Chapter Nine  Neighbourhood Design and Sustainable Lifestyles

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Introduction

This chapter attempts to answer a seemingly simple question: do residents of new housing developments, built according to sustainability principles, behave any more sustainably than the population in general? The research takes thirteen 'sustainable' housing (or predominantly housing with some other uses) schemes in the UK and investigates how sustainably their residents behave. We are only interested in sustainable behaviours that are argued, in planning and urban design theory or policy, to be supported or enabled by the physical design of the schemes. We address this task by comparing our findings with those taken from national surveys and the 'core' case study neighbourhoods’ survey. We also give evidence from our study (for ease, termed the 'sustainable behaviours' [SB] study) on residents' self-reported links between their behaviours and the design of their developments.

The chapter has the following structure. First we set out our rationale for undertaking the research, based on an argument that the 'behavioural' aspects of sustainable design are both under-researched and contentious. Second, we set out how the research is undertaken. Third we explain, in more detail, how we define sustainable behaviours, and how we derive our hypothesised links between specific behaviours and the design of housing developments. This is undertaken for three key areas of sustainable behaviour related to neighbourhood-scale design:

- **residents' home-based sustainable behaviours**: including reducing energy and water consumption, recycling and composting waste and supporting wildlife in gardens
- **residents' travel behaviour and car ownership**
- **residents' 'social sustainability' behaviours**, such as social participation and the use of local services, businesses and facilities

We then move to the empirical part of the project. We start by describing the sustainable housing schemes that we study, setting out which sustainable design features are present. Then we present some descriptive data about the sample of residents surveyed partly to explore whether any differences in behaviour can be explained by either socio-economic differences or by the fact that residents in this SB survey might have 'self-selected' to live in the new developments because they are already more sympathetic to a more 'environmentally friendly' way of life. We then present our findings on how the residents’ behaviours compare with the population in general in the three categories of behaviour set out above. Finally, we conclude with a discussion of what these analyses can and can not tell us about the extent to which 'sustainable' developments are associated with sustainable lifestyles.

It should be said at the outset that the SB survey was designed to enable further detailed statistical analyses to determine which physical features support specific sustainable behaviours. It is not the purpose of this chapter to present this aspect of
the study, but to set out evidence of comparative behaviours and of specific, self-reported, links between actions and design. This is particularly interesting in relation to the core research case studies.

**Why do we need to investigate the effectiveness of new 'Sustainable' Housing Developments?**

It is now widely accepted that the ways in which the built environment is planned, constructed and used are unsustainable (Haughton and Hunter, 1994; Williams et al, 2000). For the last twenty years, finding more sustainable ways to develop the built environment has been the focus of much theoretical and practical effort. Alongside changes in strategic spatial planning policy, a number of discrete projects are being built according to sustainability principles (Williams and Lindsay, 2007). We are seeing 'sustainable business parks', 'sustainable holiday villages' and 'sustainable housing schemes'. All of these projects are designed and built with the aim of seeking a balance between environmental, social and economic performance, both now and in the future.

In the UK there are now a number of flagship residential projects that demonstrate some of the latest thinking in sustainable design. Schemes such as the Millennium Village at Greenwich (English Partnerships, 2004) demonstrate recent best practice, and many more like them are being built. These developments contain a number of physical features now commonly associated with sustainable design, such as energy efficient homes, infrastructure to promote walking and cycling, and a range of housing types and sizes. These sorts of schemes are commonly argued to have a number of benefits over 'normal' housing developments, which are often seen as land-rich, car oriented and socially exclusive.

**How was the Relationship between the Built Environment and Sustainable Behaviour conceptualised?**

What all the sustainable schemes described above have in common is an underlying assumption that they will contribute to sustainability in two distinct ways, which we have termed ‘technical’ and ‘behavioural’ sustainability (see Figure 9.1, Williams and Dair, 2007). Technical sustainability means that the technologies, materials or design features used in the development perform effectively and contribute to sustainability in their own right. They fulfil sustainability objectives by virtue of being present in the development, but do not rely for their effectiveness on any specific behaviour by the users of the scheme. For example, using construction materials with low embodied energy ensures environmental benefits without the residents acting in a particular way.

Behavioural sustainability contrasts with technical in that it refers to the sustainable actions of those living, working and enjoying their leisure time in a development. It is argued that some elements of the built environment can enable or support behavioural sustainability (shown as the area of overlap in Figure 9.1). For example, providing cycle paths and pedestrian routes is argued to encourage people to walk and cycle rather than drive their cars, and providing neighbourhood recycling facilities may encourage people to recycle their household waste. However, these features have no intrinsic sustainability value, unless they are used properly. There are also sustainable
behaviours that are not reliant on the physical environment and can be carried out in any given setting (for example, ethical investing, shown in the right hand section in Figure 9.1).

