustainability and everyday life.

It is important to make a distinction between actual and perceived density, both in theory and in practice. Churchman discusses the difference between spatial and social density: the former describes the actual number of people in a given space, while the latter is 'created' by people in the space and both are experienced differently (1999). She succinctly describes perceived, or social, density as 'an individual's *perception and estimate* of the number of people present in a given area, the space available, and the organisation of that space' (ibid., p. 390, emphasis added). For example, when an individual considers density to be too high (regardless of the actual density), s/he may conclude that a space is (over-)crowded: this is the result of a subjective and qualitative assessment of how the relationship between people and the space they are in is perceived (Dave, 2010). Stokols (1976) argues that while high spatial density is not a necessary antecedent of over-crowding, it does provide sufficient conditions for it to occur. Over-crowding can lead to perceptions of a loss of privacy or its reduction to less than desirable levels (Altman, 1976). The sharing of limited physical space has been found to increase levels of individual stress and social withdrawal (Evans, Lepore, & Schroeder, 1996; Fleming, Baum, & Weiss, 1987). It has also been found to have a detrimental impact on children in large low-income households, who may suffer disproportionately from poorer mental health than children in households with no residential crowding (Evans, Saegert, & Harris, 2001). Other theorists argue that adaptation is required in such situations. Milgram (1970) describes a range of behaviours that individuals use to cope in environments where sensory overload prevails. This includes aloofness, impatience and social isolation (Stokols, 1976).

It has also been argued that such adaptations include accepting that privacy may not be achievable in particular environments, e.g. on public transport at rush hour or in busy shopping centres: although such acceptance should not be considered as a proxy for comfort (Proshansky, Itellson, & Rivlin, 1970). In this way, any discussion of density needs to acknowledge the context. This can help to understand fully the relationship between the physical form and the 'actual' and 'perceived' density (Stokols, 1976). For example, examining 'perceived' density must involve some understanding of the wider context, including the historical and political aspects. The UK provides a good worked example here. Section 1 outlines the widespread perception that cities of the industrial age were unsanitary and unhealthy places in which to live. It is arguably the case that many potential urban residents in the UK are deterred from considering the city (centre) or 'inner city' as a home because of such negative connotations. These connotations are unlikely to relate to the unsanitary state of today's cities – which are substantially cleaner than in the past – but instead focus on perceptions of noise, dirt and perhaps the anti-social activities said to take place there.

It is also clear that policy on residential densities, and actual housing densities on the ground, will vary according to culture as well as features of the land itself. The island of Hong Kong, for example, has extremely high residential densities (on average around 175 dph), made possible by widespread public acceptability and made necessary by the limited land available (Chan, 1999). However, it should be noted that housing markets and affordability may also influence the acceptability of high-density living for different household types. In Hong Kong there have been recent protests against high-density development and a widespread call for policymakers to consider reducing housing densities (Wong, 2010). While in the UK the danger of economic and social imbalance in some cities has been highlighted: high-density living may be associated with affluent professionals living in premium accommodation and poorer residents living in subsidised social housing (Bretherton & Pleace, 2008).

Returning to the argument that 'high-density' residential development is a component of sustainable urban form, it should be noted that there is no consensus that low-density housing is necessarily 'unsustainable'. The discussion above indicates that lower-density areas, in the UK, tend to provide more green and space open space than high-density ones (Burton, 2000), and in general may be preferable as living environments for potential residents (Breheny, 1997). It is argued by decentrists that low-density residential development is a key characteristic of high-quality neighbourhoods (Nicholson-Lord, 2003). This highlights the difficulty of dealing with the subjective nature of perceived density: high-density may be preferred by some households (for example smaller and younger) while others prefer lower-density living (families, older people). Recent research has suggested that living at high-density is a short-term choice, and that, over the long term, individual preferences are for low-density living (Howley, 2009; Howley, Scott, & Redmond, 2009; Vallance, Perkins, & Moore, 2005). This is at odds with recent urban policy (although what impact the coalition government will have on planning policy remains to be seen). As Neuman (2005) has pointed out in his discussion of the 'compact city fallacy' there is a disconnect between what is claimed to be sustainable and what people actually want. This disconnect is present in the UK and elsewhere in Europe demonstrating – Neuman argues – that there is no such thing as a sustainable city because what people want cannot truly adhere to principles of sustainability.

Having said all this, it is clear that, at a theoretical level at least, the environmental and demographic pressures on housing, green space and resources in general, demand higher than present densities (Jenks & Dempsey, 2005). Due to the dominance of sustainability theory in built environment literature, there is widespread support for increasing residential density in order to use land more efficiently (DETR, 2000b). High-density urban development is thus claimed to be more efficient and cost-effective than lower density development in terms of grey infrastructure provision (i.e. energy, roads, sanitation etc.), which potentially reduces pollution (Breheny, 1992; Burton, 2000) and promotes a more efficient public transport system and an urban layout which reduces the need for personal car transport (Williams, 2005). However, it does not seem to be possible to identify the threshold above which people find residential density unacceptable (Breheny, 1997), nor to identify how high densities should go in the UK.

This brief discussion highlights how 'density is a bit of a minefield' (Jenks & Dempsey, 2005, p. 293). It underlines a need to understand the way in which density is interpreted, both in theory and in practice, and its impact on the form and subsequent sustainability of a place. Within the UK context, the lack of consensus between theory, policy and practice arguably points to a requirement for residential densities to be examined on a case-by-case basis according to the policy in place at the time as well as the particulars of the place itself.

The way in which high-density is interpreted and the accompanying perceptions thereof thus have an important bearing on the extent to which a place is considered to be 'sustainable'. The theoretical underpinnings of this are explored in more detail later in this section.

It has already been pointed out that there is little consensus on how density as an element of sustainable urban form might be described. It is even less clear what effect density may have on specific aspects of sustainability. In an attempt to understand the definition of social sustainability provided in Section 1.4, the claimed impacts that density has on social equity are explored in more detail below.

2.2. The claimed effects of density on social equity

The concept of social equity has its foundations in social justice and 'fairness in the apportionment of resources' (Burton, 2000, p. 1970). As such it is embedded within definitions of sustainable development (Hopwood, Mellor, & O'Brien, 2005) in their focus on meeting the needs of present as well as future generations (Holden & Linnerud, 2007; WCED, 1987). Within the urban context, social equity can be described as the opposite of social and environmental exclusion: there should be no barriers to individuals participating fully in society. In a geographical sense, social exclusion may manifest itself as areas of deprivation, which may have reduced access to a range of public services and facilities for residents and poorer living environments than other areas (Brook Lyndhurst, 2004b; Macintyre, Maciver, & Sooman, 1993). The aim is therefore to equalise access to services and facilities across geographical areas, which has been described as horizontal equity (Kay, 2005). While it is necessary to take a global perspective to address sustainability effectively (Haughton, 1999), the local scale is critical in residents' everyday experience of the built environment (Dempsey et al., 2009).

It thus follows that accessibility is commonly seen as an effective measure of social equity (Barton, 2000; Burton, 2000). Related measures of the built environment include: location of key services and facilities; public transport routes; and, provision for walking and cycling – all of which affect the extent and nature of accessibility in a given place. At the same time, high-density areas are claimed – in literature and policy – to have social advantages. These advantages derive from the social equity afforded by having a range of key services and facilities, open space and employment opportunities within walking distance (Llewelyn-Davies, 2000; Urban Task Force, 1999), and a reduced need to travel by car (Burton, 2000). Higher residential densities are claimed to make services and facilities within access of a larger population economically viable, although Bramley and Power (2009) point out that this will depend on the nature of the service in question. Recent research conducted in London shows that in reality, the adequate range of services and facilities required to support the needs of communities (including older people and young children) 'is rarely established' and rather favours a transient population for whom compact city living is a temporary choice of lifestyle (Foord, 2010).

Furthermore, it should also be pointed out that the quality of the service/facility may also have an indirect impact that should be taken into account. It should not be assumed that because a service is present in a given area that it is necessarily used: this point will also be explored later on. Section 1.4 highlights the general agreement in the literature on those services and facilities to which residents should have good access. However, there is no consensus on the optimal distance at which such services should be provided for residential populations (Dempsey, 2008).

There are other physical and non-physical dimensions to the relationship between social equity and residential density. Residents in high-density neighbourhoods differ in two important ways from their lower-density counterparts: they live in much closer proximity to their neighbours and they are more likely to have to share built features and facilities (Easthope & Judd, 2010) such as open spaces and property maintenance services. These differences will be discussed throughout this paper.

The physical and non-physical dimensions also include the changing political context. For example, today there is widespread support for mixed tenure communities in an attempt to 'balance' communities in the UK: a direct reaction to the problems caused by the construction of segregated social housing in the 1970s (Allen, Camina, Casey, Coward, & Wood, 2005). This is in part linked to the socio-economic status of the population and its influence on the nature of the services and facilities that will be economically viable in a particular neighbourhood. For example, in neighbourhoods which have good schools, houses prices can rise by as much as 33%, reducing social equity; although such schools tend not to be located in inner-city areas (Bretherton & Pleace, 2008). In fact, families often perceive the standard of education in inner city areas as being poor, reinforcing their preference for settling in lower-density areas (ibid.). This, along with the

long-standing perception that in the UK high-density, inner-city areas are unsatisfactory places to live, can contribute to the physical manifestation of social exclusion: 'it costs more to live in nicer neighbourhoods. The poor do not choose to live in areas with higher crime rates and worse pollution: they cannot afford not to' (Cheshire, 2007, p. xi).

Perception of a neighbourhood's density can also affect residents' perceptions of crime in a given area: if residents feel unsafe, they may not feel able to use services and facilities, no matter how accessible they are otherwise (Talen, 2001). Research conducted in the north of England found that city centre users voiced concerns about their mobility and accessibility in and around the city centre, as well as worries about safety and comfort where there are many other users around (Pain & Townshend, 2002). This is countered by the widely accepted, but largely untested, claim that high-density neighbourhoods necessarily feel safer than lower density ones because they are under better surveillance as there are more people in the vicinity (Williams, Burton, & Jenks, 1996). Hillier and Sahbaz (2009) argue that misconceptions prevail about crime in high-density areas and that, for example, there is meagre support for the popular low-density cul-de-sac to be proposed as a low-crime housing form, particularly in relation to burglary rates. They claim that while there is conflicting evidence, it is actually a case of 'safety in numbers' which challenges the idea that 'small is somehow beautiful in designing well-working, low-risk communities' (ibid, p. 184).

Other examples of direct and indirect influences on equitable access in high-density neighbourhoods include: housing quality – which may have financial and health implications for residents; and, tenure and income – which may influence housing type and affordability (Easthope & Judd, 2010). Research has found that there are more instances of social withdrawal, isolation and depression among large families living in higher density areas, which may hinder their ability and propensity to make use of what may be very accessible services and facilities (Shelter, 2005).

2.3. The claimed effects of density on environmental equity

Environmental equity is closely linked to social equity. This is encapsulated in UK policy as *liveability* and can be described as the provision of good quality living environments for all residents (Brook Lyndhurst, 2004a). A report published by the then Office of the Deputy Prime Minister defined environmental equity as the combination of three *inter-linked* aspects (Brook Lyndhurst, 2004b, p. 4):

- environmental protection (e.g. air and water quality, waste, biodiversity, flooding);
- local place (i.e. 'liveable' neighbourhoods, quality of and access to public space); and
- access to environmental 'goods' (e.g. food, shelter, transport, justice and nature).

Lack of environmental equity results in environmental exclusion (ibid.), which is often the case in deprived neighbourhoods. For example, Hastings, Flint, Mckenzie, and Mills (2005) found that poorer neighbourhoods tend to experience more environmental problems – graffiti, fly-tipping, litter and poorly maintained green and open spaces – than more affluent ones. The researchers attributed this in part to higher population densities, particularly children, in the more deprived neighbourhoods, which result in more everyday use, wear and tear. The design and nature of the built environment was also an important factor, which they described as 'difficult to manage': in higher-density areas, there is a prevalence of large, shared open and green spaces, over which residents were not able to exercise control, maintenance or management (ibid.). Kearney acknowledges the important of urban design and layout (also Raman, 2010), suggesting that shared outdoor space should have convenient access points, with nature areas and amenities providing opportunities for biodiversity, social interaction and views over the green space for those who may not be able, or want, to use it (Kearney, 2006, p. 136).

These environmental issues link directly to perceptions of safety often associated with neighbourhood maintenance and management. For example, Woolley (2002) conducted research into open spaces finding that aspects similar to those highlighted by Hastings et al., and including fears for personal safety and dog mess, hindered people from using such spaces. A space which is not well-maintained may put off potential users of green areas and parks because it suggests that 'nobody cares' (Worpole, 2003). This in turn affects people's feelings of safety and levels of crime: the 'broken window' theory, which posits that cosmetic damage such as graffiti and litter in a space can 'invite more serious anti-social or even criminal behaviour' (Wilson and Kelling, 1982, cited in Nash & Christie, 2003, p. 47). Thus it is not necessarily the physical environment alone which makes potential users uneasy in a space: other users and their behaviour are also important in determining how safe people feel in green space

(Shoreditch Trust & OISD, 2009). Other research has shown that significant numbers of people would feel safer in parks and green spaces if they were staffed (Mornement, 2005).

The link between neighbourhood environment and social equity is also made clear in policy and practice which claims that high-quality environments are socially beneficial places (Dempsey, 2008). Concern with the quality of living environments dates back to the industrial revolution when Victorian social reformers and philanthropists actively sought to improve the living conditions of workers housed in slum dwellings in the rapidly growing urban areas (Cowan, 1997). Such concerns about improving the quality of living environments continue to be voiced today, particularly in high-density areas, where a perception arguably persists that construction and design quality is poor. This perception may be linked to research dating back to the 1970–1980s when the living conditions of high-density social housing dwellers were closely examined (and discussed earlier in Section 1).

Liveability policies address these concerns by focusing on the everyday perceptions and uses of the local environment, and the extent to which that environment supports individual and collective needs (Stevens, 2009). Like other area-based policies, liveability acknowledges the part that the physical environment plays in day-to-day life and its contribution to perceptions of satisfaction, safety, sense of place and community (Dempsey, 2009), illustrating the close links with sustainability of community (discussed in the next section). This notion of environmental equity also puts focus on equitable provision of access to green and open space. Aligned with the broader concepts of *sustainability* and *liveability*, this has its underpinnings in *ecosystem services*. Ecosystem services were defined by the Millennium Ecosystem Assessment (MEA) as: the human benefits obtained from ecosystems. Such benefits include the provision of food and water, regulating floods and land degradation, and – of particular relevance in this discussion – cultural services which encompass non-material benefits derived from the natural environment including recreational, aesthetic and a sense of place (MEA, 2005). The MEA provides the conceptual framework within which a long-established and growing body of research examines the influence of green and open space on individual and collective health and well-being (e.g. Newton, 2007; Ward Thompson, in press).

When one considers the location and accessibility of green space within a high-density neighbourhood, generally speaking, parks and green spaces in city centres tend to be smaller than those in lower-density areas and may often be unfenced or walled to maximise a sense of space. There are of course examples of large city centre parks including Central Park (New York), Hyde Park (London) and Holyrood Park (Edinburgh). There will also tend to be a higher ratio of built (or hard) space to green space in higher-density neighbourhoods, which will have an impact on the extent of greenery in the space and an effect on the wildlife supported in such an area (Wong & Chen, 2010). A further concern for environmental equity is the financial implication that proximity to parks and green areas may have for residents. It has been shown that proximity to parks and green areas has a positive effect on house prices (Choumert & Salanié, 2008). However, the financial value of urban green space is often under-estimated. For example, most UK councils currently estimate the value of their parks at just £1, which can influence the extent of investment in management of such green spaces (Cabe Space, 2009).

Having access to green space is beneficial for one's health, and was one of the drivers behind the creation of parks in 19th century high-density industrial urban settings (Conway, 1991; Renne & Bennett, 2010): to give people respite from unsanitary living and working conditions (Grahn & Stigsdotter, 2003). There has been considerable recent focus on the importance of access for residents and users to ecologically rich spaces in the urban environment, and these 19th century ideas have been revived (Woolley, 2003). A growing body of research shows that spending time in green space can have a beneficial effect on health and well-being (Hartig, 2008). These include having a place to reduce one's stress levels (Hartig, Evans, Jamner, Davis, & Garling, 2003), take time out from daily pressures and clear one's head (Kaplan & Kaplan, 1989), and improve recovery from illness when exposed to green space – be it physical access, or a view of such space (Kaplan, Kaplan, & Ryan, 1998; Ulrich, 1979). Recent experimental research shows that exercising with views of green rather than built-up space can reduce blood pressure and improve self-esteem (Pretty, Peacock, Sellens, & Griffin, 2005). Living in areas with green environments has also been found to be related to health in more general terms: populations exposed to the greenest environments have the lowest levels of health inequality related to income deprivation (Mitchell & Popham, 2008). The resurgent interest in ecologically rich urban green space has resulted in increased numbers of allotment tenants, the creation of community gardens and the active creation of green spaces through 'guerrilla gardening' (Jones & Mean, 2010).

This stems from the ongoing debate on the need for greening any 'left-over' or residual urban space which serves no clear purpose as transformative spaces which may previously have had no greenery. This creation/ insertion of open space, grass and trees may also contribute to decreasing perceptions of crowding and density (Coley, Kuo, & Sullivan, 1997, after Rapoport, 1975). The need for wilder landscapes in the urban context is also a current topic of debate in landscape design: there are increasing calls for a move away from the ever popular tamed landscapes first designed by Capability Brown, to wilder 21st century landscapes such as wildflower meadows. The design of such landscapes in urban areas, which maximise orientation and views of natural spaces, may also help make higher density development 'more acceptable' (Kearney, 2006, p. 136, after Churchman, 1999).

2.4. The claimed effects of density on sustainability of community/human well-being

As highlighted earlier, there are a number of inter-related concepts which make up sustainability of community: social interaction and networks, participation in groups and networks, community stability, sense of place and safety. Other associated aspects include resident satisfaction which will also be discussed here. This section does not attempt to disentangle these concepts from one another but rather acknowledges their inter-connectedness, which is reflected in existing theory and research.

Positive social interaction is said to be supported and actively encouraged in high-density, mixed use residential living (Talen, 1999; Young & Willmott, 1957). There is a claimed increase in opportunities for social interaction and sense of community (Calthorpe, 1993; Frey, 1999), which is attributed to the number of residents living in the neighbourhood using local services and facilities. The claimed associations between density, social interaction and sense of community are related to the particular mix of services and facilities in a given neighbourhood, supporting a given population, which are argued to contribute positively to the sense of community in that area. This idea is based on the premise that larger populations contribute to a socially cohesive mix of people who are brought together by the services and facilities they need and use in the neighbourhood, which in itself instils collective pride and a strong sense of community (CPRE & The Civic Trust, 1998).

