

'Moments of change' as opportunities for influencing behaviour

Final Report

A research report completed for the Department for Environment, Food and Rural Affairs by **nef** (the new economics foundation).

November 2011

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Executive Summary

This document is the final report from Project EV0506 – “*Moments of change*” as *opportunities for influencing behaviour*. It was commissioned by the Centre of Expertise on Influencing Behaviours at the Department of Environment, Food and Rural Affairs (Defra). The goal of the project was to explore whether “moments of change” – times in a person’s life where existing habits and behavioural patterns are disrupted – provide a significant opportunity to encourage the take-up of pro-environmental behaviours. In particular, the project focused on life events (such as having a baby) and macroeconomic events (such as the 2008/9 “credit crunch”).

The aims of the project were to:

- review relevant theoretical literature so as to develop a more nuanced understanding of *why* moments of change might serve as an effective intervention point;
- explore the extent to which the moments of change hypothesis is supported by existing empirical evidence, about individuals’ responses to personal life changes and to wider socio-economic changes; and
- consider the practical feasibility of intervening at moments of change so as to facilitate and encourage pro-environmental behaviours.

Theoretical review

The first stage of the project comprised a review of several strands of theoretical research to develop a framework for understanding the way that behaviours may, or may not, change with significant events. The framework dimensions are:

- *Degree of motivation to modify behaviour at the point that the moment of change occurs.* The Transtheoretical Model of behaviour change suggests that individuals pass through different stages in the process of changing their behaviour characterised by different degrees of motivation.

- *Extent of pre-planning for anticipated behaviour modification at the moment of change.* The Transtheoretical Model also suggests that the extent to which a change in behaviour has been anticipated and planned for is an important element in behaviour modification.
- *Personal beliefs about the new behaviour.* General beliefs and attitudes towards a behaviour influence subsequent action. This is a key strand of the Theory of Planned Behaviour.
- *Ease (perceived and actual) of adopting the new behaviour.* This dimension summarises the elements of Theory of Planned Behaviour relating to the extent of control which people believe they have over a behaviour and how they perceive social norms about the behaviour.
- *Change in performance context.* Habitual behaviours are often cued by the physical and social contexts in which they are performed. Changes in these contexts may play a role in behaviour adjustment.
- *Habit strength and conscious awareness.* Strong habits are resistant to change. Strongly habitual behaviours may thus be more likely to persist following a change event.
- *Ego depletion/relative priority of behaviour.* Live events involving conscious and deliberate self-control over behaviours may affect individuals' ability to self-regulate subsequent behaviours.

Personal life events as moments of change

The second stage of the project reviewed evidence on pro-environmental behaviour change in response to: 1) four life events – leaving home, having a first child, moving house and retiring; and 2) wider exogenous changes including macroeconomic flux and abrupt changes to energy prices caused by supply problems (referred to as energy shocks).

One component of this project undertook interviews with a number of practitioners working in areas related to the 'moments of change'. It is important to note that some of the material from interviews reflects the personal experiences and views of those consulted. Where this is the case, quotations and/or paraphrases from interviewees are given *in indented, italicised type*.

Material presented in this way should not be regarded as representative of the views of any other person or group or organisation for which they work. In addition such material should not be regarded as the expert view in this field.

Leaving home for the first time

- Overall, too few studies of behaviour were found to enable identification of typical or common changes in behaviour as people leave home for the first time (other than, for students, increases in alcohol consumption and decreases in diet quality).
- Evidence from the academic literature is relatively thin, but suggests that some behaviour changes occur more or less spontaneously (i.e. without intervention), such as those relating to food consumption.
- University students are a "captive audience", so targeting them with interventions should be relatively straightforward. By contrast, people who leave home but who do not go into higher education and who are not otherwise in contact with some other institution (e.g. social services) are hard to identify and thus may be difficult to target with an intervention.
- Interviews with a small number of practitioners (this methodology is outlined at the top of p.8) working with students provided anecdotal evidence to suggest that:
 - Students may moderate their energy use, although this may be a function of financial consideration rather than because of the change associated with leaving home (i.e. applying more to second year university students as they move out of halls rather than new students).
 - Social norms (within the peer group) relating to environmental behaviours are thought to be an important determinant of pro-environmental behaviours for students (as wider evidence suggests for other peer groups). This is

consistent with research suggesting that during “emerging adulthood” (c. 18-25) young people are beginning to forge their own identities in relation to those around them.

- Interventions based on awareness, price and competition may all influence students’ environmental behaviour to some degree. For instance, initiatives such as *Student Switch-off* suggest that interventions with new university students can be effective in helping students develop good energy use behaviours, although robust evidence of efficacy is still relatively scarce.
- Interventions led by the students’ union rather than the university authorities are likely to be more effective since this may have more credibility with students.