This chapter concentrates solely on 'behavioural' sustainability supported by the physical environment. We are interested in whether housing schemes built to enable sustainable behaviours actually make any difference to how people act in their daily lives. We recognise that both technical and behavioural aspects of sustainability are important in assessing the success of schemes, but we would argue that the behavioural performance of new 'sustainable' schemes is under-researched (notable exceptions are Lazarus, 2003; Butler, 2004; Mulholland, 2003). Furthermore, where research evidence does exist, it often casts doubt on the extent to which the physical environment can positively affect sustainable behaviour (Breheny 2004; Pett and Guertler, 2004).

![Figure 9.1 Technical and Behavioural Sustainability and their Relationship with the Built Environment](image)

**Figure 9.1 Technical and Behavioural Sustainability and their Relationship with the Built Environment**

**Research Methods**

The SB survey investigates the extent of sustainable behaviours in thirteen sustainable residential schemes in the UK shown in Figure 9.2. The developments were chosen to give a spread and range of physical features to be examined. Each development is either solely residential or predominantly housing, with a range of other uses (such as shops, schools etc.). The developments chosen have been occupied for a minimum of two years, to enable behaviour patterns to 'settle'.

In each of the sustainable developments, the behaviour of residents is assessed via a questionnaire, administered to homes, that asks about current actions in a number of key areas such as travel and energy use. The questionnaire was administered to all households in smaller developments and a sample in larger ones: 659 completed questionnaires were collected: a response rate of 34%. The physical features of the
developments are assessed using a sustainability checklist that lists all the elements that could support sustainable behaviour and, potentially, be provided in a scheme. Researchers completed one checklist for each development by analysing architectural plans and drawings, and undertaking site surveys.

**Comparison Surveys**

In order to establish if the residents of 'sustainable' schemes are behaving any more sustainably than the population in general, nine comparison surveys are used. These are the core research, and eight national surveys, used as appropriate given their coverage (see DEFRA, 2001, 2007; ONS, 2005, 2006, 2008; DfT, 2005; Scottish Executive, 2002; and DCLG, 2005).

**Understanding how Sustainable Design features in Housing Schemes could support or enable Sustainable Behaviour**

In order to carry out the research, we had to understand how neighbourhood design is argued to enable sustainable behaviours. We developed a research framework, summarising a number of key hypotheses, by undertaking a literature review which covered planning policy statements, design guidance, and empirical and theoretical material on sustainable design and planning (Williams and Dair, 2007). In order to carry out this review, we needed first to define some of the key terms being used in the research.

First, we needed a working definition of a 'sustainable behaviour'. The one we adopted was developed from the conceptualisation of sustainability used in the global policy context. This sees three objectives: environmental protection (in terms of reducing resource consumption, waste and pollution); social development (equity and justice); and, more controversially, economic growth, being collective goals of societies. If these goals are to be achieved then people need to behave in certain ways. Hence, ‘sustainable behaviours’ are behaviours by individuals or groups that contribute to these three sustainability objectives. As a setting for sustainable behaviours, various spatial scales of human activity have been targeted, for example, ‘sustainable cities’, ‘sustainable neighbourhoods’ and ‘sustainable homes’ (Williams et al. 2000; Haughton and Hunter, 1994).

We are interested in behaviours related to (but not bounded by) residential neighbourhood contexts. Behaviours relevant at the neighbourhood scale, which could in some way be enabled or supported by the physical environment are identified. Only those behaviours that could contribute to sustainability in a relatively ‘mainstream’ built environment are included. We do not include behaviours common only to groups of people with particular philosophies, for example on communal-living or low-tech eco-design. The focus is a built environment that supports a contemporary society and economy, and may require some lifestyle adjustments, but not major cultural or practical changes.

Second, we refine our definition of the ‘physical’ or design features to study. We include any physical feature of the built environment claimed to support sustainable behaviour at a scale from the individual home to the neighbourhood. In terms of home-based technologies we draw a line at features that were included in the building
and fitting of a new dwelling. Hence, we include items such as in-house grey water systems and energy-efficient boilers that were installed when the schemes were built, but exclude features subsequently introduced by the residents, such as energy saving light bulbs. Most physical features are relatively easy to identify and quantify: measures were devised for elements such as cycle paths and recycling facilities. However other features are less tangible and some are more qualitative. For example, in the literature, ‘high quality’ designs are commonly associated with behaviours that help to develop social capital (see below), yet defining high quality is subjective and complex (Dempsey, 2007). We study both discrete design features, and also specific ‘qualities’ or ‘levels’ of provision that are claimed to be required for that feature to contribute to sustainable behaviour.

Which behaviours did we study?