The underpinning theory here is one of spatial determinism: 'that resident interaction and sense of

community are cultivated via the organising power of space' (Talen, 1999, p. 1364). However, others question the association between social contact and the physical environment, arguing that high residential density reduces social interaction and increases social disintegration (the polar opposite of the former) because of crowding (Churchman, 1999). This viewpoint is based on a negative perception of density, where the subjective sensory experience in the built environment is one of overload and there is conflict between the number of people in a given area and the comfort level of the perceiver (Rapoport, 1975). Linked to this is the idea of isolation, which was particularly supported by the Chicago School of urban ecology and is to some extent still popular (Fischer, 1982; Pacione, 2001). Here there is an incongruence between perceptions of density and one's pre-determined ideal (ibid.), where 'people are independent of, and anonymous to, their neighbours...[which] is all part of the general anomie...of urban life' (Fischer, 1976, p. 113). This anomie and anonymity stems from the claimed propensity of higher-density urban dwellers to engage in weak social ties such as acknowledging and greeting other residents (after Granovetter, 1973; Talen, 1999). Wirth (1938) considered how strangers connect with one another in cities, observing that while often face-to-face, such communication is based on secondary, not primary, contacts and are detached, impersonal, transitory and superficial. Milgram (1970) attributes this to adaptive responses to sensory overload, which can manifest themselves as lack of eye contact and an 'unfriendly countenance' to discourage social contact. However, current research neither fully supports nor refutes the claimed associations between high residential density and social interaction. For example, US research conducted in the 1980s found that the more urban the settlement, the more likely respondents were to have engaged in a variety of socially interactive activities (Fischer, 1982). This supports the largely untested New Urbanist doctrine that increasing density in small neighbourhoods can promote more face-to-face social interaction and – by default – a sense of community; bringing more people closer together and creating stronger social cohesion (Talen, 1999). It is also argued that perceived safety increases with density, because of the natural surveillance offered by more sets of 'eyes on the street' (Jacobs, 1961). However this is refuted elsewhere where it is pointed out that crime is higher in higher density areas where a sense of anonymity and detachment from activity outside one's own dwelling may dominate (Newman, 1972 [1995]). Furthermore, overall levels of all crime will intuitively be higher in

higher-density settlements because of the sheer numbers of residents. This is turn contributes to perceptions of lack of safety in such urbanised areas.

Sense of place has been argued to be affected by density in terms of how it impinges on the appearance and aesthetics of the physical environment (Bramley et al., 2010). While the nature of the association may be positive and negative as there are examples of both aesthetically poor development in low- and high-density settlements, there has been continued focus on the importance of design in higher density areas in the UK as one way of attracting potential residents (Urban Task Force, 1999). It has been found that the physical form that high-density development takes can have a direct impact on the sense of identity that residents have in a place, particularly as residents are less able to personalise their dwellings (Coleman, 1985). For example, the design of high-density development can also influence the level of crime in an area: Newman found that poorly designed buildings had crime rates of up to three times higher than adjacent buildings with socially comparable residents and similar densities (Newman, 1972 [1995]).

One of the difficulties with attempting to reconcile the idea that the physical environment affects sense of community is the underlying assumption that 'community' is an inherently good thing. Clearly there may be a negative aspect to the promotion of homogeneity and exclusivity within communities (Talen, 2001). It is unclear in theory and policy at what point (if any) social cohesion can become too strong, and might manifest itself as a divided, closed or inward-looking community (Dempsey, 2009). There is a considerable literature discussing good, successful or sustainable communities. This literature supports the 'community lost' theory which claims that communities and neighbourhoods today no longer have the same sense of community or social engagement commonplace in a bygone – but unspecified – era (Pahl, 1991). It can however be argued that of the inter-related concepts which underpin sustainability of community, there is only one which must be inherently positive for 'community' (as dominant accounts define it) to exist (Dempsey, 2009). This is the concept of safety. It is argued that people 'hate to feel unsafe or to live in an unsafe place' and want reassurance that they have nothing to fear from their neighbours (Shaftoe, 2000, p. 231).

It can be useful to consider satisfaction with one's neighbourhood at this point and the association it may have with residential density. Dissatisfaction may be expressed by residents in high-density areas due to dwelling size and unacceptable noise levels from neighbours (Easthope & Judd, 2010; Lindsay, Williams,

& Dair, 2010). In an analysis of the Survey of English Housing (2002/03), dissatisfaction with where one lives (both in terms of the area and individual dwelling) was found to be higher for residents living in higher density areas and particularly those living in flats and terraced houses (Mohan & Twigg, 2007). It is clear that dwelling type has an important impact on the density of a place, which Raman argues is also associated with urban design and layout (Raman, 2010). His research shows that density is not as significant as design and layout in supporting or hindering social interaction: a well-designed high-density area does not necessarily have to feel like it is high-density (Bretherton & Pleace, 2008). Research into the impacts of density on perceptions of privacy reaches a similar conclusion: specific design features, which relate to density as they are specifically dependent on overall dwelling layout, plot size and dwelling size at the individual dwelling scale, are found to be significant predictors of privacy (Lindsay et al., 2010). This was also found in ''high-density'' residential neighbourhoods in Vancouver (20–44 dph) where the design, physical configuration of buildings and also dwelling type (where there is ground-level direct entry access) contribute to positive social interaction at ground level (MacDonald, 2005). Research by Festinger et al. found that friendship formation (among postgraduate students living on campus) was more likely to occur between those who lived closest to one another and was also influenced by the building orientation (Festinger, Schacter, & Black, 1950). While this shows the importance of local context, research elsewhere has shown that perceptions of crowding are associated with negative neighbourhood satisfaction (Churchman, 1999; Kearney, 2006). Fischer (1982) found that there were influences, other than settlement density, with an influence on social interaction (and associated concepts) including personal circumstances and propensity to engage in social activity. This is supported by Raman (2010) who found that in neighbourhoods in London and Oxford, while social interaction and networks were influenced to some extent by settlement density, the urban design and layout of neighbourhoods were also significant predictors of the strength and nature of social activity. This illustrates the importance of local context and socio-demographic composition of residents as an influence on the nature of social interaction in high-density neighbourhoods (Bretherton & Pleace, 2008).

2.5. Conclusions

Section 1 has sought to provide a broad overview of the concept of density and the associations it is claimed

to have with social equity, environmental equity and sustainability of community. The discussion shows that density is a complex concept which goes far beyond simply measuring how built-up a place is or the number of residents in an area. While there is a lack of consensus on how dense 'high-density' is and the extent to which high-density is in itself sustainable, it is clear that policy interpretations of sustainable urban environments continue to promote high-density development. UK policy and practice are based on the idea that sustainable communities are achievable (in part) through a dense urban living environment. However, the overview provided in this section shows that the different theoretical accounts, alongside a growing body of empirical evidence, do not necessarily support this idea. For example, while it is widely accepted that high-density neighbourhoods are socially equitable because they offer good access to a range of services and facilities, there may be other important factors that adversely affect this level of access, such as political context and the perceived quality of a particular service or facility. The importance of quality also relates to environmental equity and the provision of good quality living environments. Neighbourhood quality is perceived to be worse in high-density areas, highlighting the significance of, for example, management and maintenance issues. The remainder of this paper will provide empirical evidence based in the UK which examines the importance of density for social, environmental equity and sustainability of community.

3. Measuring urban form and sustainability in UK cities

3.1. Introduction

This section outlines the research approach taken by the CityForm team to measure density and its relationships with social equity, environmental equity and sustainability of community. The overall methodological approach is outlined and the indicators used to measure the specific concepts are set out and discussed. This is followed by a presentation of the sites selected for the study. Fifteen study sites were selected in the five UK cities of Edinburgh, Glasgow, Leicester, Oxford and Sheffield. Of these, nine study sites in four of the cities were selected for the qualitative primary research.

3.2. Overall methodological approach

To answer the research question – in what ways and to what extent does urban form contribute to sustainability? – the CityForm consortium conducted a large-scale cross-sectional investigation, employing a multi-method approach using a variety of datasets and both qualitative and quantitative research methods. Following an extensive literature review, the identified elements of urban form and dimensions of transport, economic, social and environmental sustainability were translated into sets of measurable indicators. These are qualitative or quantitative measures of the issue in question, e.g. dwellings per hectare, and percentage of residents satisfied with their neighbourhood as a place to live. Indicators like these are frequently used in social science and built environment research, practice and policy, and allowed the CityForm researchers to make assessments with limited and representative information (Bryman, 2004). Pragmatism plays a major role in selecting indicators (Burton, 2002; Green & Champion, 1991), with issues such as data availability, time and resource constraints affecting the researchers choice. Existing data sets do not always capture the exact topics of interest, and large-scale data collection is both expensive and time-consuming. In addition, geographical specification and coverage, time-series prospects and up-to-dateness are also important. Setting aside these practical considerations, potential indicators can be assessed according to different criteria (Coombes & Wong, 1994). These authors advise considering ease of implementation and – finally – how those indicators are to be interpreted (ibid.).

The indicators used here were adopted (and adapted) from a number of sources: secondary national datasets (e.g. 2001 Census); local authority datasets (e.g. transport and land use data); map data; and primary data collected at the neighbourhood scale. These more localised data instruments include biodiversity assessments, energy use modelling, land market assessments and focus groups (for more information, see Jenks & Jones, 2010). Two research instruments were employed in all fifteen case study sites: a site survey and a household questionnaire survey. The site survey was used to collect primary objective data about elements of urban form (e.g. building types and heights, land use mix) as this is not available in existing datasets.

While there will be some reference to the site survey data in this paper, a more exhaustive discussion of the indicators and their subsequent analysis can be found elsewhere (Bramley et al., 2009; Dempsey et al., 2010). The focus of the remainder of this paper is on findings from the household questionnaire survey and focus groups.

3.2.1. The sample and the case study neighbourhoods

A total of fifteen case study neighbourhoods, made up of at least 2000 households each, were selected across the five cities of Edinburgh, Glasgow, Leicester, Oxford and Sheffield. The neighbourhoods chosen were selected to be representative of key urban forms in:

- the suburbs (referred to as 'outer' case study neighbourhoods in this paper),
- intermediate or 'in-between' areas (referred to as 'intermediate'),
- part of the city centre/inner-city area (referred to as 'centre').

Each case study neighbourhood has a mix of urban layouts, housing types, land uses, residential densities and a public transport route of some kind within its boundaries. These criteria ensured that a number of elements of urban form and their potential effects on aspects of sustainability could be measured and analysed. Table 3.1 shows a selection of urban form characteristics for each of the study areas, taken from the 2001 Census database (numbers are rounded). More detailed information about the neighbourhoods and their characteristics is set out in Jenks and Jones (2010).

Table 3.1 shows that the density of the case studies, here measured by dwellings per hectare, tends to be higher – on average – in city-centre areas than in others, while the proportion of dwellings which are detached and semi-detached tends to be higher in outer case study neighbourhoods. As one would expect, the table also shows that the proportion of flats tends to be highest in city-centre areas.

Some of the characteristics of the total population sampled can be seen in Table 3.2, also broken down by case study neighbourhood. This shows that for each city, higher proportions of 16–24 year olds (and 25–34 year olds in the Scottish cities) live in city centres, while larger proportions of people aged 60+ live in outer and intermediate areas. Data were collected for a longer list of demographic indicators including ethnicity but for brevity, these results are not presented here.

Table 3.3 shows that the majority of the case study neighbourhood populations have high proportions of one-person households without dependent children (over 60% in Leicester and Glasgow centres). Within each city, higher proportions of one and two-parent families with dependent children tend to live in the outer case study neighbourhoods, while higher proportions of 'other' households, including multiple occupancy, are found in the city centres of each city, and the intermediate case study neighbourhoods of the 3 English cities studied.

3.2.2. The household questionnaire survey

The CityForm household survey was a sample-based, postal self-completion questionnaire carried out in the fifteen case study neighbourhoods to collect a range of objective and subjective data from residents. The survey served several purposes within the CityForm Consortium's core research programme:

Table 3.1

Housing characteristics by case study neighbourhood (net density calculated by CityForm and housing types from 2001 Census data).

Study area	Net density (dwellings per ha)	% of housing types			
		Detached	Semi-detached	Terraced	Flat
Edinburgh centre	271	1	1	5	93
Edinburgh intermediate	70	8	16	15	61
Edinburgh outer	27	32	34	11	22
Glasgow centre	226	1	1	4	94
Glasgow intermediate	68	8	6	2	83
Glasgow outer	46	13	42	17	28
Leicester centre	127	0	4	11	82
Leicester intermediate	80	3	16	62	18
Leicester outer	25	28	62	4	6
Oxford centre	84	2	4	37	56
Oxford intermediate	81	3	15	42	38
Oxford outer	63	4	27	43	26
Sheffield centre	117	3	12	14	11
Sheffield intermediate	59	10	20	55	15
Sheffield outer	27	30	51	4	15

Table 3.2
Age groupings of case study neighbourhood populations from Census data (%).

Study area	16–24	25–34	35–49	50–59	60–69	70+
Edinburgh centre	23	34	18	6	6	6
Edinburgh intermediate	8	16	21	12	10	14
Edinburgh outer	12	9	22	14	12	15
Glasgow centre	24	37	16	8	6	5
Glasgow intermediate	13	16	22	8	6	9
Glasgow outer	12	18	27	8	5	6
Leicester centre	47	23	13	5	4	4
Leicester intermediate	25	24	17	8	6	9
Leicester outer	9	12	23	13	10	13
Oxford centre	43	19	13	6	4	6
Oxford intermediate	21	22	18	11	6	9
Oxford outer	11	18	21	9	7	7
Sheffield centre	33	18	14	7	6	9
Sheffield intermediate	21	22	19	9	7	8
Sheffield outer	8	8	22	16	12	15

- to supplement the demographic and social profile of the case study neighbourhoods obtained from the 2001 Census;
- to ask a representative cross-section of the populations in all the case study neighbourhoods a number of key questions relating to most elements under scrutiny in the research (e.g. attitudes to housing development; wildlife, gardens and use of open space; travel to work; satisfaction with home); and
- to ask more detailed questions which relate to the agenda of the 'social sustainability' project (e.g. specific questions on the use of local services,

social interaction, feelings of attachment to the neighbourhood, community engagement and safety).

A household survey was selected because residents were considered to be the most important source of evidence concerning the social sustainability of the urban forms under examination (Bramley et al., 2009). The survey was administered by post (with two reminders) to 12,000 households in the fifteen case study neighbourhoods and achieved a response rate of 37% (with 4381 valid returned surveys).

Table 3.3
Household composition of case study neighbourhood populations (% – 2001 Census data).

Study area	1 pers hhold (no dep kids)	2 pers hhold (no dep kids)	1 pers hhold (dep kids)	2 pers hhold (dep kids)	Other hholds
Edinburgh centre	57	5	5	19	14
Edinburgh intermediate	44	8	15	29	4
Edinburgh outer	29	3	23	43	2
Glasgow centre	61	2	2	19	16
Glasgow intermediate	30	6	32	27	5
Glasgow outer	31	12	29	27	1
Leicester centre	69	1	2	12	16
Leicester intermediate	42	4	12	26	16
Leicester outer	27	5	29	38	1
Oxford centre	49	5	11	21	14
Oxford intermediate	42	5	14	24	15
Oxford outer	33	17	21	26	3
Sheffield centre	54	6	9	16	15
Sheffield intermediate	35	6	14	30	15
Sheffield outer	28	3	26	41	2

When designing the questionnaire, use was made of existing national and local surveys measuring related topics. This not only means that 'tried and tested' questions were used in the CityForm survey, but also allowed for benchmarking of the survey results. As social sustainability is defined as a multi-dimensional concept, clusters of questions were used to measure both social equity and sustainability of community. The responses were then grouped together in composite social outcome measures which were considered for their logical/linguistic interpretation, or 'face validity' (Bryman, 2004) and patterns of correlations between the responses across our sample. A range of statistical techniques were used to analyse the survey data including multiple regression modelling. Detailed discussion of this is provided elsewhere (Bramley et al., 2009, 2010), but some of this analysis is reported here.

3.2.3. Focus groups and sampling strategy

The focus group was chosen as a 'follow-up' qualitative data collection method to complement – and enrich – data collected in the household questionnaire survey. The aim of the focus groups was therefore to build up a clearer picture of how people use their local environment and to get a sense of what this environment means to them. The focus group thus explores the nature of the relationships that have emerged from the household survey findings. In this way, these two research methods (questionnaire and focus group) complement one another and allow for triangulation (Miles & Huberman, 1994).

The focus group is described as a way of interviewing a group of people which has an emphasis on a particular 'fairly tightly defined' topic with 'accent…upon interaction within the group and the joint construction of meaning' (Bryman, 2004, p. 337). It is described elsewhere as 'a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment (Krueger, 1994, p. 6). Thus the focus group allows researchers to tap into the shared experiences residents have of their neighbourhood and to explore how they use it. The emphasis on shared experiences means that it is usual for focus groups to aim for participants with similar characteristics. As a result, three household groups or types were identified for these focus groups: 'family' households (defined as single and two-parent households with children under 16), 'younger' households with no dependent children (aged 16–45), and 'older' households with no dependent children (aged 45 and over). It was originally planned for the 'older' age group to consist of

participants aged 65 and over. However, the sample structure of, and the responses received from, this particular age group did not provide sufficient numbers of focus group participants, and the age-range was subsequently widened.

Focus groups normally have between six and twelve participants, while the optimum number may differ according to the people involved (Bloor, Frankland, Thomas, & Robson, 2001). As the questions posed were not of a sensitive nature and concentrated on everyday activities experienced by any resident in a given neighbourhood, focus groups were considered preferable to individual interviews (Bryman, 2004). Like other methods of qualitative data collection, focus groups can be influenced by 'self-selection', where the sample may be skewed because participants may be particularly active in the community, involved in local activities and therefore more likely than others to take part in a focus group about their neighbourhood. This phenomenon is impossible to control for, but the use of incentives is a common device to attract people who may not have the propensity to participate in such an activity (Corti, 1993). Furthermore, the method of sampling employed can, at the very least, target a random selection of potential participants, offering them the same opportunity as the next randomly sampled resident to take part. Krueger (1998, p. 21) advises that the focus groups should be 'guided by the research plan' and that different groups of participants might be selected 'to facilitate comparison'.