As stated above, the study examines behaviours clustered in three key areas: home-based sustainable behaviours, travel behaviour and car ownership, and social sustainability behaviours. These are the behavioural categories that are most commonly cited in literature, policy and design guidance as being affected by neighbourhood-scale design. The next sections of this chapter set out why each is important, and how each is argued to be supported by neighbourhood design.

Home-based sustainable behaviours

Four sustainable behaviours are considered under this category. These are: reducing energy consumption; using water efficiently; recycling and/or composting waste; and supporting wildlife.

Reducing Home Energy Consumption

It is commonly known that UK households need to reduce their energy use in the home to reduce consumption of finite resources, to cut down on pollution and to help reduce fuel costs. Many professions engaged in housing production have looked to residential design to see if and where features can be incorporated into new housing to support residents to reduce their energy consumption. Within homes, energy efficient heating systems can be fitted and residents need to use the systems properly to make savings. For example, they need to time heaters and heating systems to be on only when someone is at home, to set thermostats on heaters and heating systems to the lowest temperature needed to satisfy their comfort needs, to leave empty rooms unheated (or at a low temperature) and to heat only the water they need.

Using Water Efficiently

Reducing the amount of mains water used in the home is an important aspect of sustainable behaviour for several reasons. It conserves scarce water reserves, it limits abstraction and any consequent environmental damage, and it lowers the amount of waste water discharged which in turn helps prevent flooding. In order to enable or support residents to use less water in the home, several physical features can be provided, such as grey water recycling systems, rainwater recycling systems, garden water butts, and duel flush toilets.

Waste Recycling and Composting

Recycling and composting waste are included in the study because they are significant behaviours in terms of environmental impact (DEFRA, 2005a). A number of physical
features of new residential schemes are argued to encourage residents to recycle their waste. Within homes, this includes space to sort waste material at source. In multiple occupancy buildings, recycling bins can be provided in shared utility spaces. Refuse chutes can also be provided to deliver segregated waste straight into bins. Within developments, on-site collection facilities can be provided (Barton et al., 2003; Rao et al., 2002). Provision can also be made for composting organic waste, either in private gardens or in shared space for neighbourhood use (Brownhill and Rao, 2002).

**Encouraging Wildlife in Gardens**

Globally biodiversity is in decline. In the last 200 years more species have become extinct than at any other time in the last 65 million years (TCPA, 2004). Hence, protecting biodiversity is a central aim in seeking a more sustainable future (DEFRA, 2005b). It has been argued that, in urban areas, biodiversity can make a contribution to the quality of life of residents, workers and visitors and add economic value. Residents can encourage wildlife in their gardens by actions such as providing food (although some argue this interferes with eco-systems), providing 'natural' habitats such as ponds or 'undisturbed' areas, or by using only organic gardening techniques. The physical features in new developments argued to enable householders to do such activities include the provision of private outdoor space in the form of gardens, balconies and roof terraces (TCPA, 2004; Gaston et al., 2003).

**Travel Behaviour and Car Ownership**

Travel behaviour is one of the most pressing areas of behavioural change required to move society towards a more sustainable future. The predominance of car use, and reduced levels of walking, cycling and public transport usage have created significant environmental and social problems. Here we look at behaviours related to making fewer and shorter journeys using fuel-efficient modes of transport, and car owning.

**Making fewer and shorter journeys by car, and using more fuel-efficient modes of transport**

Reducing the number and length of trips by fuel inefficient modes of transport (i.e. reducing travel demand, particularly by car) is crucial for a sustainable future as it reduces petrol (and diesel) consumption, and therefore pollutants that affect climate change and air quality. A modal shift away from the car and towards walking, cycling and public transport also has wider benefits: it ensures there are more people 'on the streets' which improves neighbourhood activity and safety, and reduces noise pollution. It also means that public transport services are more likely to be viable. In addition, it could help to improve public health (see DfT, 2004; Transport 2000 Trust, 2003).

Neighbourhood design features claimed to enable residents to make fewer, shorter and less car trips vary in scale and type. At the master planning scale it is argued that high-density developments within existing built up areas can enable most people to live near amenities, facilities and employment and thus reduce the need to travel (DETR, 2000c). Mixed-use developments are advocated for similar reasons (Barton et al., 2003). In addition, the appropriate design of the movement framework is seen as the best way to ensure that car use is limited (DETR, 1998). This means transport networks that are well integrated with the surrounding area, have dedicated, convenient, direct routes for pedestrians and cyclists, and are linked in a grid or deformed grid pattern (rather than a cul-de-sac configuration). They also need to be
able to accommodate public transport and offer direct routes to interchanges (DETR and Cabe, 2000; Llewelyn-Davies et al., 2000).