The research team employed a two-pronged selection process to select focus group participants based on neighbourhood location (centre, intermediate and surburban) and household type (family, younger, older). The focus groups were thus devised to correspond with each cell in the resulting 3×3 matrix. Thus three focus groups were held with each household type: one in an inner location, one in an intermediate location and one in an outer area. Nine focus groups were conducted in all, as follows: Glasgow centre (older); Glasgow intermediate (younger); Edinburgh centre (younger); Edinburgh intermediate (older); Edinburgh outer (families); Oxford centre (younger); Oxford outer (families); Sheffield intermediate (families) and Sheffield outer (older).

The focus group participants were targeted from a larger sample which responded to the CityForm household questionnaire survey. Using the SPSS statistical software package, those household types listed above (family, younger, older) were identified and invitations sent to the identified households. It therefore should be stated that there is some selection bias

inherent in this two-stage sampling process (Bryman, 2004). This sample is therefore biased towards respondents with what might be described as more civic concern than others because they already responded to the household questionnaire and then agreed to give up more time to participate in the focus group (after Groves & Couper, 1998; Laurie, 2006).

3.2.4. Practical considerations of conducting focus groups

A number of different methods were considered for use in the follow-up data collection exercise. These include face-to-face semi-structured interviews, telephone interviews as well as the chosen method, focus groups. The main reason for adopting the focus group over other methods was the nature of the questions to be asked and the data to be collected. Crudely put, the questionnaire asks respondents *what* they do in the neighbourhood, while the focus group asks *why* they behave in such a way and *how* they feel while in the neighbourhood. As the research team aimed to uncover the factors which influenced decisions, behaviours, feelings and attitudes in everyday neighbourhood life, the focus group was considered suitable to generate discussion on collective experiences in relation to aspects of the participants' neighbourhood.

There are practical limitations to be borne in mind when using the focus group as a qualitative data collection method (Bryman, 2004; Krueger, 1994). Organising focus groups can involve contacting a large number of residents, providing incentives to induce participation. The discussion should be both led and – where necessary – controlled, by the researcher, as it may often fall into the control of the participants. This can be useful (e.g. bringing topics to light that the researcher may have been ignorant of), but can also result in irrelevant digressions in the discussion. Having more than one researcher present is critical when carrying out focus groups, particularly in larger focus groups, where multiple conversations may go on at one time. There is also the potential problem of group effects, which was touched on earlier, where some participants may be more dominant and forceful in verbalising their opinions and others may not want to contribute to the discussion (Bryman, 2004). Where this is the case, the researcher must ensure that all participants have adequate opportunity to talk freely and air their opinions. However, it may not be possible to induce all participants to contribute to a discussion if they feel uncomfortable with other group members.

3.2.5. Analysis of focus group data

The focus groups were recorded and fully transcribed for analysis, with additional long-hand notes taken for back-up and cross-checking. This created a huge amount of data analysed using content analysis, including coding, counting phenomena, and comparing and contrasting relations between variables (Coffey & Atkinson, 1996, p. 47, Bryman, 2004). Coding data and counting phenomena as they occur in the data are objective and systematic techniques aimed at minimising the researcher's personal biases in the research process. However, it is clear that some interpretation is involved in the process. Content analysis is argued to be 'firmly rooted in the quantitative research strategy' as its 'aim is to produce quantitative accounts of the raw material in terms of the categories specified in the rules' (Berelson, 1952, paraphrased in Bryman, 2004).

Coding permits the organisation and reduction of transcribed interview data into different code categories, modified as and when necessary throughout the process, with care taken to code consistently without losing the original meaning and sense of the data (Coffey & Atkinson, 1996). The finalised categories may then appear to fall into similar groupings or consist of further sub-categories to be organised by the researcher (Pole & Lampard, 2002). Data coding is based on 'grounded theory', which is, in essence, 'the discovery of theory from the data' (ibid., p. 200, Glaser & Strauss, 1967). In the following sections, findings from the questionnaire survey, by density and demographic group, will be used to contextualise (and triangulate) the focus group findings in relation to specific aspects of social sustainability.

4. Findings: does density influence aspects of everyday life?

4.1. Introduction

This section reports on findings from the household questionnaire survey and the focus groups, with an emphasis on the latter. To explore the relationship that density has with aspects of everyday life, data are analysed according to the simple density typology (centre, intermediate, outer) established earlier on and based on proximity to the urban centre. This section begins with an examination of the relationship between density and social equity: that is, access to services and facilities. The qualitative data analysis permitted an exploration of influences other than density on *social* equity. This is followed by a critical discussion of the findings relating to how density influences *environmental* equity. After this, the impact

of density on the sustainability of community is explored, focusing on the different dimensions including safety and community spirit. The section concludes with the presentation of integrated findings in an attempt to provide data on the cumulative effect of density on social sustainability.

4.2. The influence of density on social equity

The broad research questions in relation to this aspect of social sustainability were:

- What is the relationship between physical form and use of services and facilities?
- What issues influence people's perceptions/use of particular services and facilities?

Services – for the purposes of this research – comprise supermarket, food shop, corner shop, post office, doctor's surgery, chemist, bank and building society, restaurant/takeaway/café, recreational facilities, library and pub among others. It was not considered appropriate to ask participants to discuss a long and exhaustive list of questions about services and their usage of each one in turn. The focus group discussion thus began by questioning participants about their use of supermarkets, followed by questions on their use of services in the 'high street' or local shops in general. Analysis of the household survey – including multiple regression analysis – showed that significant differences were found in the frequency of use of services by respondents in centre, intermediate and outer case study neighbourhoods ($p < 0.001$). Fig. 4.1 shows the overall mean frequency scores measuring the overall use of services and facilities (used at least once a month) by location and selected socio-demographic group.

The average score for residents' use of services and facilities in the local neighbourhood is higher overall in the centre case study neighbourhoods than intermediate

and outer areas respectively. In terms of the average frequency of use by the different socio-demographic groups, families scored higher than other household types; older childless households scored lowest. The 'other' household category refers to multi-person households – three or more adults – and household types not already described above.

4.2.1. Supermarkets

The household survey findings showed that, on average, almost 70% of residents in the sample reported using supermarkets in their local area at least once a week (Table 4.1). This figure was higher for residents in the centre case study neighbourhoods (76%) than those residents in intermediate (67%) and outer case study neighbourhoods (66%). Almost 10% of the total sample stated that the question was not applicable, suggesting that, according to those respondents, there is no supermarket within their neighbourhoods, or if there was, they did not use it. It is not appropriate to embark on a full discussion about the differences between subjective and objectively defined neighbourhoods (as this has already been examined by Jenks & Dempsey, 2007). However, these findings give some indication of the difficulties inherent in examining a concept as nebulous and open to interpretation as 'neighbourhood'.

Analysis of the focus groups reveals that different aspects of the physical environment have varying levels of influence on participants' choice and use of services. Supermarket location was often raised as an important point in the discussions, particularly in relation to home, the neighbourhood and the workplace. A number of centre respondents remarked about their close proximity to supermarkets:

Female: I would go to [supermarket] for my main shop...which is just over the way on [...] Road, yeah, and it's so it's literally, it's once a week because that's as much as I can carry.
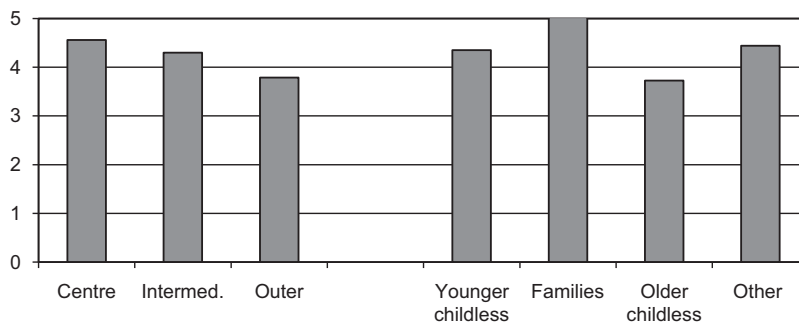

Fig. 4.1. Mean frequency of use of services/facilities in the local neighbourhood, by case study type and specific user group.

Table 4.1
Frequency of use of supermarkets in the neighbourhood (% of sample).

Frequency of use	Centre	Intermed.	Outer	All
Most days	25	17	16	19
At least once a week	51	50	50	50
At least once a month	7	10	8	9
Occasionally	5	9	8	7
N/A	7	7	11	9

Edinburgh centre

This does not however indicate that residents necessarily use the supermarket located closest to home. Some residents in the Oxford and Glasgow centres did not use the supermarkets in their neighbourhood for various reasons. These include combining shopping trips with visits to family living outside the neighbourhood; visiting the supermarket on the way home from work; and, simply choosing to shop at a supermarket further away from home.

For older residents, there was some variation in supermarket use within and outside the neighbourhoods. Most of the (older) respondents in the Sheffield outer and Glasgow centre case study neighbourhoods reported travelling by car to do their shopping, mainly at supermarkets outside the neighbourhood:

> **Female 1**: I think with me it's just that you can get lots of things under one roof, although I do think we should support the local shops as well, which I do, but I think it's just easier if you're just going to do a big shop to just do one shop where you can get it all.
> **Female 2**: I prefer the experience of just walking down the road to the corner [to the supermarket].
> **Male**: So do I.
> **Female 1**: Which you can do, whereas we're too far away to do it.

Sheffield outer

Older residents in the Edinburgh intermediate case study all reported using the supermarket within the neighbourhood, often by foot. The café at the supermarket also served as an important meeting place:

> **Male**: Even after church on Sunday it's err, you go up [supermarket] and then you have discussions again...
> **Female 1**: ...My husband used to say: "How long are you going to be?"..."Where have you been? You said you'd be back three quarters of an hour ago. Who have you met today?" Because there's always someone we know in [supermarket] isn't that right?

Edinburgh intermediate

This suggests that the supermarket can act as a node or centre for community and social interaction – particularly where other focal points are missing from the neighbourhood. In prescriptive theory it has been pointed out that not enough data are collected and analysed about the use of supermarkets by older people – or about the shopping preferences of older people in general (Brook Lyndhurst, 2004c). This is therefore a potentially important finding which needs further investigation as it may have implications for the planning and urban design of supermarkets with specific users in mind, with accompanying facilities, as a focal point for interaction in neighbourhoods.

4.2.2. Local shops

While the majority of participants discussed using supermarkets, there was significant use of local shops reported, both within and outside the neighbourhood. An important theme which affected the use of local services such as bakers, cafés, post offices and chemists, was the actual provision of such shops in the local area. Generally speaking, residents in city centre neighbourhoods commented on the convenience of having services such as pubs, newsagents, supermarkets and a cinema within walking distance. However, factors such as the provision of services near the workplace and the quality of services indicate that residents would not necessarily use the nearest services simply because they were there.

> **Female**: I go to buy my fruit and veg at the wee greengrocers, grocers at the West End, which because I work at [other] either end of town I get up a bus early, do my shopping there, and walk down.

Edinburgh centre

This suggests that some people are oriented towards shopping near work for reasons of convenience. This may be due to the availability of multiple services and facilities near to the workplace, and, for example, clustered in city centres. This is reflected in the proportion of services found in the different case study locations: urban form data collected shows that centre case studies have a consistently better proportion of mixed use and non-residential land uses (or provision of services and facilities) than other locations (Jenks & Jones, 2010).

In all the focus groups, some participants expressed dissatisfaction with local service provision. Most respondents stated that there were services in their neighbourhood which had closed down. The effect that the closure of services such as post offices, food shops and banks had was varied:

Female: . . .for groups that are in vulnerable positions like older people, and that's affected the other businesses as well because you hear when you go into shops, older people say, I've had to go down to [. . .] or [. . .] for the post office, I've done my shopping there, and I think that's a real shame.
Female 2: And for a lot of those people, they're going to have to spend money on the bus. When they said, you can go down to [. . .]. . .but a lot of people are not going to walk that hill.

Sheffield intermediate

This highlighted the importance of local shops for many of the participants, not simply in terms of residents supporting them financially, but also how they support certain groups of people in the neighbourhood:

Female: When I was working full time, you tend to use the services around where your work is, and when I was made redundant I was like a fish out of water, that's when I really, really valued and realized what services I'd got in the community.

Sheffield intermediate

Other residents (Oxford centre and Sheffield intermediate) reported that some closed down services had been replaced by housing, while Edinburgh centre and intermediate residents reported a lack of choice in the local shops available:

Male: the big disadvantage I've found about [this neighbourhood] as we've mentioned here that there isn't a butcher and all people have really, fruit and veg are mentioned and it's [a] big disadvantage on that score (yeah). If there were butchers and bakers and fruit and veg merchants I would use those, in fact, it's just that I don't have, haven't got any choice.

Edinburgh centre

4.2.3. Parking provision

The practical issue of parking at local shops seldom arose in the discussions on services and facilities. This may be due to respondents' close proximity to services, their satisfaction with existing car parking provision, or their use of non-car transport to access services. In the Oxford outer case study, one resident reported not using her car to go to the local shops (approx. 1.5 miles away) because the parking charges were higher than the bus fare:

Female: . . .it's cheaper to take the bus and you take the bus there and then hop on the bus again. . .and they have some really bargain shops there as well. I

pop in there again for most of the baby stuff: nappies, wipes. . .which is worth it on the bus, you pay your pound ten, you don't have to pay for parking however long you stay in there.

Oxford outer

Having said this, a small number of respondents felt that constrained parking space, specifically around shopping parades and 'high streets' had an impact on the use of, and in some cases, closure of, local shops.

Female: the number of cars at [. . .] you won't be able to park your car easily at [. . .] shops.

Sheffield outer

Female: The traffic has got worse, all the parking, since [supermarket] has been there the parking has got atrocious.

Sheffield intermediate

Female:. . .well, it is difficult for parking. [The neighbourhood] is notorious for businesses opening and closing after a couple of years. And there was a big issue about parking and people saying that's killing a lot of the small businesses.

Edinburgh centre

4.2.4. Non-physical influences on use of services

The **mode of transport** used to access supermarkets, local shops and other services consistently emerged as an important theme in the focus group discussions. For the questionnaire survey respondents, there were significant differences according to neighbourhood location. Table 4.2 shows that over 50% of city-centre respondents reported walking or cycling to their main foodshop against only 10% of respondents in outer case study neighbourhoods. Conversely, 32% of centre respondents reported using a car, van or taxi, compared with 77% of outer respondents suggesting that the further away from

Table 4.2
Method of transport used to main foodshop (total household survey sample).

Method of transport	Centre	Intermed.	Outer	All
Walk/cycle	54	26	10	28
Public transport	9	8	9	8
Car, van or taxi	32	61	77	59
Home delivery	2	3	2	3

the centre respondents lived, the less likely they were to walk or cycle. The extent of public transport use remained more or less the same across all densities.

The majority of focus group participants reported using a car to reach services and facilities. Walking to services and facilities was also often reported by participants, regardless of case study type or demographic group, while cycling and using bus use were also reported, but to a lesser extent.

It is not possible to compare with any real accuracy the methods of transport used by the focus group participants to access services and facilities by different demographic groups or as residents of different urban form types. This is largely due to a number of participants who did not volunteer such information in the discussion. However, it is clear that participants from households with children did not frequently report using buses when shopping, and participants from older childless households did not report cycling as a method of transport. The picture however is muddied when neighbourhood and city characteristics are taken into account. For example, it comes as no real surprise that no participants in the two Sheffield case studies reported cycling when visiting shops as both neighbourhoods are situated on very steep hills. Similarly, as Oxford is well-known for its large cycling population, it is unsurprising that many centre residents cycle – among other modes of transport – to access services and facilities.

What does emerge is an association between the location of a service, the distance of that service from home, and mode of transport used. The general – and unsurprising – finding was that the greater the distance between home and service/facility, the more likely people were to use a car or bus to access the service. Bus use for shopping was discussed by the older participants in the Edinburgh intermediate case study, primarily because of the free travel (all Scottish adults aged over 60 receive a pass entitling them to free bus travel across the country). For a number of older participants in Sheffield, the use of the bus was limited to evenings out in town to services and facilities other than shopping, indicating that the free bus travel was used, but not on an everyday basis. For older Sheffield residents who all reported using the car to access the supermarket, the physical infrastructure of streets had a strong influence on the extent and nature of use of particular supermarkets:

> **Female**: You've got to go up and down bumps, haven't you?
> **Female 2**: Oh, I hate it.
> [**Facilitator**: And do speed bumps make a difference?]

> **Male**: Yes, we've stopped using those supermarkets because of the speed bumps.
> **Female**: I just cut down on the frequency.

Sheffield outer

There seemed to be two **types of shopping trip** that participants in all groups engaged in on a regular basis. Firstly, a 'main' shopping trip to the supermarket, or, particularly in the Edinburgh case study neighbourhoods, to the local shops, including butcher, fishmonger and greengrocer. Secondly, participants would also do some 'top-up' shopping, invariably done at the local corner shop for newspapers, milk, bread etc. and other items needed:

> **Female**: [The] corner shop in [the neighbourhood] . . .obviously just for odd things, milk, suddenly need an onion, suddenly run out of loo rolls, not for a big shop. . .

Oxford centre

> **Female**: . . .walking to and from work because I work city centre, I'll pass the corner shops and that's where I buy my lottery tickets and magazines and odds and ends.

Edinburgh centre

No real pattern emerged in shopping frequency as some participants use their supermarket monthly or once every six weeks (in Oxford centre and Sheffield outer) whereas other participants use it weekly (Oxford outer, Glasgow and Edinburgh centre) and others 'use it a lot. . .use it like a corner shop' every day or every other day (e.g. Sheffield intermediate, Edinburgh and Oxford centres).

Table 4.3 shows the proportions of household survey respondents who do not own a car. Almost half of the household survey respondents living in those case studies selected for the focus group analysis reported not owning a car, against 60% of Census respondents living in all of the case study neighbourhoods selected

Table 4.3
Proportion of different samples <u>not</u> owning a car.

Own no car	Census	All case studies	Focus group case studies
Centre	60	53	48
Intermed.	37	30	30
Outer	24	20	19
All	41	33	31

Table 4.4

Methods of transport to supermarket by frequency of use (%).

Frequency of use of supermarket	Walk/cycle	Public transport	Car, van or taxi	Home delivery
Most days	44	8	45	1
At least once a week	27	7	62	2
At least once a month	21	7	65	5
Occasionally	19	8	66	3
Do not use supermarket	18	14	66	2
Total sample	28	8	60	3

for study. This table would suggest that there is a clear association between respondents residing in or near city centres and lower car ownership.