Due to the localised nature of short journeys, much importance is attached in design guidance to the detail of the public realm at the neighbourhood scale as a way to encourage walking, cycling and public transport use. A number of elements could contribute to ease of access, legibility, safety and convenience, which are significant in influencing peoples’ travel mode choices (Llewelyn-Davies et al., 2000; Civic Trust, 2001; Brownhill and Rao, 2002; Transport 2000 Trust, 2003; DfT, 2003). Such features include signs and maps, adequate seating, and convenient places to park or store a bicycle in homes and at trip ends.

Car Owning
The vast majority of households in the UK (77%) now have access to at least one car. Clearly car ownership and usage rates are related: when people have access to a car, especially if they have invested in buying and maintaining it, they often feel an incentive to use it, rather than use other modes, such as public transport. Designers of new sustainable residential developments have been keen to dissuade residents from owning one or more cars. Overall, the desire is to create places which do not 'feel' car oriented and that are comfortable to walk and cycle around. But, alongside the positive measures set out above to encourage walking, cycling and public transport, there are more punitive attempts to reduce car ownership, such as reducing the amount of parking or providing limited parking space for a pool of shared cars.

Social sustainability: social participation and the use of local services and facilities
There are elements of neighbourhood design that are argued in policy and literature to be related to social sustainability (see Chapter Five for a fuller discussion). Here we are interested in the simple concepts of social participation (in community groups, for example) and the use of local services and facilities as indicators of social sustainability. We have picked these out for the reasons set out below.

Social Participation
Social participation is seen as the cornerstone for building and maintaining social capital, and in turn social capital is essential to avoid social exclusion (Social Exclusion Unit, 2001). Research findings indicate that people living in communities with high levels of social capital are more likely to benefit from personal well-being, lower crime rates, more empowerment and a higher quality of life than those living in communities where social capital is lacking (Healey and Côté, 2001; Putnam, 2001). Additionally, through positive social interaction, people become more attached to a particular neighbourhood and want to remain there and invest time and energy in maintaining community organisations. In this way, social networks of friends and family are built over time. A sense of ‘belonging to’ or ‘ownership of’ a neighbourhood is argued to be a key element in creating sustainable communities (Urban Task Force, 1999).

The relationship between social participation and the physical environment is neither direct nor easy to define, but a number of physical features are argued to support it. An obvious requirement is the presence of community facilities and amenities close to homes (Barton, et al, 2003). In addition, the quality of the environment is important (Urban Task Force, 1999; Gehl, 2001). For people to engage with each other they
need to feel comfortable and enjoy their neighbourhood. In addition, people need to be able to access space for social interaction easily and efficiently. In this respect the physical features related to the transport behaviours above are also all relevant.

**Use of Local Services, Amenities and Businesses**

The use of local public services and businesses is argued to support sustainability objectives in a number of ways. First, it supports local economic sustainability: the more people use services, amenities and businesses, the more viable they become, and this in turn creates employment demand. It also supports local supply chains and helps retain money circulating within the local economy for longer periods, with the effect of increasing growth in that area (Dixon and Marston, 2003). There are also benefits in terms of increased vitality of the neighbourhood. There are higher numbers of people in the public realm and this in turn increases feelings of safety and reduces the need for formal security. It also increases opportunities for social interaction and helps guard against isolation and exclusion (Carmona et al., 2001), and makes use of any spare capacity in social provision (DETR, 1998).

As with social participation, the link between using local services, amenities and businesses and the physical environment is not always direct. However, a number of links are commonly made. First, in order to enable people to use local services and businesses, they must be provided nearby. Therefore buildings for services such as surgeries, schools, community centres and commercial activities (e.g. retail and workshops) need to be either provided in new developments, or the developments need to be located near to existing provision. The services and businesses will be more viable if they are located in high density developments with sufficient numbers of people to patronise them. Consideration also needs to be given to accessibility. Hence, the physical features supporting reduced travel demand and supporting the use of public transport, walking and cycling are relevant. High quality urban design, buildings and open spaces are also associated with the regular and frequent use of local facilities (DETR, 2000a and b; Carmona et al, 2001). Research evidence also suggests that the attractiveness of a place has a direct impact on the number of people spending time in an area and using its facilities.

We have now set out the main theoretical and conceptual thinking underpinning the SB study. The next sections of the chapter set out the empirical analysis. We start with a description of the thirteen case study schemes.