Further analysis (Table 4.4) shows that, of respondents who use the supermarket most days, 44% of them walk or cycle there, which drops to just over a quarter for those shopping once a week and a fifth for those using the supermarket once a month or less. 45% of respondents who use the supermarket most days use a car, van or taxi, rising to over 60% for those shopping once a week and over 65% for those using the supermarket once a month or less. This shows that survey respondents are more likely to walk or cycle the more frequently they visit the supermarket, but that overall, most respondents use the car (or van/taxi) regardless of frequency of use.

It was touched on earlier in the paper that the **quality of the service/facility** might have an influence on the use thereof in a neighbourhood. This emerged in the discussions in a variety of ways. Some participants focused on the quality and choice of the products available at the relevant services, while others discussed choice in terms of availability (or lack thereof) of good services (also discussed earlier):

> **Female 1**: There's basically not a lot of corner shops. You have at your end, we don't really.
> **Male**: It's alright buying your newspaper in your corner shop but [for] other stuff...
> **Female 2**: They're not like they used to be.
> **Female 3**: No.
> **Male**: Let's say when you think of Arkwright's corner shop ''Open All Hours'' [laughter]. That is a corner shop. There's nothing like that here.

Edinburgh intermediate

The quality of the services and the products sold in local shops was sometimes compared to the reliability, cost and convenience of the supermarkets, indicating there may be a perceived trade-off between the two.

Some of the participants expressed a supermarket preference based on a number of issues including the quality of one supermarket over another, and, specifically for the Oxford outer participants, the shopping experience:

> **Male 1**: I find that [supermarket 1] is too much like the old style sort of hospital. It's very white and very clean. But it's...got no sort of warmth to it.
> **Male 2**: You can stroll round [supermarket 2] can't you? Everybody's in a rush to get out of [supermarket 1].
> **Male 1**: Yeah, it's just so sterile. I just, I mean I used to shop there quite a bit, before I moved...But, now, we tried [supermarket 2] a couple of times and we just like preferred it. Preferred the atmosphere...

Oxford outer

Some participants did express anti-supermarket sentiments, preferring to buy locally where they can:

> **Female**: I mean I live right across the road from [supermarket], I avoid it like the plague apart from they do a good selection of real ale. (laughter) I go...I go to [shop outside neighbourhood] to buy my fruit and veg...and I avoid all supermarkets if I possibly can.

Edinburgh centre

The earlier sections show that this sentiment was not echoed by all participants, some of whom seemed to be content to use the supermarket in their neighbourhood, discussing their satisfaction with the quality of the products and the service itself.

This section shows that there is no clear association between residents' use of services and facilities and neighbourhood density. There are both physical and non-physical influences on the extent and nature of supermarket and local shop use, which seem to vary according to the user and their particular lifestyle. The findings point to the positive role that neighbourhood services can play in the neighbourhood for different groups, such as unemployed residents needing to use services on a regular basis, and (older) residents using the supermarket and its café as a place to meet and interact with people. While participants highlighted using services and facilities near the workplace for reasons of convenience, the closure of services in the neighbourhood was widely opposed. The extent to which threatened neighbourhood services would be used and supported by residents is unclear from the findings but it is evident that factors such as the quality of the services

and their location have important parts to play in the choice to use services located nearby.

4.3. The influence of density on environmental equity

Open and green space is important in any neighbourhood, and focus group discussions included questions about use of neighbourhood open space. It is worth noting here that for the PPG17 categorisation (DCLG, 2002) was used to define open and green space: this includes publicly accessible spaces such as parks, community gardens, allotments, recreation grounds, woodlands and amenity green space as well as private spaces including outdoor sports facilities.

Results from the household survey show that – of those who answered this question – over 30% stated that they used open spaces at least weekly for sport and recreation, over 23% used them to see wildlife and almost 10% used them for dog-walking.

Fig. 4.2 shows that there is not much variation in the level of use of open spaces by residents in the different locations. Between 30% (outer) and 36% (intermediate) of respondents reported using open spaces at least once a week for recreation. A slightly higher proportion of centre residents did, however, report *never* using open spaces in the neighbourhood (29%) and having no access to open spaces (4% against 1% for the other case studies). It is also interesting to examine the amount of open and green space within each site.

Fig. 4.3 shows that the relationship between open/ green space and density is not as might be expected. Existing theory suggests that access to green space necessarily declines as density increases. However, including private garden space in the calculations provides a more accurate picture of the overall provision of green and open space in the different case study neighbourhoods (Fig. 4.4). On the whole, this
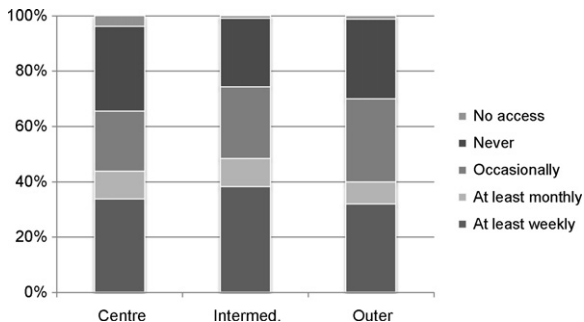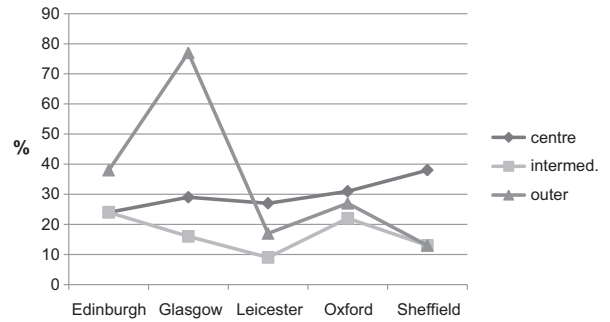

Fig. 4.3. Proportion of land which is publicly accessible open space by case study and city.
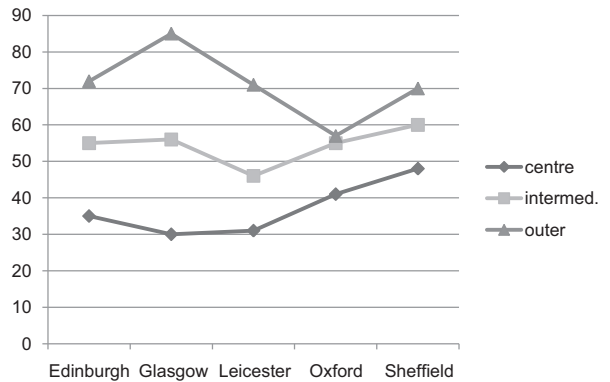

Fig. 4.4. Proportion of land made up of publicly accessible open space and private gardens by case study and city.

shows the more expected relationship between density and green space.

The next section focuses on some of the themes which emerged from the focus groups discussions of open space. These have been divided into physical and non-physical themes, but – as will be shown – there is overlap between the two. The broad questions posed relating to environmental equity are:

- What is the relationship between physical form and the use of open spaces?
- What factors influence people's perceptions and use of local open spaces?

4.3.1. The physical form and use of open spaces

The questionnaire survey responses show that people use open spaces on a less regular basis than they do other services and facilities. The issue of where open spaces are located in relation to home was often raised by focus group participants. In all of the discussions, participants used positive terms when describing how close or far away open spaces were: it was more often

Fig. 4.2. How often do you use neighbourhood open spaces/parks for recreation?

the case that participants, regardless of age, emphasised having good access, however far, to open space:

Male: You can walk. . .you can walk to [the beach] in fifteen to twenty minutes.
Female: Yes all the way along the sands.

Edinburgh intermediate

Participants did not express dissatisfaction at the level of access they had to open spaces, and discussed the range of modes of transport to reach them. This perhaps suggests that being in very close proximity to open space may not be a critical issue. The location of open spaces was however discussed as having a potentially negative effect in one case study neighbourhood: one participant discussed the location of allotments which she described as 'quite isolated':

Female: . . .all those old allotments there. . .I've often thought it would be really nice to have [one] so near it but it is quite isolated. . .if you go right down they really are isolated, no one would hear you.

Sheffield intermediate

The issue of safety did emerge frequently in the discussions on open space and are discussed in more detail in Sections 4.3.2 and 4.4. Questionnaire respondents were asked about the access they have to private gardens. For the total sample an average of 61% reported having access to private gardens. More variation was uncovered when the same data was analysed by case study and density. Results from the multiple regression modelling showed that having access to a private garden is quite strongly positive across most social sustainability outcomes, including neighbourhood pride and attachment. Fig. 4.5 shows that fewer respondents in centre case study neighbourhoods reported having access to private gardens (on average 21%) than respondents in intermediate (63%) and outer (88%) areas.

There was a variety of *types* of (public and private) open spaces used by focus group participants, and some patterns emerged. Participants in the Oxford and Sheffield case study neighbourhoods, and in the outer Edinburgh area, all reported access to private gardens. A number of participants in both Glasgow case studies and the Edinburgh centre and intermediate areas reported having access to private open space shared by a number of residents in tenement blocks and blocks of flats. There was further variety in the type of shared open space, which ranged from roof terraces and courtyards to shared greens and gardens. It became apparent that the nature of the shared space can have some influence on the use of parks and other public green spaces in the area:

Facilitator: How many of you have got a shared green that you use?
Female: Mine's concrete, it's not even got any green on it, oh it's horrible.
Facilitator: So, it's really not much of a. . .?
Female: It's not a garden, you wouldn't go and sit in it, it's just concrete, it's got a couple of small trees, some tubs with plants in, it's really rubbish. So I take myself up to [. . .Park] and it's a good ten minute walk but it's worthwhile, it's really nice.

Edinburgh centre

Other participants choose not to use the shared spaces for a range of reasons, including: wanting a private garden, missing having a private garden and feeling detached from the garden and its users:

Female: I've got a communal garden, I mean I've got a garden between the block, you know, but because I live in the top flat, it sort of always feels like it's someone else's garden when I'm in it. So I tend not to sort of sit around in it.
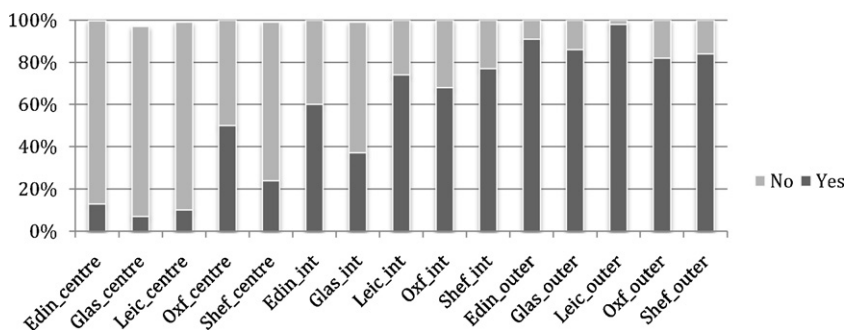

Fig. 4.5. Do you have access to a private garden?

Glasgow intermediate

For others, the poor state of shared space has prompted organised action among residents aimed on improving it, which may include applying for funding:

> **Female**: Well, where I am in that, that bit, just, it's like a quadrant and there's a, just in the last few months there's a committee been set up to try and make something of that space... And they have applied for funding for gates, at both ends to at least prevent the fly tipping.

Glasgow intermediate

This finding is interesting in light of policy and urban design guidance which supports the provision of communal open spaces for residents in, for example, blocks of flats. For example, the Royal Commission on Environmental Pollution (2007) advises that communal green spaces must be provided in all future high-density residential developments; and the Urban Task Force, given the task of establishing a vision for British cities, also underlined the importance of communal open space 'allowing groups of residents to manage their own communal garden' (1999, p. 125, also Barton, Grant, & Guise, 2003). Such attention to the provision, and resident-led management, of communal open spaces needs to be examined in more detail as the focus group findings suggest that most experiences of communal space are negative except in a few instances when residents are brought together (in the case of organised action).

This leads to an important theme in the discussions. Participants in *all* of the focus groups discussed the maintenance and management of their neighbourhood open spaces (regardless of whether they personally used them or not) and how it affected their choice of open space.

The questionnaire survey findings showed that respondent perceptions of neighbourhood cleanliness varied depending on location. Fig. 4.6 shows the scores
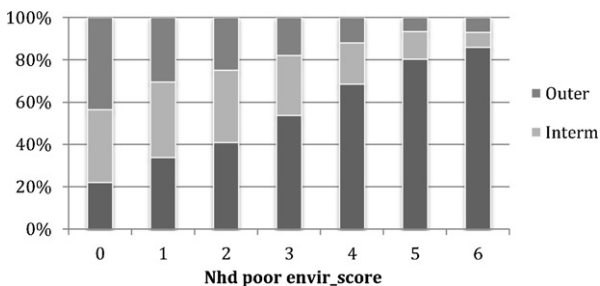
Fig. 4.6. Composite score measuring perceptions of poor neighbourhood environment (on scale of 0–6) by density.
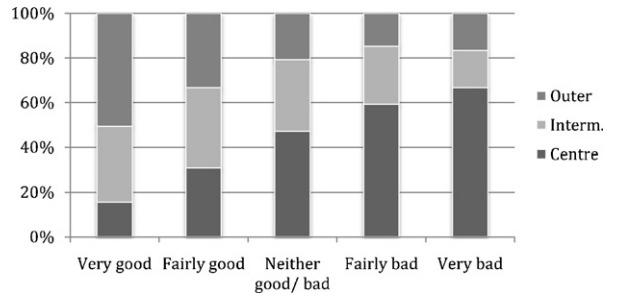
Fig. 4.7. Rating of the overall appearance of respondents' neighbourhood.

of indicators in the questionnaire measuring poor neighbourhood environment (factors including litter, noise and traffic being a problem), on a scale of 0–6 where 6 indicates a worse environment according to respondents. This shows that participants in centre case studies were less likely to rate their neighbourhood environment positively. This is supported by other findings from the questionnaire survey which showed that outer respondents were more likely to rate the attractiveness of their neighbourhood as very good while centre respondents were far more likely to rate it as very bad (Fig. 4.7). Such findings are confirmed by other evidence, including the national Survey of English Housing (2003/2004) which shows that feelings of dissatisfaction with one's neighbourhood increases with density (Bramley et al., 2009). However, care should be taken in interpreting these results because statistical modelling reveals that urban form accounts for only part of this dissatisfaction, and poverty is more important than density per se (Bramley et al., 2010).

The maintenance of public open space emerged as a very important issue for participants: in terms of the condition of the physical infrastructure (e.g. footpaths and playground facilities), the cleanliness of that space (e.g. amount of litter and graffiti) and its management and supervision. Participants in all of the focus groups expressed varying levels of dissatisfaction with the maintenance of their neighbourhood open spaces. For some participants, this dissatisfaction related to other users of open space and their influence over its maintenance.

> **Facilitator**: Is dog mess a problem in the park?
> **Male**: They've got several bins in there and [people] don't use them, and I've been walking round there and it's awful. I mean you can't let your kids play out there, it's awful.

Oxford outer

Female: . . .It is used as a park by all the. . .lunchtime eaters, alcoholics, I passed a couple drinking vodka on the way past, and wild kids playing football, you know like youths and stuff because it's a non car area.
Facilitator: Is that causing a problem?
Female: The police do get called out, because we do get broken windows.

Edinburgh centre*
* It should be noted that the open space referred to here in the Edinburgh centre case study is a pedestrianised area very close to the city centre and a mainline railway station.

For a smaller proportion of participants, this dissatisfaction also related to the part that the local authority has to play in the upkeep of the open spaces:

Female: . . .I found that [greenery] is not actually trimmed back so it kind of encroaches onto the path so as you're walking through you feel a little bit wary about it, sometimes.

Sheffield intermediate

Female: Oh I wouldn't go near [the park] at night, no. No there's no lighting and the trees make it a big secluded which is nice I suppose, I just find it a wee bit creepy. I just like to see what's coming.

Edinburgh intermediate

Female: But [the park] is now pretty well unused other than people with their dogs occasionally and it's a real waste and every now and again the council go in it and look like they're going to do something, and maybe cut a bit off plants here and there and then that's it, they stop. . .

Glasgow intermediate

Safety was an important issue in the discussions of open space and is discussed in more detail in the next section.

With regard to shared private spaces, there were different perceptions in how the maintenance was conducted. The experience of one participant in Edinburgh (centre) was very positive where a residents' organisation secured funding to improve the communal space and residents maintained it. Other participants reported applying for funding or being surveyed about

their use of communal spaces (Sheffield intermediate, Edinburgh centre and intermediate and Glasgow centre), and waiting for responses:

Female 1: In our flat we filled in a questionnaire and things and we haven't really heard anything back about it.
Female 2: What I did, I just kept on phoning them and eventually, they have said to me that they are going to have a residents meeting eventually. . .and it's only taken six months but they're doing it.
Female 3: I think there's a problem with funding.

Edinburgh centre

Where maintenance is on an informal basis, in terms of collective action as opposed to local authority-led maintenance, difficulties can arise:

Female: a lot of my neighbours particularly on the ground and first floor are elderly and so they said when I moved in, if you want to do the garden then we'll all pay you a small monthly fee. . .so I did it for about 18 months and. . .nobody paid me, nobody said thank you. . .then decided that really the blisters and the cuts and. . .folks lobbing out their cigarette butts, leaving litter in our garden, just wasn't worth it. So now it's just a jungle and I just go out there, find a chair and a book. (laughter) And I go in it, but it's not a very pretty place to go.

Edinburgh centre

The maintenance of the open spaces was closely related to qualitative assessments and ratings that participants made about them. Terms such as 'nice', 'lovely', 'fabulous', 'wonderful', 'great views', 'really good' and 'very pretty' were used to describe some of the open spaces in all the case study neighbourhoods. This would seem to follow the findings from the questionnaire survey on how respondents rated the open spaces and parks in their neighbourhood (Fig. 4.8). This
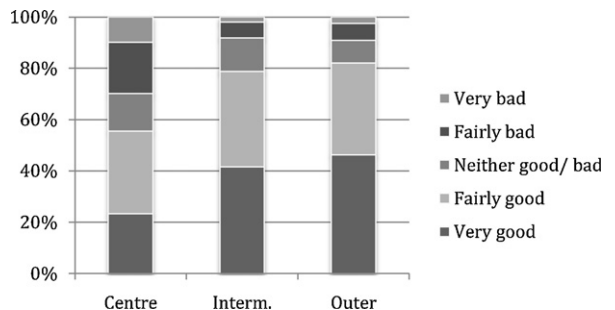

Fig. 4.8. How would you rate the open spaces and parks in your neighbourhood?

shows that the majority of questionnaire respondents in the different neighbourhood types rated their neighbourhood open spaces and parks as 'fairly-very good'. This proportion was lower for city centre respondents (52%) than for those in intermediate (76%) and outer case study neighbourhoods (78%).