**The 'Sustainable' Developments**
Figure 9.2 The Case Study Locations

The thirteen 'sustainable' schemes are spread around the UK. The locations are shown in Figure 9.2. The main characteristics of the developments are set out in Table 9.1. It should be noted that all the information relates to the part of the development that is included within the site boundary for the research (or, in the case of 'uses' in the development or within 500m of the boundary). In some cases this was the whole development, in others part of it.
Table 9.1 Sustainable Developments in Study

<table>
<thead>
<tr>
<th>Name of ‘Sustainable’ development</th>
<th>Grange Farm</th>
<th>Amersham Road</th>
<th>The Waterways</th>
<th>Alpine Close</th>
<th>The Courtyards</th>
<th>Great Notley Garden Village</th>
<th>Greenwich Village</th>
<th>Millenium Village</th>
<th>Ingress Park</th>
<th>Lansdowne Gardens</th>
<th>Newcastle Great Park</th>
<th>Westoe Crown Village</th>
<th>The Staiths South Bank</th>
<th>Cooper Road</th>
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<td>% homes + efficient heating systems</td>
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<td>Quality of routes %</td>
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<td>Public transport provision %</td>
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<td>43</td>
<td>86</td>
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<td>86</td>
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<td>Pedestrian routes %</td>
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<td>58</td>
<td>50</td>
<td>50</td>
<td>88</td>
<td>10</td>
<td>55</td>
<td>38</td>
<td>88</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Cycle routes %</td>
<td>100</td>
<td>0</td>
<td>13</td>
<td>0</td>
<td>13</td>
<td>100</td>
<td>33</td>
<td>67</td>
<td>0</td>
<td>13</td>
<td>13</td>
<td>100</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Average parking standard per home</td>
<td>-</td>
<td>2.00</td>
<td>1.50</td>
<td>1.50</td>
<td>-</td>
<td>0.75</td>
<td>1.50</td>
<td>1.85</td>
<td>2.00</td>
<td>1.50</td>
<td>1.00</td>
<td>1.94</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. This is a simple count of the number of different uses. Categories were: schools, health facilities, place of worship or community halls, local store (e.g. post office, newsagent or food store), shopping centre or high street, social space (e.g. public house, restaurant, café), indoor leisure/sports facility, park and public open space. This count is for uses in the development (i.e. within the boundary of the case study area) and nearby (within a 500m radius of the development boundary).
2. This includes pre-school, primary and secondary in the development or within 500m of the boundary.
3. RSL: Registered Social Landlord
4. This is a composite weighted score based on SAP ratings and heating systems ratings.
5. This is a composite score of three measures in the site survey: the preservation of existing wildlife areas, the creation of new wildlife areas and the management of the wildlife areas.
6. This is a composite weighted score based on assessments of a number of features, e.g.: maintenance, litter, active frontage, building quality, attractiveness, local style and character and quality of public realm

7. This is a composite weighted score based on assessments of a number of features, e.g.: predominant street pattern, extent of natural surveillance, legibility, active frontage, extent of direct links outside the development, signage and traffic calming

8. This is a composite weighted score based on, e.g.: number of bus routes, bus lanes, bus stops and distance to public transport interchanges

9. This is a composite weighted score based on, e.g.: lighting, seating, crossings and direct routes to outside the development

10. This is a composite weighted score based on, e.g.: quality of cycle paths, number of cycle paths and direct-access routes to outside the development

11. The '-' indicates missing data (i.e. it was not available for the parts of the developments covered in our case studies)

As Table 9.1 shows, the schemes vary in scale and in the sustainability features they have. Some have almost all features, while others have fewer (in the site survey this information is broken down into a finer grain of measures). This is taken into consideration in the analyses. Another interesting aspect of the schemes is their architectural quality. Some have an 'eco-aesthetic', others are more traditionally designed. In addition, the extent to which the schemes are 'known' or 'marketed' as 'sustainable' varies considerably. Developments such as the Millennium Village in Greenwich, are well known for their 'green' aspirations, whereas in others, the sustainability elements are conveyed more subtly, or not at all. Figs 9.3-11 give some images of the developments.

Figure 9.3 and Figure 9.4, Millennium Village Greenwich; Figure 9.5 Amersham Road, Reading

Figure 9.6 Alpine Close, Maidenhead; Figure 9.7 Cooper Road, East Sussex; Figure 9.8 Great Notley, Essex
Differences between the Sustainable Behaviours Study and the Comparison Surveys

Before we move on to the results about behaviours, it is useful to comment on our sample of households and how it compares with the comparison surveys. Overall, the SB sample is quite similar to national averages on most key characteristics, such as household type and size, age, and way in which the homes are owned, except that two of our schemes are occupied wholly by tenants of Registered Social Landlords (RSL). As would be expected, people in our sample have lived in their homes for far shorter a time than average: 40% of our sample had lived in the schemes for less than 2 years. This may affect some behaviours, such as social participation, that take time to develop. We also have a moderate over-representation of higher social classes in our sample: 24% higher managerial and professional, compared with a national average of 13%; and 38% lower managerial and professional, compared with 23% nationally. This may have some bearing on the sustainable behaviours as some have been shown in previous studies to be undertaken more by some socio-economic groups than others.

In terms of variations in urban form or design between the SB study and the samples, clearly our sample has far more sustainability features than either the core study or the national comparisons. There is also a wider range of densities in the core case study neighbourhoods (from 24.5 dph to 270.5 dph) than in the SB sample (26 to 153 dph). The national comparator surveys cover both rural and urban areas, so some differences may be explained by these different contexts. Where data is broken down by area type in comparison surveys, this is mentioned.

Notwithstanding these variations, it should be stressed that it is impossible to control for all socio-economic or urban form variations in this type of research. No samples of residents will ever be identical save one or two key built form variables: comparative built environment research always faces this problem. However, undertaking the comparisons presented here, using carefully selected descriptive data, has value in assessing the question posed at the outset about the relative behaviours of residents in 'sustainable' schemes. The inclusion of the self-reported links with the physical environment helps to shed further light on the behaviours.

Residents' Attitudes towards, and Knowledge of, Sustainable and Environmental Issues
The first comparative task undertaken is to see if the residents of the SB schemes are more sympathetic to, or knowledgeable of, sustainability issues than the population as a whole. This is to determine any predispositions to behaving sustainably that may not be linked to the physical environment. First, residents are asked if they had heard of the term ‘sustainable development’: 64% of SB respondents had heard of the term, compared with only 32% in the DEFRA survey (2001). The SB study then asked how concerned residents are about the environment (Figure 9.12). Here, we found no significant difference between the SB study and the national average. This perhaps suggests that our sample is more knowledgeable, but not more concerned, than the population as a whole.

![Figure 9.12 The Proportions Concerned about the Environment in the SB and DEFRA Surveys](image)

We also asked our sample if they feel they, or other people, need to change their behaviour so that other people can enjoy a good quality of life and environment in the future (Figure 9.13). Overall, the SB sample residents have a stronger feeling that both 'themselves' and 'most people' need to change, but both surveys reveal a strong feeling that as well as personal change, other people need to do their bit.
Do you, and other people need to change your/their way of life so other people can continue to enjoy a good quality of life and the environment?

![Bar chart showing proportions of people who think there is a need for change.]

Figure 9.13 The Proportions who see the need for change to improve Quality of Life and the Environment in the SB and DEFRA Surveys

Note: SS: Scottish Survey

Finally, we asked respondents in the SB study what had been the most important factors when choosing their home (Figure 9.14). It is interesting that around a third of respondents state that energy and water efficiency was important (34% and 28%), and around 40% state that the quality of the development and of local facilities were factors. One would expect aspects such as size and type of home to be highly rated, but this set of responses shows quite a high degree of conscious prioritising of sustainability features when choosing a new home. Clearly, the high prioritising of parking space (48%) goes against this, but is consistent with most studies of requirements for new housing, particularly in higher social classes.
Important reasons for choosing your home

Figure 9.14 Reasons for Choosing a Home in Sustainable Developments

Findings on Sustainable Behaviours

Home energy use and water efficiency
To see if the SB respondents are efficient in their use of energy and water in the home we asked them about their behaviours in a few precise areas that are also included in national surveys: turning off lights in empty rooms; heating rooms only when they are in them; and taking showers instead of baths. For all three behaviours, the SB sample is significantly more active than the population as a whole, as evidenced by a comparison with the DEFRA Survey 2007 (89% turn off lights, 56% only heat required rooms and 74% shower instead of bathe) (Figure 9.15).
Figure 9.15 Energy and Water Efficiency Behaviour recorded in the SB and DEFRA Surveys

Note: The wording in the DEFRA and SB studies is slightly different, but the data are still comparable.

We then asked the SB sample if living in an energy or water efficient home had made them more cautious about how they used these resources. Figure 9.16 shows the responses only from those who are actually living in energy or water efficient homes in the sample. It shows a positive impact on behaviour, with the majority saying it has made them more cautious about energy (56%) and water use (62%), slightly fewer saying it has made no difference, and only a very small percentage saying they are now less cautious. This indicates a direct impact on behaviour due to the design of homes.
Has your energy/water efficient home encouraged you to be … ?

![Bar chart showing percentages of residents of energy efficient and water efficient homes in the SB project.]