A significant proportion of respondents rated these open spaces as 'fairly-very bad'. Again, there was variation by density: 28% of city centre respondents against 8% in both intermediate and outer areas. The qualitative data from the discussion groups does not support differences between case study types because poor maintenance and poor quality of open spaces was discussed by all focus group participants.

4.3.2. Non-physical influences on use of open spaces

Most focus group participants, regardless of density or demographic group, discussed using open spaces for leisure and recreation. These discussions ranged from using the facilities for children, walking the dog, attending barbecues in shared spaces, playing football and other recreational and leisure activities including gardening. Fewer participants discussed using the open space as a through-route, which may have been due to both the location of open spaces, and the method of transport used to access, for example, work or the city centre:

> **Female 1**: [I] will cycle through the nature reserve, not [. . .] park, I don't feel that comfortable walking through it. . . And also the big sports field next to it, that is worse.
> **Female 2**: I walk that every day but maybe I'm very brave.
> **Female 1**: Well, you have a dog. I feel better if I'm on the bike as I can get through it quickly.

> *Oxford centre*

As this quotation indicates, participants' feelings of safety can have a part to play in their choices to use or avoid open spaces. Other open space users have already been highlighted as a contributory influence on decisions to use open spaces. Anti-social activities such as drug use, drinking and criminal damage can contribute to feelings of insecurity which negatively influence people's use of an open space. In two of the case study neighbourhoods, the presence of seating in the public space was perceived to have a negative effect on safety because of the people who are attracted:

> **Female**: the methadone addicts tend to come along and score their stuff so. . .if you go down. . .past the bottom tonight you'll see quite a number of alcoholics sometimes, some people drinking vodka and . . .because there's nowhere else and there's seats there.

> *Edinburgh centre*

> **Female**: They have just refurbished [the children's play-area]. . . It looks nice but what puts me off it is going there and I find these big boys around it and they are smoking and they are drinking it's unfriendly for the younger children.

> *Oxford outer*

Having said this, users can also have a positive effect on feelings of security:

> **Male**: I used to go in there [the green] 20 years ago. . .you wouldn't have gone in there because it was all druggies, junkies and wine drinkers and prostitutes. . . Now there, it's all types of people using it and there's people out cycling, roller-blading, there's a girl playing. . .her violin on one corner, there's a whole different feeling.

> *Glasgow centre*

Feelings of security were also influenced by the presence of litter, vandalism, poor lighting as well as the reputation of a place. Where participants felt unsafe, they would frequently also report not using those public open spaces:

> **Female 1**: I don't take them [children] to the swings. . .because there's glass, he'd be running around when there's, you'd always check the trainers, there's dog poo everywhere.
> **Female 2**: I think down to some very large trees it can get very dark kind of oppressing I think as well. . .

> *Edinburgh outer*

> **Female**: I think it's a wee bit creepy. I never take the dog there.
> **Male**: There's no lighting.

> *Edinburgh intermediate*

> **Female 1**: [. . . Park] has the light from the valley end, I wouldn't go anywhere near it and of course [(other) Park] has a reputation for stuff going on.

Female 2:Yes, they found a body in the bushes once and the other end, [. . .] Lane end used to have a reputation, I don't know whether it still does, you just wouldn't go near it at night.

Sheffield intermediate

These findings support the plethora of evidence which makes the link between non-use of parks and public open spaces and feelings of insecurity (Box, Hale, & Andrews, 1988; Cabe Space, 2005b; Day, 2006; Dunnett, Swanwick, & Woolley, 2002; Gold, 1972; Shoreditch Trust & OISD, 2009).

Another non-physical influence on participants' use of open spaces has already been discussed above: the rating or perceived quality of the open space had an influence on, not only people's use of a space, but also their feelings while in that space. Such feelings relate to security and safety (as some of the above remarks illustrate), as well as positive feelings which may be associated with well-being:

Female 1: I take myself up to [. . .] park and it's a good ten minute walk but it's worthwhile, it's really nice.
Female 2: [. . .] park's really good, it's lovely.

Edinburgh centre

Male: there's a route you can take which you hardly see a car at all, it's following the [. . .river], following the [. . .] canals so [it's a] fabulous space up there, and it has been transformed, every year it's getting better and better and better. When I first went you couldn't see the water for Eldorado bottles and Buckfast and it's all been cleaned up and there are boats on and there's birds and. . .people fishing.

Glasgow centre

There was also some discussion in a number of the focus groups which related to organised activities which take place in open spaces, including fairs, carnivals, festivals, bonfires and barbecues.

Organised activities were also discussed in relation to applications made by organised groups for grants to improve open spaces. Such initiatives were discussed by a number of participants in different focus groups in Sheffield, Glasgow, and the three Edinburgh case study neighbourhoods. Examples of success outside the case study neighbourhoods where, for example, 'heaps and heaps of parks in Edinburgh [have] just been upgraded with a whole shipload of council money' (Female, Edinburgh outer) were cited

by some participants as the reason behind current applications. The participants highlighted the long process involved in grant applications, a number of which related to shared space in Scotland. There seemed to be strong feelings behind the need to improve the open spaces despite the lengthy and bureaucratic process involved:

Female: . . .so rather than having a separate green for my flat, my set flats and for the other ones, we've opened it all up and we've now got, and it's going to be communal area for. . .I can actually hang my clothes up for the first time in 8 years. . .But it is hard work, and we've all put our effort into this, but we've also had funding to do it which has assisted with the tools and training. . .

Edinburgh centre

Such a formal arrangement of managing the maintenance and supervision of shared open space, which calls on both the local authority and the residents, may offer a more effective solution than depending wholly on informal, collective action by residents which can be problematic.

The influence that the built environment has on the use of open spaces is distinct from the influence it has on the use of services and facilities. The maintenance and supervision of open spaces appears to be very important for participants while the location is less important than it is for use of services. Due to the dual physical and non-physical nature of maintenance, the rating and perceived quality of open spaces on the part of the user are also very closely related.

4.4. The influence of density on sustainability of community/human well-being

A number of aspects of social sustainability are under scrutiny in this section starting with perceived safety.

The majority of questionnaire survey respondents reported feeling fairly-very safe walking alone in their neighbourhood after dark (65%) while almost 12% of the total sample stated that they did not go out after dark. Fig. 4.9 shows the analysis of the sample by density which suggests some variation in feelings of safety. 57% of centre respondents reported feeling fairly or very safe, while the proportions were higher for respondents in the intermediate (71%) and outer (60%) case study neighbourhoods. A higher proportion of respondents in the centre case study
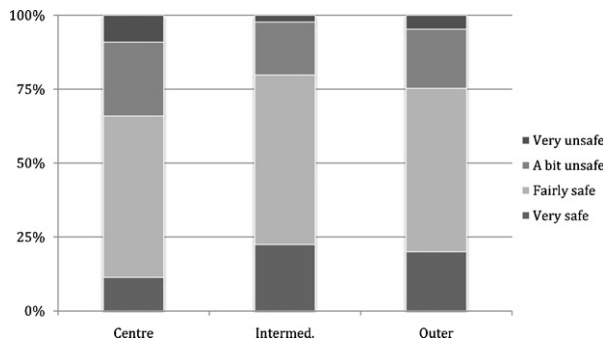
Fig. 4.9. How safe do you feel walking alone in your neighbourhood after dark?

neighbourhood reported feeling a bit or very unsafe when walking alone after dark (30%) than those in intermediate (18%) and outer (21%) case study neighbourhoods. It should be noted that respondents in the Oxford outer case study neighbourhood reported significantly lower feelings of safety than the other outer areas (26% of respondents report feeling fairly or very safe against an average of 69% for the other outer case study neighbourhoods). This may explain the unexpected lower average score for safety in the outer case study neighbourhoods.

These findings correspond with analyses of the Survey of English Housing which show that respondents living in higher density areas are more likely to consider crime to be a problem in their area than respondents in lower density areas (Bramley & Power, 2009; DCLG, 2007).

The focus groups provide some insight into why residents feel safe and unsafe in their neighbourhood. The main questions answered in this section are:

- What physical features of the neighbourhood influence feelings of safety?
- Are there non-physical factors which influence feelings of safety?

In all of the discussion groups, most of the participants stated they felt safe in most parts of their neighbourhood:

> **Female 1**: It would never occur to me not to go somewhere, I'm surprised that you're all saying that you're nervous about it, it wouldn't occur to me, I would think, well, I've got to there and I would go
> **Female 2**: No no go areas in [neighbourhood] are there really?

Sheffield intermediate

> **Male**: I think there's a general misconception that [this neighbourhood] is, you know, one of those difficult areas and you're going to have your car broken into and you're going to get mugged. I mean, I've been mugged, and...it was half ten in the morning...that wasn't in [this neighbourhood], that was...a built up road and I just turned down a side road and I got mugged... So I think, you know, personally I feel safe.

Oxford outer

Some participants related their feelings of safety to other places that they have lived or other places in the city:

> **Female**: I feel safer here than I did when I rented in [other neighbourhood], because there aren't many prostitutes and things, people don't walk past, late at night drunk. Because it's in a small area, and so it does feel safer...

Glasgow intermediate

> **Female**: People who commit crimes here, they're not from here. You hear someone's come from [another neighbourhood] and they've done a big fight at the [pub] but you know they don't even live here.

Oxford outer

4.4.1. The physical form and feelings of safety

Open spaces were discussed as parts of the neighbourhood where participants did not always feel safe. The secluded nature of some open spaces, such as cycle paths, was raised as a reason for feelings of insecurity, as were overgrown foliage and bushes:

> **Female**: ...I would say I feel very safe round here having come from London, which is completely different, so I feel extremely safe, but there are things like...I would not cycle on that disused railway line, nor at the top of the wood.

Edinburgh outer

> **Female**: And it's not safe coming through the causeway, you think twice before you go. And put your key in your pocket before you go, and your purse in your other pocket.
> **Facilitator**: Is that because it's poorly lit?

Female: No, I would say it's quite well lit but it's overgrown.

Edinburgh intermediate

Perceived poor maintenance of open spaces, private as well as public, contributed to some participants' feelings of insecurity (also see Section 4.3).

Female 1: . . .I really like. . .to hear the children in the street. . .but, I think in the street that we live in they can be pretty unruly, and they don't have any respect for the cars and everything in the street
Female 2: . . .they're in the street because nobody maintains the back closes so nobody maintains the back garden
Female 3: Well I think it's problem with this area's that, it's the lack of respect for keeping it nice.

Glasgow intermediate

The positive effect that maintenance in open spaces on participants' feelings of safety also came up in some of the discussions:

Female 1: It's [the neighbourhood] also one of the closest places for privacy and bushes, because you've got a lot of the university grounds are all locked at night-time so it's a very convenient place. I think there has been quite a lot of [anti-social] activity there as well just because it's private.
Female 2: They've chopped down trees, haven't they, this year, to open it up a bit.
Facilitator: Has that worked?
Female 2: It's bit better, isn't it, yes, I think it's a bit better.

Oxford centre

The layout of streets was also raised as an issue contributing to participants' feelings of insecurity in several of the discussion groups regardless of urban form and demographic group. This included streets with 'dead frontage' where there are no houses, windows or doors, overlooking the road and hence no natural surveillance occurring; and in one case study, building construction was being carried out which formed dead frontages.

Female: Between [. . .Road] and [. . .Road]. . .where one side you've got the school so there's no, nobody, and on the other side you've got the cemetery and a wall. So you've got a long stretch where. . .you would just feel that there's no house I could run into. . .that's an area where I feel unsafe at night.

Edinburgh intermediate

Female: I'm not keen walking there especially since they've been doing building work and putting those. . .ways over for folk to walk past the scaffolding, I don't like walking round there.

Edinburgh centre

Other street types and pedestrianised walkways such as back alleys and tunnels also influenced participants' feelings of safety in, and use of, the neighbourhood at night.

Male: I feel a bit uneasy about using the tunnel late at night.
Female 1: I won't use it late at night.
Female 2: If I'm on my own I never use it at night.
Female 3: The thing is if you're on your own late at night, it's a hell of a detour if you don't use it.
Edinburgh centre

Some participants avoided using back alleys, in part because of poor street lighting, which is something that would seem to put them off walking in their neighbourhood after dark, however a 'common-sense' attitude was dominant when discussing alleyways.

Male 1: The alleys and lanes, that's very dim bit of in fact that's almost black that little bit there, you'd look daft going along there. There would be no reason to be in an alley, to be honest with you, anywhere.
Male 2: That would be daft going there and going that way.

Glasgow centre

Female 1: Yes, I would [walk]. I wouldn't think about it.
Male: Keep to the main road.
Female 1: That's right, you wouldn't go down some dark [alley].
Female 2: I often walk through the church at [. . .Road] from where but I'd prefer to walk along the main road.
Male: That's right, you wouldn't put yourself in [danger], no.

Sheffield outer

Earlier in this section, a participant made reference to hearing children in the street and the enjoyment derived from this. In other case study neighbourhoods, the relationship between the built environment and children was perceived more negatively, largely due to

safety concerns brought about by traffic, layout, and in the case of Sheffield, topography:

Female 1: I feel sorry for the little girl that's got a bike because she just can't go out on it.
Female 2: Yes, I can't just let them, especially as we're right on the road, I can't just say, we'll go out from there.
Female 3: A boy was killed in Sheffield by a van driver that didn't stop. . .
Female 2: They're quite small. . .yards, or gardens on such a steep hill they're useless. You can't do a thing with it, really, you can't play in it, it's just too steep.

Sheffield intermediate

Female: I haven't been for a little while up the hill, but it's because I would be there as the only adult with two boys and they're running, I mean they're not running riot or anything or running off but, if you've then got to go with one and you're leaving another and all the rest of it, I mean that's why I would feel slightly vulnerable.

Edinburgh outer

There were also discussions about where children, and teenagers, spend their time when out and about in the neighbourhood, often culminating in the general expression that 'there is nowhere for them to go', indicating a lack of appropriate facilities and spaces; this was particularly the case for participants with families in particular:

Female: It's a shame because the youngsters need somewhere to go. . .but they need something to do and I think that's half the, you know, in as far as I'm aware, in [the neighbourhood] there isn't a lot to do, my kids are 14 and 11, son's finding his space to go to, but my daughter isn't so much so, and when you ask her where are you going, where is there for her to go in [the neighbourhood]?

Edinburgh outer

Male 1: You do, I say, going back to the park, you do, there's a group of trees in the middle here and you do get ladders.
Male 2: And then they sit there on the bridge all the time.
Facilitator: What do the teenagers do around here, where do they go?
Male 2: Exactly.

Male 1: Exactly, that's it, what do they get up to?
Female: You can't lock them in the house forever. They've got to get out and find something to do. That's why they end up ganging up there with bigger boys.

Oxford outer

Further discussion also focused on participants' perceptions of children and teenagers as groups of users in the neighbourhood. These findings are reported in the section below.

4.4.2. Non-physical influences on feelings of safety

The other main theme relates to other users of the neighbourhood. While not specifically about the physical form directly, the discussions suggested that, at times, users of the neighbourhood can have an impact on the quality of the built environment. Most visibly, this can take the form of vandalism, graffiti and litter:

Female: I occasionally see kids running the roof smashing the windows of the brewery and recently put graffiti on it, so I'm the old woman of the stair and I keep phoning the police saying there's young hooligans running across the roof. Police don't do anything at all.

Edinburgh centre

Large proportions of the discussions on safety related to *different groups* of users of the neighbourhood. Kids and teenagers were often discussed, and described as congregating in groups, which may or may not have a negative influence on the participants' feelings of safety:

Female 1: I used to be on the community council in [other neighbourhood] and there's no way I would have walked home because there tend to be groups of, probably very innocent, young people but you feel challenged.
Female 2: . . .I think every area's got groups of youths and at the top of [. . .Crescent]. . .there's a telephone box there and it used to be repeatedly smashed to smithereens it was, seemed to be a gathering spot. You know, time after time, it was smashed, and it's just groups of youths gathering.

Edinburgh intermediate

There are also particular groups of people, including football supporters, people drinking, and students, who, at particular times of the day, are avoided by participants:

Male: Some of the streets aren't too bad, if you go down to university streets there are lots of students around, if you're going from [. . .Street] to [sub-area of neighbourhood] and I don't fancy doing the gauntlet of [. . .Street] at night, sometimes until 11 o'clock at night, I don't fancy going down there, I just do the back street around [. . .Street] and into [. . .Street].

Oxford centre

Female: I wouldn't go out on a, on Saturday afternoon when the football. . .when everyone spills out the pubs. Because we've actually watched a riot take place in front of our house, right here, for people running along [. . .Street] throwing bricks at each other. Out in the middle of the street, and cars screeching to a halt to avoid those, during the day.

Glasgow centre

Female 1: Quite a lot of people camping down there and you see homeless [people].
Female 2: If you suddenly see someone coming out of a bush it's a bit disconcerting.
Male: . . .they go down to [. . .] to take their drugs and that sort of thing, so there is a lot of drug dealing in [. . .], down here especially, and I think lots going on in parks as well, they cause trouble there.

Oxford centre

There were different experiences in the neighbourhoods as to whether, where such anti-social behaviour occurs, it is dealt with effectively by the relevant authorities:

Female: I have seen a number of young chavs** on the roof of the brewery, lobbing stuff at the traffic. . .what worries me is that it's high speed traffic, there aren't pedestrian crossings at the moment so there's no reason for them to be concerned about driving and if a child or a brick or whatever falls onto the road, it can be quite a huge accident but the police don't seem to be that bothered.

Edinburgh centre

**chav: Brit. slang (derogatory) a young person of a type characterized by brash and loutish behaviour and the wearing of designer-style clothes (esp. sportswear); usually with connotations of a low social status (OED, 2007).

Male: The policing policies have changed. . .the police used to blitz Glasgow Saturday afternoon from 2 o'clock onwards, where even [. . .Street] there still be groups of neds*** walking around, and that never used to happen, police come in and put them in the back of the van and take them away, but they have changed that so they don't no longer blitz late Saturday afternoon.

Glasgow centre

***ned: *slang* (chiefly *Scottish*) A stupid or worthless person; a good-for-nothing; *spec.* a hooligan, thug, yob, or petty criminal. Also used as a general term of disapprobation (OED, 2007).

Facilitator: They have introduced wardens here-. . .are they effective?
Male: They do stroll around quite a lot. You don't have the drunk bums so much now. They probably do more than you actually see of them. . .they've got quite a portfolio you just don't actually physically see them doing anything.