Figure 9.1 Influence of Energy/Water Efficient home on efficiency behaviour in Sustainable Developments

**Waste Recycling and Composting**

We then compared the percentage of the SB study that regularly recycle or compost their waste with national surveys (here we have used the DEFRA surveys from 2001 and 2007 as they illustrate that, in general, these behaviours are becoming more common) (Figure 9.17). In terms of recycling, the SB study has a higher percentage of recyclers than the 2001 survey, and slightly fewer than the 2007 study. Overall though, almost 79% of SB respondents regularly recycle waste compared with 84% nationally. In terms of composting, the SB study performs less well than both DEFRA surveys. This could be partially due to the fact that composting rates are generally far higher in rural areas (48% compared with an average of 36%), but still does not explain the very low rates. Open-ended responses from the questionnaire suggest reasons for not composting are related to wanting to keep gardens pristine, or not having enough outdoor space.
Figure 9.17 Regular Recycling or Composting of Waste recorded in the SB and DEFRA Surveys

Note: The DEFRA data relate to paper recycling only, the SB study does not differentiate

We asked our sample which recycling facilities they used regularly, to see if local provision of facilities were being utilised (Figure 9.18). Respondents could tick any facility they used on a regular basis. 55% used kerbside collections, 54% used local facilities, and 37% used facilities in their own homes.

Figure 9.18 Recycling Facilities used regularly in Sustainable Developments

*Encouraging wildlife*

In terms of encouraging wildlife, we compare our findings (Figure 9.19) with some from the core survey. Interestingly, we find that in the SB study far fewer people provided food for wildlife (30% compared with 52%), and fewer maintained ponds
than in the core study (4% compared with 8%). The core data is a useful comparison for this behaviour, because both studies are largely of urban populations, and the data shown here are only for respondents in both surveys that have access to private outdoor space. Reasons given in the SB survey for not providing food or a pond are that people liked their gardens to be tidy, they find wildlife a nuisance, and that they do not have enough space.

![Bar chart showing support for wildlife recorded in the SB and Core Surveys](image)

**Figure 9.19 Support for Wildlife recorded in the SB and Core Surveys**

**Making fewer and shorter journeys by car, and using more fuel-efficient modes of transport**

Although, as set out above, numerous claims are made about the travel impacts of new forms of development, it is very difficult to make comparisons because local context is so critical. Hence, here we have chosen the simple measure of mode of travel to main place of work. Clearly this does not cover travel for non-work uses, nor does it address frequency (which is addressed to some extent below) but it is the most readily comparable measure with wider data sets and is therefore useful. Figure 9.20 shows that fewer people walk to work in the SB study (9%) than in any comparable survey; this is at odds with the theory and policy advice on sustainable housing schemes. Fewer people drive to work than national averages (60% compared with 68% nationally), but more do so than in the core survey. Cycling is also slightly higher than national averages, but less than the core. However, public transport use is higher than all national comparisons and the core survey (24%), signifying perhaps some success in integrating public transport facilities. But, it should be noted that this result is slightly skewed by large numbers of respondents at Greenwich Millennium Village using the tube and bus services.
We asked the respondents who regularly walked, cycled or used public transport (for any trips, not just work) whether any of the common design aspects thought to encourage these modes of travel were important in their choices. We also asked them about non-design related public transport provision such as frequency of services. Just under 40% of people said that convenient pedestrian routes, well lit routes, and direct routes to local facilities were important (Figure 9.21). The most commonly cited influence was the frequency of regular bus services (45%). We have to remember for this chart though, that not all the features listed are present in all schemes, so the relative benefit may actually be higher.
Figure 9.21 Factors that encourage People to Walk, Cycle or Use Public Transport

Car Owning
We asked SB respondents how many cars they had access to. The hypothesis is that the SB study residents will own fewer cars than the population as a whole. In contrast to this, our sample had the lowest percentage of car-free households in any of the surveys (13% compared with 32% in the core survey) (Figure 9.22). The SB survey also had the highest percentages owning one and two cars. This result could be explained partially by the proportion of higher social classes in the study, who tend to own more cars, but considering the mainly urban locations and the limited parking, this is an unexpected result.
Figure 9.22 Number of Cars owned/available recorded in the SB, Core, National Travel and DEFRA Surveys

We asked those in the SB study who did not have access to a car if any of the 'stick' or 'carrot' measures designed to discourage car ownership had been important in their decision. We found that these measures had a negligible impact (Figure 9.23). A lack of parking was hardly ever reported as a disincentive (5%), even though many of our schemes have limited allocations by recent standards. Positive 'carrots' such as good public transport facilities were only seen as important by 13% of the population. However, it may be that as most of our schemes had at least one parking space per household, the question would have been more revealing if it had asked about owning more than one car.
Figure 9.23 Factors influencing Car Ownership

Social participation
As explained above, social participation is a complex concept. Here, we have chosen a simple measure of 'participation in local community or neighbourhood groups' as an indicator. This leaves out any measure of individualised and less formal social participation. The SB study results for participation are very similarly to those in the core study: the numbers involved are very low, with only 10% of respondents in the SB survey, and 13% in the core survey regularly taking part. Whilst there is no direct national comparator, the DERFA 2007 survey records that half of the population (50%) had been involved in a social activity in their local area in the two weeks previous to the survey. This count allows for a wider definition of social activity, and does not directly imply 'regular' participation, but the percentage still seems significantly higher than the core and SB survey to raise the question of whether these rates are particularly low.