Oxford outer

The focus group findings do not suggest that there is any link between anti-social behaviour and factors such as poverty or the make-up of the population residing in a neighbourhood. Regression analysis of the household questionnaire survey data (Table 4.5) shows that income, tenure and economic status are significantly associated with feelings of safety ($p < 0.001$). The analysis indicates that respondents with higher incomes were more likely to report feelings of safety than those with lower incomes, as were homeowners (compared to all renters) and those in full employment (compared to retired, unemployed and other respondents). The analysis also shows that there are significant associations between feelings of safety and perceived anti-social behaviour: respondents who reported that crime, litter, noise from neighbours and disturbance from children were not a problem were more likely to report feelings of safety.

This section has highlighted that there are both physical and non-physical influences on participants' feelings of safety in neighbourhoods. While the questionnaire findings show that people from older age groups are more likely to feel less safe after dark in their neighbourhoods, the focus groups findings do not

Table 4.5
Standard multiple regression analysis with feelings of safety as dependent variable.

Independent variable	Unstandardised coefficients-beta	Standard error	Standardised coefficients-beta	Sig.	Collinearity statistics	
					Tolerance	VIF
(constant)	3.293	0.034		0.000		
economic status	−0.047	0.016	−0.049	0.003	0.815	1.227
personal income	0.015	0.003	0.102	0.000	0.473	2.115
tenure	−0.094	0.016	−0.095	0.000	0.841	1.189
crime_problem	0.375	0.021	0.309	0.000	0.715	1.399
litter_problem	0.098	0.019	0.089	0.000	0.713	1.403
noisefromneighbours	0.121	0.020	0.100	0.000	0.790	1.265
disturbfromchildren	0.115	0.020	0.096	0.000	0.774	1.292

$R = 0.506$; R square $= 0.256$. This indicates that 25.6% of the variance in feelings of safety in the sample is explained by the variables included in the model.

specifically support this, although it is acknowledged that some older people might have chosen to not attend the focus group because of safety fears. (To attempt to counter this possibility, the focus group discussions for the older demographic group were held during afternoons, rather than evenings, when the other discussion groups were held). The influences on perceived safety seem to be the same for all participants. A range of physical factors relating to maintenance, secluded areas, particular layouts were found to have an influence on participants' feelings of security, while the main non-physical factor affecting perceived safety was other users.

4.4.3. Community stability and sense of place attachment

In this section, the research team was interested in what attracted residents to a particular area and what kept them there. Fig. 4.10 reports household questionnaire data that on average, outer case study neighbourhood resp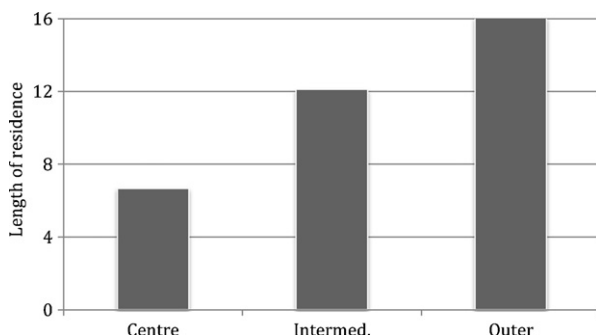ondents reported longer lengths of residence (16 years) than those living in intermediate (12 years) and centre case study neighbourhoods (7 years), indicating that residents remain in lower density neighbourhoods for longer than higher density residents.

In addition to this, and perhaps unsurprisingly, length of residence was positively associated with age indicating that older age groups were more likely to report living for longer in a neighbourhood than younger respondents (Fig. 4.11).

Further analysis shows that the age of respondents and their location both have significant effects on respondents' plans to move house (Figs. 4.12 and 4.13 and Table 4.6), indicating that, when age of resident is taken into account, respondents living in city centres are more likely to move house than respondents living in other case study type; and, controlling for location, younger respondents are more likely to be planning to move house than older groups.

The focus group aimed to understand the reasons behind these associations. The specific research questions to be answered here are:
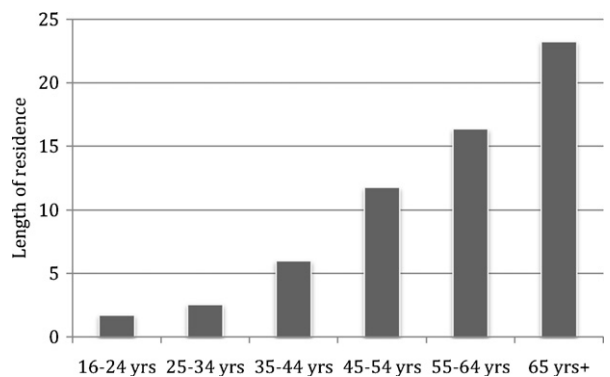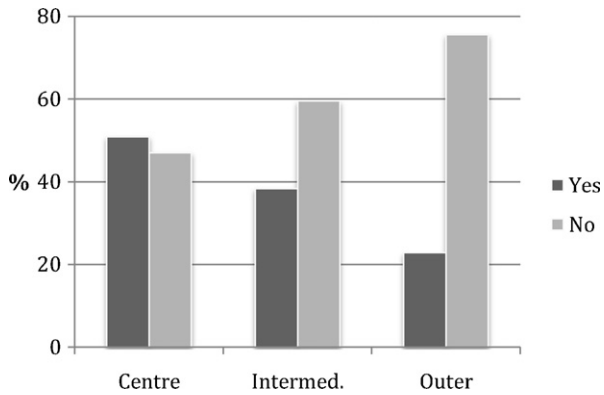

Fig. 4.10. Length of residence by density.

Fig. 4.11. Length of residence by age group.

Fig. 4.12. Plans to move house by density.

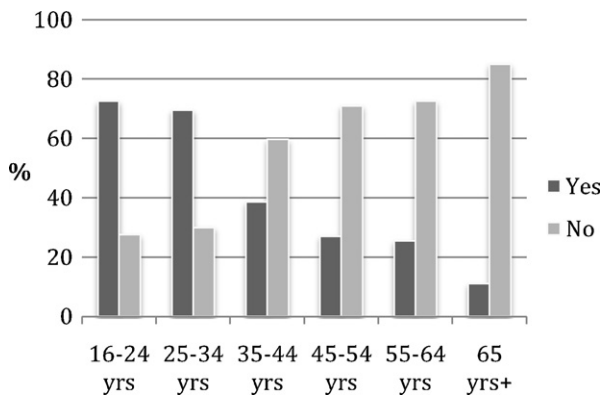Fig. 4.14. Why do you expect to move house?

Fig. 4.13. Plans to move house by age group.

- What attracts people to an area? Are these attractions related to the physical environment?
- Why do people stay in an area? What are the positive or negative factors keeping people in a place or encouraging them to move away?
- How attached are participants to their neighbourhood?
- Does the built environment contribute to feelings of attachment?
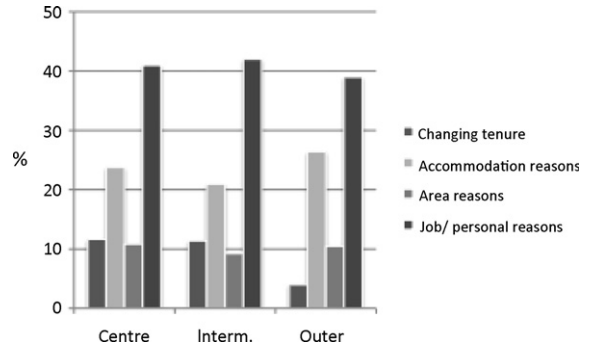- Are there other, non-physical influences on feelings of attachment?

Most focus group participants expressed some acknowledgement of changes in the population demographics in their neighbourhoods. Changes included lower numbers of students (Oxford and Edinburgh centres and Sheffield intermediate), overall reduction of the older population (Oxford/Sheffield) and more families (Oxford). Changes in tenure were also noted, with an increase in home-ownership in Sheffield (intermediate), as well as high turnovers of residents due to renting in the neighbourhoods (Edinburgh centre and intermediate, Sheffield intermediate).

Density was not a significant factor for people wanting to moving house. Accommodation was cited (centre 24%/intermediate 21%/outer 26%) as a reason for planning to moving house and "the area" was cited by similar proportions of respondents in each location as a reason for moving (9–11%). Fig. 4.14 shows that the proportion of respondents planning to move house to change tenure reduces as density decreases. Most respondents planning to move house cited personal and employment reasons, perhaps related to lifestyle. It should be noted that there is some difficulty in using the focus group data to supplement these particular questionnaire findings because of the use of very general terms in the latter when asking respondents about why they might move house. There may be great

Table 4.6

Partial Correlation Analysis: Plans to move house, controlling for density and age of resident.

Control variable	Variable	Age	Plans to move house	Location
None	Age	–	−0.356[**]	0.187[**]
	Plans to move house	−0.356[**]	–	−0.237[**]
	Location	0.187[**]	−0.237[**]	–
Location	Age	–	−0.327[**]	
	Plans to move house	−0.327[**]	–	
Age	Plans to move house	–	−0.186[**]	
	Location	−0.186[**]		–

[**] Significant at the <0.001 level.

Table 4.7

Proportion of respondents planning to move house in the next few years.

Housing type	Total	Centre	Intermed	Outer
Detached	8	1	5	25
Semi-detached	15	3	12	38
Terraced	26	11	47	18
Flats	51	85	36	19

Table 4.8

Composite scores of 'neighbourhood pride'.

Age group	Centre	Intermed	Outer	Total
16–24 years	0.9	1.2	2.0	1.1
25–34 years	0.7	1.5	1.7	1.2
35–44 years	0.8	1.6	2.1	1.6
45–54 years	1.0	1.8	2.0	1.7
55–64 years	1.3	2.4	2.3	2.1
65 years+	1.3	2.2	2.8	2.3
Total	1.0	1.8	2.3	1.8

overlap in, for example, 'accommodation', 'area' and 'personal' reasons which as terms are open to some degree of interpretation.

Further analysis shows that there is a significant relationship between housing type and plans to move house. Over half of those questionnaire respondents planning to move house reported living in flats (or tenements) and over a quarter in terraced housing (Table 4.7). The majority of centre case study residents planning to move house reported living in flats (or tenements) against 36% of those residing in intermediate and 19% in outer case study neighbourhoods.

This significant relationship between housing type and resident turnover did not however emerge in the focus group discussions. Participants expressed a range of feelings of attachment to their neighbourhoods, from 'very attached' to 'not really attached'. One participant stated that if she had to move away tomorrow, she 'wouldn't give it a second thought' (Edinburgh outer) while another participant in the same case study stated that 'I don't feel attached, I feel settled' which reflected the feelings of a number of participants in this case study neighbourhood. The relationship between feelings of attachment and neighbourhoods can also be quite complex: one participant expressed feelings of attachment to some parts of the neighbourhood but not others.

From the questionnaire survey, it is possible to get a general idea about positive feelings about the neighbourhood, which was referred to as 'neighbourhood pride'. This composite variable drew from specific questions, including those measuring feelings of pride and belonging in the neighbourhood and the rating of the neighbourhood as a place to live. Table 4.8 shows the average scores of 'neighbourhood pride' by density and age group. Generally speaking, city-centre residents reported lower neighbourhood pride than intermediate ones, with residents in outer case studies scoring highest suggesting that neighbourhood pride increases as density decreases. It was also, generally, the case that older respondents reported stronger feelings of neighbourhood pride than younger respon-

dents. Overall, older respondents in outer case studies reported the highest scores while younger respondents in centre cases studies reported the lowest. The following sections explore the part of physical form and other influences, in community stability and participants' feelings of attachment.

4.4.4. The physical form and community stability

There was considerable overlap in focus group participants' reasons for choosing the areas in which they live. A number of different factors were mentioned – and it seems clear from the discussions that people are influenced by multiple issues. The discussion that follows examines some of these issues in turn – but as the quotations illustrate, most participants mention more than one factor affecting their choice of location. Accommodation was discussed as important to participants in different neighbourhoods, particularly dwelling size:

> **Female**: We found a flat that we really loved and [it] happened to be here, but we were looking in the area because it's cheaper than [other neighbourhood], it's close to town, good transport. . .

> *Glasgow intermediate*

> **Female**: I think the houses, the council houses, the ones I live in at least. . .the rooms are really big.
> **Facilitator**: That's the main reason [you have stayed in the area]?
> **Male**: Yeah, because I mean. . .the older houses. . .they're a lot bigger. You've got gardens front and back, you haven't got parking, you've got a car park.

> *Oxford outer*

Proximity to the city centre, as well as to services such as schools and churches, also featured as a reason for some participants in neighbourhoods of different densities.

Male: I work in [other neighbourhood] so I can drive to work, I get the train to work. There's a lot of things socially to do in Glasgow in that area, in [the] town centre and [I can] get an underground to [other neighbourhood]. . .so, why move?

Glasgow centre

As the above quotations reflect, having access to good public transport was also discussed by participants as an important feature of where they live, regardless of the neighbourhood density:

Female 1: I stay where I am because I like the area. . . There's a park nearby. I like my house, I like my garden. So that's why I'm staying there.
Female 2: It's very suburban and yet it's very close to the centre. And because we've. . .got good bus services and facilities.

Edinburgh intermediate

Female: I think what it came down to was, it is easily accessible transport-wise. So even if you don't have a car you can easily get on the bus and get on and off any time even if you did a night shift or a late shift you can get home whatever the time.

Oxford outer

For some participants, moving to a bigger house might not be an option (Section 4.4.5), and so increasing the amount of space in one's home could provide a solution. This was discussed in the outer case study neighbourhoods of Edinburgh and Sheffield in particular:

Male 1: We can't afford to move. . .we bought our house ten years ago, we can't afford to move. And we can. . .do. . .an extension. . .
Male 2: We did an extension ourselves. . .and the cost for me to do that extension was the same as would have been the legal fees.

Edinburgh outer

There were other positive reasons relating to the physical form why participants remain in their neighbourhood. Participants from all the case study types stated that they liked the area and that it was a nice or good place in which to live. The location of the neighbourhood in terms of having access to services, facilities and public transport and being close to the city centre was also cited as a pull factor:

Table 4.9
Plans to move type, by household type and location.

Household type	Centre	Interm.	Outer
Younger childless	85	70	47
Families	9	18	32
Older childless	7	11	21

Male 1: The other thing about it is its convenience in terms of location, in terms of its proximity to the city centre and yet being remote from it. . .so you've got both, you've got the Peak District and the attractions of a major city.
Female: And the bus service is very good in and out.
Male 2: Yes, good transport.
Sheffield outer

It became clear that participants with families and participants who were younger and without children were more likely than older participants to consider moving house. This supports the questionnaire findings (Table 4.9) which found that, of the three demographic groups, younger childless households were more likely to have plans to move house. This table also shows that respondents from younger childless households were most likely to have plans to move house, while there was more of an even spread for the different groups in the outer case study neighbourhoods.

In the discussion groups, reasons for considering moving included a number of physical considerations, such as wanting to move to a larger house or to a house with a garden, and, to a lesser extent (and indirectly related to the physical form), dissatisfaction with noise levels and wanting to move somewhere quieter.

Female: I would move – not yet because the kids are too small – but I would love to move somewhere quieter. The thing that will get to me in the end is the noise from the traffic.

Edinburgh outer

Facilitator: Are you planning to move house?
Female: Yeah, probably. . .that's to do with accommodation and having a house with a garden. And going back to somewhere peaceful, which isn't necessarily anything to do with culture, but I do desperately want to get away from the rubbish, I just cannot stand the rubbish dropping around here.

Glasgow intermediate

Where older participants considered moving house, reasons pertaining to the physical environment, rather than to other non-physical considerations, were given. These included house size and other housing development going on nearby:

Male: And the river was also…part of my decision…because we were overlooking the river…I grieve that we may lose that.
Female: Overnight when somebody builds a twelve storey flat next to you.
Male: Right in front of us.

Glasgow centre

There were a number of physical features that participants cited when discussing their feelings of attachment to the area, including 'nice streets', particular buildings, public transport, services and facilities, and green space in the neighbourhood:

Male: I'm really proud of the building…I really like the building…it's fairly well designed so I'm really proud of it…
Male 2:…you've also got the open space of […Green] and the history behind, I can.,walk through there and just think of what's been happening for 5–600 years and that's the spot, and it's just incredible, you just feel part of all of that.

Glasgow centre

Male: …My big attraction to [the neighbourhood] is the open spaces and [...hill], and the zoo and things like that…the same sort of important thing about having open spaces and access to recreation and things like that which are important to me, and the other thing is the transport links into town and to the airport and things like that.

Edinburgh outer

Other participants discussed the neighbourhood location as a reason for feeling attached to the neighbourhood, particularly in relation to the city centre. For participants in the Sheffield outer case study, both the real and perceived distances from the city were important:

Female: [The neighbourhood] tends to be a confined area so you get to know people.
Male 1: [It is] an established neighbourhood, it has a history and it's evolved from ancient communities.

Female: That's right and you sort of hit it on the head, the proximity to the city, country runs. It has a natural geographic contour around…
Male 2: You can go down into [the] city, cinema, have a meal all the rest of it and within ten minutes you're out, totally out, no relationship to the city.

Sheffield outer

4.4.5. Non-physical influences on community stability

There were a number of non-physical reasons cited by participants for moving into particular areas. These included affordability, work, family (both starting one and having an existing family network) and friends nearby.

Female: The fireplace was one of the reasons why I got where I am, and the fact that it's opposite my best mate, virtually.

Sheffield intermediate

Female: [I] came to the area because it was affordable being a first time buyer.
Edinburgh centre

Other reasons included liking the area and considering it to be a good one, and returning after studying at university (this was the case specifically for participants in the Sheffield intermediate area):

Female: It's interesting now, lots of people have actually moved into this area because of families, they've come from different parts of the country and have chosen this area to perhaps retire, often to live near their families or within central striking distance, they see it as a good area.

Sheffield outer

Female: One of my closest friends came from […], we were up here, went down to […], we came here as student[s].

Sheffield intermediate

There were some minor differences between participants from the three demographic groups in the importance of different aspects of the neighbourhood. For example, the quality of schools was of particular importance to participants with families, and affordability was mentioned by participants in the

young childless and family groups, but not older groups. On the whole, however, there was considerable overlap in the responses, with participants from all three demographic groups citing a range of reasons for moving to the area, both physical and non-physical, including accessible transport, proximity to the city centre and services, attributes of the individual residence and liking the area.

Participants were asked if and why they planned to remain in their neighbourhoods. There was a variety of responses, including positive (physical) reasons which have already been discussed and others discussed below. One consistent and negative reason why participants were *not* planning to move out of their neighbourhood was cited by participants across the neighbourhoods, relating to the affordability of staying where one was and the high cost of moving away. For all of those who raised this issue, house prices were too high elsewhere indicating that moving somewhere more desirable was viewed by some as impossible:

Female 1: It was salvation for me because I did say that I'm on my own, I haven't met my millionaire so…I'm kind of stuck put because I probably wouldn't even be able to buy my flat, the one I'm in and I've been in it for 15 years so I couldn't buy it on the salary I'm on now.
Female 2: I would love to, I would move tomorrow if I could but I'm priced out of Edinburgh, this is as close as I can get. Which is again had I known that [this neighbourhood] was going to increase slower than the rest of Edinburgh I never would have bought [here].

Edinburgh centre

Some participants welcomed the increase in the value of their own house, but identified difficulties in moving up the housing ladder as house prices had also increased elsewhere:

Female: I was thrilled to find out just how much my property's increased in the last two years…and then I started hearing other propert[y prices] around Edinburgh and I can't go anywhere…I can't move within…a half hour radius in the city centre.

Edinburgh centre

Another non-physical influence on participants' decisions to stay in an area relates to the perceived sense of community. Community groups and associations and the mix of people were 'pull factors' for some participants staying in the area:

Female: There is an enormous sense of community actually that this town does have because a lot of towns don't have that general feeling that they want to look after their town, you only have to read the letters that are in the Oxford Times and listen to all of our opinions now.

Oxford centre

This is also illustrated in the Edinburgh centre case study discussion where some participants expressed dissatisfaction with the neighbourhood, but not with the people living there:

Female 1: And actually I'd really like my flat and it's a nice, relatively, trouble-free, relatively quiet place most of the time, I mean that's, that's a big advantage.
Female 2: I'd just like to move mine somewhere else with my neighbours.
Female 3: That's what I want to do.
Female 2: …It's fine round where, beside where I am but as soon as I get out of there and start walking along here I…feel that it's, there's something missing from it, I don't know what it is.

Edinburgh centre

A large number of participants discussed their attachment to the people in the neighbourhood as well as to its physical fabric. Positive references to residents varied from the mix of people living there to the sociability of people and networks established through one's children:

Facilitator: In what way do you feel attached to [your neighbourhood] overall?
Female 1: Nice streets.
Female 2: Great people first, nice streets next.

Edinburgh intermediate

Female: Over the years you become attached because of people and activities, plus your general environment.

Sheffield outer

Organised activities and groups were also cited as aspects contributing to participants' feelings of attachment, as was the church, particularly in the Edinburgh and Sheffield outer case studies:

Male 1: It's like going out with the men's coffee group to Nottingham for the day out, it's evolved from a church activity but nevertheless there have

been a lot of early retired people that do get themselves organised and there is a very strong sense [of community].

Male 2: I think that is a thing up in [...neighbourhood] that people do tend to do that more than perhaps in other parts of the city. People tend to be very sociable and want to do that sort of thing, don't they?

Male 1: There are strong walking groups here, the community association and others and ex-university staff have walking groups...

Sheffield outer

A sense of community among residents was also cited as a reason for feeling attached to the neighbourhood, specifically by participants with families and from older households.

Female 1: Having babies is the key to everything. I like to feel part of a...community and I think it's nice to hear folks like...who have grown up here and they give a different perspective to it. I do think it's a great area...I think you make the most of where you are if you want to.

Female 2: I like using local things and I do like being part of the community. Maybe because for sixteen years I was in London...there wasn't much of a, sort of community feel so I quite like that.

Edinburgh outer

Other reasons for considering moving house include dissatisfaction linked to the quality of schools in an area, cost and affordability of living in the area:

Female: I'm a bit concerned about [the local school]...I think it is a good school generally...and I'm just thinking again I might move back [to other neighbourhood] so that my kids can go to [other school] but at the end of the day we probably won't.

Edinburgh outer

Female: My partner can't drive, he's disabled so really anywhere that doesn't have excellent transport [like] this area does, it isn't really an option moving out of Glasgow...I don't see in the next twenty years say if we wanted to, we could actually afford to get a house anywhere in this area, and I'd rather stay in the area. We're actually planning to start a family [and] I quite like this area for kids.

Glasgow intermediate

The quotations cited in this section show that, while it is possible to uncover particular physical and non-physical features of the neighbourhood which contribute to the stability of the community, often it is a combination of such features which have an influence on a participant's decision to move to, stay in or move out of a neighbourhood. There is real variation in the feelings of attachment that participants feel towards their neighbourhoods. The built environment seems to have some influence on those feelings, in particular the services and facilities, open spaces and location of the neighbourhood in relation to the city centre. Importantly, non-physical influences, which include other residents and neighbours, the sense of community present in the neighbourhood and organised activities and groups, also make a significant contribution to these feelings.

4.4.6. Social networks and social interaction

The questionnaire survey asked respondents a number of questions about their social networks and the extent of their social interaction with others in the neighbourhood. Multiple regression analysis of this outcome revealed that while raw interaction scores fall as densities rise, the modelled urban form effect rises with increasing density up to around 120 dph, which reflects claims in literature and practical experience. In less densely developed suburbs, people are less likely to bump into each other, partly because they are more likely to use their cars. In intermediate density area with terraced or lower-density flatted housing, people are more likely to meet coming or going. In very high density housing, this is less likely to be the case. Table 4.10 shows that respondents from younger childless households score lowest while respondents from families and older childless households generally score about the same.

To understand why there are differences in the nature and extent of neighbouring and social interaction, the discussion groups were asked the following questions:

Table 4.10
Composite variable 'friendscore', by household type and location.

Household type	Centre	Interm.	Outer	Total sample
Younger childless	2.3	3.7	4.1	3.3
Families	3.8	4.3	4.7	4.5
Older childless	3.5	4.3	4.7	4.3
Total	2.7	4.0	4.4	3.8

Table 4.11

Composite variable measuring *negative social interaction*, by household type and location. This variable, crudely put, assigns a high score for negative (or less sociable) interaction and a low score for less negative (or more sociable) interaction.

Household type	Centre	Interm.	Outer	Total sample
Younger childless	4.5	2.7	2.7	3.3
Families	3.1	2.2	1.9	2.2
Older childless	3.0	2.1	2.0	2.2
Total	4.0	2.4	2.2	2.8

- How strong/well-developed are participants' social networks in the neighbourhood?
- Does the built environment contribute to social networks in any way?
- Where do people meet/bump into friends/neighbours? What things prevent interaction?
- Do non-physical factors influence social networks and interaction?

The focus group findings show that there is some variety in the extent to which residents know their neighbours, but it does not reflect the correlation with the density of neighbourhood showed in Table 4.11. The discussion groups focused on two broad themes relating to social interaction in neighbourhoods: where participants meet people in the neighbourhood, and what barriers there are in the neighbourhood to meeting people.

4.4.7. The physical form, social networks and social interaction

Participants discussed how social interaction often takes place close to home: in the street and in gardens, and can be influenced by the physical layout of residential buildings and gardens:

Female 1: I think the way our [gardens] are set up, they're not very private. It's alright if you like your neighbours, we've got lovely neighbours, they're great, they're really lovely, that's nice but I think you do meet people when you're out.
Female 2: [We have] got shared back yards. You have to get on with your neighbours.
Female 3: Oh yes, you do have to get on with them.
Female 4: On our road they're mostly built in blocks of four where you've...got offshot kitchens so our kitchen windows face each other so we're facing each other doing the washing up. So you really have to get on with your immediate neighbours.

Sheffield intermediate

The physical layout of buildings had an impact on knowing and interacting with neighbours for one participant:

Male: I think that was the big thing...moving in together all at the one time and being stable and also the actual physical build of the building made a big difference because...before I've lived in a tenement flat, you never met people really you had to go into your own front door and never actually get the chance to meet people on your [floor].

Glasgow centre

Participants in all of the discussion groups mentioned particular services and facilities where they met friends, neighbours and other people. Shopping in the neighbourhood was an activity often mentioned which involved meeting other people. It has already been mentioned how the supermarket can be a hub for the community:

Facilitator: Where do you bump into people...?
Number of people: [the] supermarket
Female 1: ...Well it's just that we're going round with the trolley or I'm going round with the trolley and somebody says: "Ooh Hello! I haven't seen you for a couple of weeks".
Male: And then it's half an hour later! [Laughter]
Female 3: Well, I used to bring an old lady up for her shopping and before we moved from that person another person had gathered and you could have half a dozen, you know blocking the aisle.

Edinburgh intermediate

Older participants also reported bumping into people while standing at bus stops (Sheffield outer, Edinburgh intermediate). Walking (the dog) was an activity discussed by participants primarily from family households but also in the younger childless groups. Unsurprisingly, participants from family households discussed the school as a place for bumping into people. It seems to be the case that connections and networks are made between parents through their children and associated activities:

Female: I think the thing is I've found that people at the school gates and people generally in and around [neighbourhood] are really friendly and I know we've done things at [school] together helping out on the fun days, little different sets of communities.

Sheffield intermediate

Female: …most of the children go to the same school so I tend to meet so many of my [friends] at the school picking or dropping their children. In the holidays we really, we meet along the way, have a good chat. The children and play area, so, we're likely to meet.

Oxford outer

It has already been shown (in Table 4.10) that neighbourhood density appears to have some influence on the level of contact between neighbours. This finding was generally borne out when examining negative social interaction: overall, negative social interaction was found to drop as density decreases (Tables 4.11 and 4.12). Analysis of the questionnaire survey shows that there is a tendency for respondents in the centre case studies to report having contact with fewer neighbours than other respondents. Table 4.11 shows that respondents from younger childless households in centre case study neighbourhoods are most likely to score highly on the negative social interaction variable which measures the extent to which they not only do not interact with their neighbours, but also avoid them, have no friends in the neighbourhood and consider the neighbourhood to be an unfriendly place. Respondents from younger childless households consistently score highly, and all household types in the centre case studies are more likely to higher negative interaction scores than in other locations.

There is no suggestion, however, from the focus group findings that this lack of social interaction is particular to any one demographic group or tends to be located in the centre case studies. For example, the focus group discussions in Edinburgh suggested that building form and layout may be a barrier to social interaction, especially flats and tenements with a single point of access for a number of residents. Analysis of the

questionnaire data (Table 4.12) shows that respondents living in flats, regardless of neighbourhood density, scored consistently higher on the negative social interaction measure than respondents in all housing types. There was more variation when examining social interaction by residents of other housing types. In the centre neighbourhoods, respondents in terraced housing scored lowest, while for intermediate and outer respondents residing in semi-detached and detached housing respectively scored lowest.

Some potential reasons why neighbours do not know each other emerged in the discussions about what the barriers might be to meeting people. While having more time to spend in the neighbourhood would seem to be strongly associated with getting to know people there, this was not always the case for participants working from home. One participant (Sheffield intermediate) commented that she doesn't see many people because she is 'sat at home', while for participants in Oxford centre, there was nowhere locally to meet other home-workers in the neighbourhood. The lack of suitable meeting places was also cited as a barrier to meeting people by a number of participants in two of the three outer case studies (Sheffield and Edinburgh). Participants in both of these case studies also commented that there wasn't a 'natural' or 'proper' meeting place where different people might see one another.

Female: I mean what there isn't, there isn't a real nice pub, I mean it has to be a pub where you'd want to meet [friends]. Or [where] you [could] meet school mums.

Edinburgh outer

4.4.8. Non-physical influences on social networks and social interaction

While the previous section highlighted services and facilities where participants may bump into people or arrange to meet friends and relatives, participants more consistently referred to different activities engaged in, usually on a regular basis, such as evening classes, the school run, dog-walking, visiting the gym, and the social interaction this involved:

Female: It was when I was on maternity leave, actually and so I'd a post-natal support group and I thought, I'm not going to one of them, but anyway I did and it was absolutely fantastic and there were new mums who I would never have come into contact with so there was me from [neighbourhood], there was some from [other neighbourhood], we were spread quite wide.

Table 4.12
Composite variable measuring *negative social interaction*, by housing type and location. This variable, crudely put, assigns a high score for negative (or less sociable) interaction and a low score for less negative (or more sociable) interaction.

Housing type	Centre	Interm.	Outer	Total sample
Detached	3.5	2.3	1.9	2.0
Semi-detached	2.8	2.1	2.1	2.1
Terraced	2.7	2.4	2.5	2.5
Flats	4.3	2.7	2.9	3.6
Total	4.0	2.4	2.2	2.8

Sheffield intermediate

In addition to the part that school plays in building social networks through children, school age also has an influence on social interaction for participants, as a parent's interaction can diminish as the children get older and are no longer accompanied to school.

Facilitator: Is school important in terms of people you know in the area?
Female 1: I would say yes.
Female 2: Yes, that's age dependent because the…older they are you don't take them to school, you don't pick them [up].

Edinburgh outer

Organised groups and activities were also mentioned in a number of focus group discussions, across the urban forms and demographic groups. These include political groups, street parties/events, neighbourhood-wide events such as fairs and Housing Association meetings and a bunting workshop for children, which one participant described as a good way of meeting a different set of people:

Female: We have bunting workshops in the Easter holidays and we hung out [at] different people's houses just like sewing and sticking, printing things and that was the best Easter holiday I've ever had, just spent a fortnight mucking about with bits of fabric paint and bits of foam…we met a whole different set of people doing that.

Sheffield intermediate

Female: I…probably know more people from standing outside a pub leafleting…

Glasgow intermediate

The questionnaire data shows that the extent of friendliness in the neighbourhood is likely to increase as density decreases (Table 4.12). However, the focus group findings show that friendliness differed among the cities but not by neighbourhood density, and a number of participants from the different locations described their neighbourhoods as friendly:

Female: …people generally in and around [the neighbourhood] are really friendly.

Sheffield intermediate

Female: I generally know the shopkeepers, who say hello, and things like that, so in that kind of way I think Edinburgh's very friendly.

Edinburgh centre

Male: There are other people that live around I might meet in the pub but generally I wouldn't, no, because [my neighbours] they're going to be, they're students or whatever.

Oxford centre

Perceived friendliness differed for participants: it may be experienced through shopkeepers and more formal interaction, or through the informal greeting of people and neighbours in the streets. Some participants had existing friends and relatives in the neighbourhood, as well as neighbours who may have since become friends. In two of the Edinburgh case studies in particular, there seemed to be some city-level differences not at play elsewhere.

Female: I've lived in lots of places in Edinburgh and I've never got to know my neighbours, I've sometimes had conversations with the occasional one…our next door neighbours…would help us out if we needed it, and that's fine…people will not be your friend but they will be a reasonably good neighbour.
Female 2: …in tenements in Edinburgh I think that people just, very often, unless there's a reason that they become friendly I think [when a] back green project [is] going on or they have major repairs on their roof and they all start to talking to each about how on earth are they going to pay it and then they suddenly find they're all friends, that's happened to someone I know so…got a whole new group of friends because the roof fell in. Looking up from the mess, unless there's something specific I think that it is an Edinburgh thing, I don't think it's a [neighbourhood] thing.
Female 3: I don't actually, I don't think it's so much unfriendliness as people just keep to themselves.

Edinburgh centre

Female 1: there is a word which is applied to, you know, people who move in are called 'incomers', and that's the majority term and people who move here learn very, very, quickly.
Female 2: Yes, I experienced that. We moved from Leith, although I've lived all the Edinburgh I suppose, but we moved from Leith, and people, I was amazed people said, ''where are you from?''
Female 1: …we did feel we were incomers because we came from the inside of Edinburgh and in fact people referred to us [as such]…there's a few elderly

folk near us at the [place] I just don't really know them, but. . .they're lovely, but they were very you know, "gosh! Where have you come from?"

Edinburgh outer

Interestingly, this 'Edinburgh reserve' phenomenon did not arise in the discussion with older participants there. The overall tone of the focus group discussion relating to social networks in this neighbourhood was relatively positive, with only one participant commenting that he did not know his neighbours.

Having said this, there was a sense in Edinburgh, and to a lesser extent (in terms of volunteered information) in the other cities, that 'people keep to themselves'. This was acknowledged as a barrier to meeting people, linked – possibly – to people's daily routines. A number of participants, mainly from family households and the Edinburgh case study neighbourhoods, commented that people come and go at different times of the day which may be a reason for not knowing one's neighbours:

Female: I've only just retired and when I was working full time I never saw my neighbours. I was away at half past seven in the morning and coming back at six o'clock at night.

Edinburgh intermediate

Female: [I] didn't really get to know people here until I stopped working. I think the biggest thing for me getting to know people was when I had twins because everybody wanted to look at them.

Sheffield intermediate

A further barrier to meeting and knowing one's neighbours relates to tenure, and the short-term nature of renting, in the centre case studies in particular:

Female: I say hi to them on the stairs, they say hi back most of them, but I don't know any of them at all. I've tried, I've been like hi, but. . .nobody seems to be interested, everyone keeps themselves to themselves and out of the twelve houses, more than half are not Scottish, not that make any difference but it tends to be people that only stay for a very short time. Polish people, Spanish people big mixture but not long term residents, there's only about (although) three owners.

Edinburgh centre

Facilitator: Do you all talk to your neighbours?
Male: Only the one, really. There are other people that live around I might meet in the pub but generally

I wouldn't, no, because they're going to be, they're students or whatever.

Oxford centre

This finding is also reflected in the household questionnaire results (Table 4.13). This shows that those respondents who reported owning their homes (outright or with a mortgage) scored consistently higher on the positive social interaction indicator than those who reported renting their properties; those who rent privately scored lowest in all locations.

The mix of nationalities was also cited by some participants as a barrier to knowing neighbours as sometimes the difference in culture and language was an obstacle:

Female: I would say that I know more kids now that I've been off on maternity leave, because the language barrier for me and my neighbours is quite a big issue. . .I can only speak to certain neighbours and some have to come with their children to [translate]. . .

Glasgow intermediate

Participants in the Sheffield outer area identified it a place where it is difficult to meet ethnic minorities (almost 96% of the questionnaire respondents described themselves as white), indicating that not having a good mix of nationalities in a neighbourhood could act as a barrier for such social interaction.

One further – and final – barrier to seeing neighbours, which only emerged in the Sheffield focus groups, but may have been a consideration in other cities, was the season of the year. According to one participant (Sheffield intermediate), neighbours 'don't really see each other. . .apart from in summer', while in the outer case study, one sees less of neighbours in the winter but 'may see them every day in summer'. Examination of the questionnaire data shows that respondents in Sheffield reported spending more time gardening in summer months than respondents in Oxford, Glasgow and Edinburgh, which may explain why they raised the seasons as a potential barrier to seeing neighbours.

Table 4.13
Composite variable 'friendscore', by tenure and location.

Tenure type	Centre	Interm.	Outer	Total sample
Home owner	3.1	4.3	4.6	4.2
Social renter	3.0	3.6	3.9	3.4
Private renter	1.7	3.0	3.8	2.4
Total	2.7	4.0	4.4	3.8

The focus group findings illustrate the range of influences on residents' social interaction which were both physical and non-physical. Physical aspects such as housing layout and bus stops, and (particularly for families) schools positively affected social interaction while non-physical influences included the activities participants engaged in, the propensity of people to interact with others and tenure were also influential.