Use of local services
As with social participation, use of local services and facilities is a particularly difficult behaviour to measure meaningfully in a comparative context, as so much relies on the extent and provision of services. Hence, we have chosen to look not at absolute numbers of trips to facilities, but at the most commonly recorded frequencies of use to see if the SB residents use local facilities more frequently than those in the core survey. SB residents were asked about their use of facilities both 'in' their development, and 'outside their development but in the nearby area'. This distinction is obviously not relevant for the core sample, hence the differentiation is not made. Also, some of the categories of facilities are framed slightly differently in the two surveys. Hence, the data shown is presented exactly as it was collected from the respective surveys.

The facility that is most commonly used on a daily basis is the corner shop/convenience store in the core survey (Figure 9.24). The local shops in the SB
survey both inside the development and nearby are the next most commonly used on a daily and weekly basis. Community and sports facilities are also used relatively regularly (weekly) with cafes, pubs etc. used less frequently.

![Frequency of use of local services](chart.png)

**Figure 9.24 Use of Local Services**

**Conclusions**

We began this chapter by asking the seemingly simple question: do residents of new housing developments, built according to sustainability principles, behave any more sustainably than the population in general? We have answered this by looking at key sustainable behaviours identified in policy and literature as being linked to neighbourhood scale design. This has been done through the use of descriptive data from the SB survey and comparable national surveys.

Overall, our answers are mixed, but more negative than positive. The residents of the 'sustainable' schemes only seem to behave more sustainably than the rest of the population in home-based resource efficiency behaviours, such as water and energy use. Results for recycling and frequency of use of local facilities are about the same as national comparisons. For most other behaviours, such as travel to work by car, owning (or having access to) a car, social participation, encouraging wildlife, and composting they behave less sustainably than the population in general. For around a third of residents energy and water efficiency is important in choosing their home, and many feel that living in a more sustainable house has either affected thei r resource consumption behaviour positively, or at least not changed it. Just under half of residents who regularly walked, cycled and used public transport feel supported in doing so by elements of neighbourhood design, but hardly any are dissuaded from owning a car. What we see, in general, are residents who are more knowledgeable about sustainability issues than the general population, but not necessarily more concerned or 'active'. However, as with all research of this type, the devil is in the detail and these results need further unpacking to give a more critical picture.
First, we need to consider the fact that these settlements are all new. As we stated above, many residents have only recently moved to them. This may have an impact on certain behaviours in comparison with more established places (unfortunately no comparable studies of new developments exist). Behaviours related to social participation, for example, traditionally develop over time. Similarly, we find that behaviours like outdoor composting and encouraging wildlife in gardens are often unpopular because people feel their gardens are 'new and pristine' and want to keep them like this. Many also said they do not have enough space in the new development: a consequence of higher density policies.

Second, not all the case studies have all the sustainability features (or only have them in small degrees), so in some cases it could be seen as 'unfair' to judge the case study in terms of consequential behaviours. Where appropriate in the analysis we present results via subsets (for example by selecting samples only of energy and water efficient homes), but in some instances this has not been undertaken as we are attempting a general comparison at this stage. To a certain extent we are interested in the totality of sustainable behaviours and also the extent to which they 'add up' to form sustainable lifestyles in these new settlements.

Third, as has been mentioned throughout the analysis, the SB survey does not have a representative social profile: it has higher proportions of managerial/professional residents than would be expected. This could be affecting the results: some negatively, for example, for issues like car ownership where we would expect higher rates, yet we would also expect higher rates of, for example, recycling and energy efficiency, but these results are more mixed. We should also say that in the case studies that were populated by RSL tenants some differences in both opinions and behaviours could be noted and these also require further analysis.

This comparative research has proved useful in setting our results alongside national data, but we are now undertaking further statistical analysis to examine in detail the relationships between the specific behaviours and individual elements of physical design to determine if any relationships exist at this level, and what the nature of these relationships may be. During this analysis we will test for the impact of socio-economic and other contextual variables, and examine additional behaviours, such as travel for other uses.

As a footnote, it is interesting to stand back from this research and contemplate the value of trying to build housing schemes to support sustainable lifestyles at the present time. Although evidence of sustainable behaviours does not seem strong at present in the SB survey, it could be argued that the real benefit of the schemes studied is that they provide built environments that can support more sustainable lifestyles if and when people are ready to take them up. Increases in fuel costs, for example, see people reduce their car use and start walking, cycling and using public transport instead. The SB schemes allow residents to make this transition easily, unlike many 'normal' schemes where residents are locked into car use. It would be interesting to revisit these schemes in ten years.

Acknowledgements
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