5. Conclusions

5.1. Integrated findings: the cumulative effect of density on social sustainability

Overall, the findings reveal a number of associations between residential density and aspects of social sustainability. Neighbourhood density was found to have a positive influence the *use of local services and facilities*: residents in denser neighbourhoods were more likely to use their local services and facilities than those in lower-density areas. Residents in denser neighbourhoods were also less likely to own or use a car to access services and facilities. Those services closer to home were more likely to be reached on foot or bike, and those further away by car. Some participants also reported using services and facilities en route to and around the workplace. However, having accessible key services within the neighbourhood was highlighted as very important for different groups of residents such as the unemployed, older people and young families. These findings were unsurprising and broadly support existing theory and policy (Barton et al., 2003; Urban Task Force, 1999), however the analysis has shown that easy access to services and facilities is not always provided in practice.

There were however clear indications of factors unrelated to density or the physical environment which

Table 5.1
Overall findings: aspects of social sustainability more prevalent with high-density respondents.

High-density respondents are more likely to report...
Greater use of neighbourhood services and facilities
Walking or cycling to access neighbourhood services and facilities
Lower levels of car use and car ownership
Lower provision of open/green space and a lower propensity to use neighbourhood open spaces
Lower rating of neighbourhood parks and green spaces
Poorer neighbourhood quality
Feeling less safe walking in their neighbourhood after dark
A shorter length of residence in their neighbourhood
Having plans to move house in the next few years
Lower propensity to socially interact positively with neighbours ...than residents in lower density neighbourhoods.

also have an important influence on residents' use of services and facilities. These include the provision and quality of the service and facility: the impact of shop closures in the local neighbourhood such as post offices was a particular cause for concern for residents, while the quality of the services had led some participants to use those outside the local area. It does not simply follow that if services and facilities are provided, residents will use them.

The findings show that the higher the residential density, the lower the overall provision of public and green space, particularly private garden space – which was consistently lower in all five of the city centre study sites. The reported use of such public and open space also was lower in city centres compared to lower-density neighbourhoods, with higher proportions of residents here stating that they never use their neighbourhood open spaces. Having said this, the reported *use of, and perceived access to, public open spaces* was, on the whole, relatively high and satisfactory across the different demographic groups living at different densities. However, residents did not use public open spaces as frequently as other services and facilities such as shops and supermarkets. Two important factors were found to affect participants' use of public open space which related to perceived safety and maintenance. Respondents were less likely to report using open spaces if they perceived them to be unsafe. They were also less likely to feel comfortable using public open spaces if they were not well-maintained. These findings support existing theory and research (Cabe Space, 2005a; Hastings et al., 2005). Linked to this is the underlying importance of the perceived quality of open space, which emerged again as a significant factor in people's decisions to use the space, regardless of neighbourhood density. The survey findings show that residents in higher-density neighbourhoods were more likely to consider their local parks and green spaces to be of a poorer quality and less attractive than residents in lower-density areas.

The focus groups also included discussion of residents' access to, and use of, shared gardens or communal outside space. Provided for residents in higher density housing types such as tenements and blocks of flats, these spaces were often not well-maintained – and residents said this was cited as a reason for non-use. In addition, a general perceived lack of comfort and, to some extent, privacy, when using the communal space also discouraged use. A further finding indicates that formal arrangements for maintaining and managing shared open spaces are more successful than informal collective action on the part of residents. These findings point to a need for further research examining

the influences on residents' use and non-use of such spaces.

Survey respondents in city centres were more likely to report *feelings of insecurity* than their lower-density counterparts, in line with other research (Burton, 2000; Newman, 1972). Neighbourhood open spaces contributed to participants' feelings of safety – influenced too by levels of seclusion and aspects of maintenance. This indicated that secluded, overgrown and poorly maintained spaces were less likely to be used – supporting recent research conducted in London (Shoreditch Trust & OISD, 2009). Particular street characteristics also influenced feelings of safety. In neighbourhoods of all densities, alleyways and streets that were not overlooked made some participants feel less safe when moving around. The speed and volume of road traffic also had negative effects on feelings of safety, particularly for the safety of children. A significant non-physical influence on participants' feelings of safety was the behaviour of other users, particularly anti-social behaviour. This included football fans and city centre drinker as well as children and teenagers among others. Participants were often quick to point out however that for the latter group this may be resolved (to some degree) by giving young people a place to go and something to do other than hanging around on streets – a well-cited argument (Institute for Public Policy Research, 2006; Margo, 2007). Other non-physical influences on reported feelings of safety included age (older residents are more likely to report feeling unsafe) and tenure (homeowners are more likely than renters to report feeling safe) and income (higher incomes are associated with higher reported levels of safety).

Community stability and *sense of place attachment* were found to be influenced by a number of physical features including: density, accommodation type and location in relation to services/facilities, public transport and the city centre; and non-physical aspects including: feelings of satisfaction with the neighbourhood. Survey respondents in lower-density neighbourhoods tend to have lived in their neighbourhood for a lot longer than respondents in city centres. Furthermore, city centre residents were more likely to have plans to move house in the near future, particularly those living in flats. Older participants were less likely to report a desire to move house than younger participants and those with families, the latter groups citing a need for more space, a garden and a quieter place to live among reasons. The main non-physical reason given for staying in an area was not being able to afford to move. However, friendliness, organised activities and sense of community were also more positive reasons given for staying put. As housing density increases, respondents were less likely to report feelings of place attachment. There was a sense throughout the case studies that while some participants may not be living in the ideal place for them, the neighbourhoods functioned well, fulfilling residents' requirements to a considerable extent and therefore constituted a good compromise. This support is important for the stability of communities and understanding the extent to which participants are reconciled to living in their neighbourhoods, when, should personal (e.g. financial) circumstances differ, they would probably move away.

Analysis of the CityForm household questionnaire found that s*ocial interaction* and *social networks* tended to be stronger in lower-density neighbourhoods, and lowest for city centre respondents. Unsurprisingly, the focus group findings did not reflect this tendency nor did social interaction seem to be stronger among any one demographic group. Features which positively supported social interaction included the physical layout of housing (in tenements however this was reported as a barrier to interaction), as supported in theory and empirical research (Lawson, 2010; Raman, 2010). Other features included services and facilities such as schools and shops, and also bus stops. A range of non-physical influences were found to affect social interaction including tenure, having children, participation in organised groups in the neighbourhood, the perceived friendliness of an area, and the propensity of neighbours to interact socially. This latter point echoes other findings in that longer-term residents – rather than more transient ones – are more likely to interact and forge social networks in the neighbourhood. It may be helpful to see the associations found between high residential density and aspects of social sustainability in Table 5.1:

5.2. Limitations of the research

As with all research, there are some limitations that should be taken into account. Generalisations are made on the basis of a relatively small number of neighbourhoods which are located in five British cities. The five cities were selected arbitrarily because of the flexible nature of the research and its potential application to any neighbourhood. However, care should be taken in applying the findings to other cities (in England, the UK and beyond) without taking into account cultural differences.

The indicators used in the CityForm project to collect data on the built environment and dimensions of social sustainability had specific limitations. For

example, those indicators measuring neighbourhood density largely employed data which were valid only at the neighbourhood level. While the neighbourhood is a meaningful scale at which to measure such a feature of the built environment, caution is required because there were only fifteen neighbourhoods, providing limited variation in densities.

The neighbourhoods were delineated according to administrative boundaries. This was both a strength – because it is tried and tested – and a weakness because the resultant areas probably have very little bearing on residents' perceptions of what they recognise as their neighbourhood (Jenks & Dempsey, 2007).

5.3. Implications of the findings and scope for further research

A number of the claims of the high-density sustainable neighbourhood, particularly relating to social equity and accessibility, are borne out in the empirical evidence. It is more likely for high-density residents to use their local services and facilities, and to access them on foot or by bike, and less likely for them to use a car. This indicates clear support for the theoretical and policy supposition that denser neighbourhoods provide residents with easier access to services and facilities for all residents. It also suggests that services in city centre, high-density neighbourhoods may be better patronised by residents than those in lower density neighbourhoods which have greater competition from services further away as residents may, for example, choose to shop while they are en route to/from work at more convenient locations and times. While there was vocal opposition to the role that the supermarket plays in neighbourhoods, there is some scope for it to act as a hub for social interaction. While probably not an objective of the supermarkets, this is already being facilitated through the increasing provision of in-house cafés. This points to a need for further research to examine the social impacts of supermarket provision in urban neighbourhoods.

The findings do not however support claims that high-density neighbourhoods are environmentally equitable. The research shows that high-density residents are less likely to have good access to green space, which is likely to be of lower quality than that found in lower density neighbourhoods. This directly challenges the tenet that all residents have good access to good green space, which can be particularly poor for poorer residents. While this research was limited to five UK cities, it supports other research which finds that the provision of parks in deprived areas is worse than in

affluent areas (Cabe Space, 2010). Furthermore, the use and perceived quality of green spaces in high-density neighbourhoods are lower than in other neighbourhoods. Research and theory indicate that these findings are inter-linked and that if the quality of green space is high, then it is more likely to be used (Cabe Space, 2010; Shoreditch Trust & OISD, 2009). This is also linked to the focus group findings that perceived safety has an underlying impact on participants' propensity to use green space. Thus efforts to enhance feelings of safety in open space may have a significant impact on the usage thereof. The findings suggest that such efforts might be focused on the management and maintenance of these spaces. Spaces which are kept free of litter and graffiti are perceived to be more welcoming to users. An interesting finding relates to residential open spaces which are shared by residents, the research suggests that arrangements should be formalised for them to work: efforts by residents alone to manage the spaces have not been successful. More research is therefore required to explore how best to manage such spaces, which may be a combination of public and community responsibility. The impact that the coalition government's 'Big Society' policy will have on this and the wider management programme of neighbourhood open spaces is as yet unknown. However, it is strongly assumed that there will be increased focus on active community involvement in the management of such spaces. More research, such as that currently conducted in the EU-funded 'MP4' project, needs to examine the potential models that might address the shortfall in funding cuts and community organisations that might take on the management, such as 'Friends of' groups, development trusts and social enterprises.

While not all aspects of community sustainability were analysed in this research (as outlined earlier), the findings for specific aspects do not seem to support claims that high-density neighbourhoods are sustainable for communities. For example, the findings show that overall, residents in high-density neighbourhoods feel less safe than those in other neighbourhoods. Specific features of the physical environment, in particular urban layout, traffic, the lack of overlooking and street lighting, were identified as contributing negatively to perceptions of safety – supporting previous theory and research (Jacobs, 1961; Raman, 2010). This suggests that specific physical features of the neighbourhood could be targeted and improved to increase residents' feelings of safety.

The findings show that less social interaction between residents takes place in high-density neighbourhoods than in lower-density areas, and that it is more likely to be

of a negative nature – that is to say, they avoid neighbours and consider their neighbourhood to be an unfriendly place. Again, urban layout was found to potentially contribute to this, particularly housing layout which can impede or promote interaction between neighbours, which is not a new supposition or finding (Coleman, 1985; Lawson, 2001). This illustrates the scope there is for specific design features to support such interaction while retaining privacy. For example, Raman (2010) suggests that this could be through strategically located and visually well-connected open spaces in relation to dwellings. Elsewhere, the distance from dwellings to street and the area of private outdoor space at the front of dwellings have been highlighted as significant influences on social interaction and privacy (Lindsay et al., 2010). It should be noted that we cannot comment on the extent of social networks and interaction that operate beyond the spatial boundaries of the neighbourhood (e.g. online communities) as this was outside the remit of the study.

Two further inter-related findings focus on the relationship between density and community stability. Residents in high-density neighbourhoods are less likely to stay in the neighbourhood for as long as residents in lower density areas, and are more likely to be planning to move in the near future. An interesting point emerges here in relation to housing type. Residents living in flats in high-density neighbourhoods were more likely to want to move house than residents in other housing types. Although not discussed in the focus groups, it might suggest that providing housing which is suitable for larger, family households could bring about a stronger sense of attachment to an area. However, this links back to the discussion at the beginning of the paper which highlighted the well-rooted perception that the compact city is an unhealthy and unsafe place in which to live and therefore not suitable for raising a family. This points to scope for international research to examine the attitudes and perceptions of the many families living in flats in European countries to examine how/whether it might be made possible and successful in the UK.

5.4. The high-density city: a model of urban sustainability for the 21st century?

The nature of the world's population is changing. It is no longer predominantly rural and most of us now live in urban areas a trend that is set to continue (Jenks, Kozak, & Takkanon, 2008). In an urbanising world, high-density development makes sense because of the economic return on investment and the economies of scale in services and markets they afford (Design for London, 2007). In the developed world, densification is happening through processes of infill and intensification; in the developing world it is happening more organically as a result of large-scale rural migration. But while the model of the compact city might be an attractive one across the world, this paper has shown that density and its potential impacts on the resident population are not fully understood by academics, practitioners, decision-makers or residents.

These research findings discussed here point to a number of broad reflections for the 21st century city, however that might be formed, be it through planned design, organic development, market forces or otherwise.

Urban policies in developed countries continue to promote (or in the case of US and Australian cities are newly focused) on an *integrated approach* to creating well-designed places with sufficient densities that are affordable for all residents, provide economically viable services and good-quality open spaces. This research does not directly contest any of these laudable aims, but it does provide some insights as to why it an integrated approach is a valuable one to take. For example, the research shows how different elements in the neighbourhood, physical and non-physical, are inter-linked. Design, maintenance, and safety for example are all inter-linked. People interact socially in the local neighbourhood if there are legitimate reasons for them to do so, often manifested as services and facilities which can be reached safely and comfortably, by foot where possible.

The *design and layout* of the urban environment is very important for density and its acceptability to residents. Exactly what this looks like remains to be seen, but a high-density form which is designed so it is not *perceived* to be high-density would seem to garner favour in both research and practice (Raman, 2010). Thus in the UK context, the acceptable form might be high-density but not necessarily high-rise (Lawson, 2010). Similarly, it might also be high-density but with more generous internal space standards than recent urban development has provided – one of the main failings of the UK's urban renaissance movement (Punter, 2011). Linked to this is the importance of *privacy*. The research undertaken and discussed here shows that privacy is important both in the home and in open spaces, to allow users to feel safe and comfortable. This is particularly pertinent in areas of very high-density (Design for London, 2007): the design *quality*, the quality of spaces and building materials can all contribute to how comfortable people feel in their homes and gardens or outside space. This in turn can

have an effect on the social interaction with and between neighbours (Lindsay et al., 2010). High-density living needs to be seen to be an attractive option for residents at all stages of life, to make it meaningfully sustainable and viable (Howley et al., 2009; Vallance et al., 2005).

Within the design, there should also be the *passive/ visual access to green space* as the research indicates that high-density residents are not only less likely to have access to green space, but also less likely to use it than residents in lower density areas. It may therefore be the case that in high-density areas, visual rather than actual access to green space is particularly important. While there is clear, long-established evidence of the restorative effects of visual access to green space (Kaplan et al., 1998; Ulrich, 1979), it is unclear to what extent this is available in high-density environments, although there would seem to be a strong argument for this to be the case.

The design and layout must be accompanied by effective *management* of open space, which again points to a need for integration and not looking at elements in isolation. The research highlights how management influences the maintenance in a space, which can have a knock-on effect on users' perceptions of safety and comfortable use. Effective design means that high-density development is not perceived as such which can challenge the opposition in the UK to such types of development which is reflected in the large-scale flight from the city to low density suburbs and the country with much smaller counter movement to large cities (Champion, 2004).

What is not fully clear from the research, and as yet not fully explored in the wider body of research, is the impact of ultra-high residential densities on aspects of social sustainability. It is not uncommon, for example, for residential densities of over 600 dwellings per hectare in Mumbai, India (Dave, 2010). In the UK, on the other hand, designers are advising against housing densities of 200 dwellings per hectare – although these are happening in practice despite exceeding policy recommendations (Punter, 2011).

This points to the importance of *the local context*. This is fundamental to how high-density development actually is in an urban area, what that development looks like and how it is accepted. Clearly, density is not absolute, but rather culturally determined (Jenks & Dempsey, 2005). In this way, ultra high densities in cities such as Mumbai, Tokyo or Cairo are accepted (or perhaps tolerated) at levels that density has not been experienced in western European cities since industrialisation. This is an important point

because the dominant perception of the compact city is a western one, typically based on a romantic view that looks to replicate European city centre living at relatively modest densities (Dempsey & Jenks, 2010).

This highlights a gap in the way the compact city is conceptualised for the 21st urban context and questions whether the model, as it is currently interpreted, is appropriate for the range of very dense, rapidly developing cities in China, South America, India and Africa. These cities have a variety of forms: sprawling suburbs, monocentric and polycentric forms, illegal slum settlements and forms with no discernible centre. To apply the compact city model to all of such diverse urban forms would be ill-advised given the need for research into further understanding these forms, the local context and the applicability of different urban models to them. For example, recent policy focus in Hong Kong is on 'eco-density': well-designed high-rise forms which are environmentally sustainable, affordable for residents and well-supported with amenities (Wong, 2010). In Mumbai, on the other hand, the key challenges for built environment policymakers and practitioners include the provision of basic infrastructure, the lack of habitable housing, large-scale rural–urban migration and environmental pollution (Urban Age Programme, 2008). Thus while factors such as privacy, green space quality and provision are undoubtedly important, the challenges faced in developing countries are distinct from those in developed countries (Dempsey & Jenks, 2010). Urban form should therefore be examined within the specific demographic, technological, economic, environmental and social context of a place – and at different scales. There are also calls for future urban development in developing countries to be strategic, taking a long-term view and integrating the elements of urban life: including cheap and effective transport, land-use planning, urban design and governance structures (not to be under-estimated) which involve all sectors of society (Urban Age Programme, 2009). Such a combination of physical and non-physical elements will be particular to a city within a region within a country: how a particular city might approach a programme of social and environmental equity will therefore differ.

All in all, while the compact city model appears to offer various sustainability benefits, its contribution to social sustainability is not entirely positive. And, in a globalising and urbanised world, many questions remain about its applicability and replicability outside Europe and the US.

Acknowledgements

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Dr Nicola Dempsey is a Lecturer in the Department of Landscape at the University of Sheffield.

Dr Caroline Brown is a Lecturer in the School of the Built Environment at Heriot-Watt University.

Professor Glen Bramley is a Professor of Urban Studies in the School of the Built Environment at Heriot-Watt University.