Transition to parenthood

- For new parents, some evidence was found for changes to: 1) habitual travel; 2) food purchasing; and 3) self-care behaviour. All seem to change in directions which have positive environmental impacts although two – curtailment in travel and less time spent on self-care – appear to arise from necessary practical considerations (i.e. focusing on the baby), rather than any individual motivation to change. Some evidence suggests that such changes are not maintained as children get older.
- New parents buy a significant amount of baby equipment and develop habitual behaviour around nappies. Purchasing copious new equipment is likely to have a negative environmental impact. In the case of nappies, most parents choose to use disposables which have a clear environmental disadvantage from the point of view of waste volume, but a much less clear cut impact on carbon emissions.
- Previously-held pro-environmental convictions can influence decisions about baby-related consumption behaviour. However, these may be offset by social norms and resulting feelings of guilt about providing for the baby, particularly influencing decisions about purchasing new equipment.
- The transition to parenthood offers a number of opportunities for intervention, since most new parents come into contact with existing services and support networks. However, anecdotally, having a new baby is characterised as

“overwhelming” and mentally and physically exhausting. This may influence receptivity of new parents to behavioural interventions. Evidence from interventions targeting health-related behaviour suggests that new parents do not always maintain behaviour changes after the birth of their child.

- Relatively undesirable behaviour changes which are “forced” on new parents (e.g., reduced time for self-care, disturbed sleep patterns) may constitute a barrier to external interventions aimed at creating further changes (people feel they have “enough to deal with already”).
- Interviews with a small number of practitioners (this methodology is outlined on p.8) suggest the demands of becoming a parent mean that further pro-environmental behaviour changes perceived as non-essential to meeting the demands of their new situation are likely to be given considerably lower priority than changes which the situation makes inescapable. Interventions must be sympathetic to the fact that the transition to parenthood is a challenging moment in most adult lives, where attention and effort is focused narrowly on the baby. Advice and support must be seen to be relevant to these concerns if it is to be taken on board.

Moving house

- There is reasonable evidence to show that residential relocation is linked to changes in travel behaviour, but little evidence was found specifically relating it to other behaviour changes.
- Researchers who have explicitly addressed the moment of change hypothesis by examining travel mode choice during and following residential relocation have found evidence of a number of effects including increased use of public transport, reduced strength of car use habit, activation of pro-environmental values leading to a desire to change travel behaviours and, at the group level, reduction in the growth of car ownership.
- Characteristics of the new residential area can influence travel mode choice, e.g. whether the new area has good public transport links. Interventions designed to make alternatives to car driving easier, such as providing free public transport tickets, have shown some success with people who have recently moved home.

- Some evidence suggests that travel options are often considered during the early stages of planning for a house move. This means that people may have already made their decisions about travel behaviour before the move actually occurs.
- The most successful interventions have involved the provision of personally-tailored support and advice, but this is – potentially, at least – a somewhat time and resource intensive approach.
- Identifying people who are about to move house is difficult. One study found that identifying recently sold houses from a property website was relatively successful. Other approaches have been tried (e.g. working with estate agents and utility companies to identify new householders) but with less success.
- One approach, currently being tried in two UK areas, is for the local authorities to require developers of new housing to cover some or all of the costs of public transport for the initial period of occupancy and also provide personal travel planning advice.

Retirement

- Overall, there is a lack of evidence regarding the impact of retirement on everyday and habitual environmental behaviours. No interventions, successful or otherwise, were found that specifically targeted recent retirees (as opposed to older people in general).
- However, there is some evidence of differences between retired people and other groups, *controlling* for age, which suggests a specific effect of retirement. Beyond the obvious reduction in car use resulting from not having to commute to work there is evidence that, even controlling for age, retirees use cars less for non-commuting travel than working people. Some evidence suggests that retired people engage in more pro-environmental behaviours – such as energy saving in the home and reducing food waste – than other groups.
- Where there are differences specifically linked to being retired, it is possible they are more motivated by money-saving than by environmental concern, e.g. increased energy-saving behaviours and less food waste.

- Reduction in car use may be related to internal factors such as emotional attachment to personal vehicles and external factors such as availability and ease of use of public transport. However, evidence on this is extremely limited.
- The importance of cost factors for retired people suggests that interventions that help them make savings, particularly regarding energy, are likely to be successful. Moreover, the increased time affluence of retirees has, in some cases, been found to lead to the possibility of more pro-environmental behaviour (e.g. “slow shopping”, walking rather than driving). Interventions could be targeted to make the most of this.

Exogenous shocks as moments of change

This section reviewed evidence for changes in environmentally-relevant behaviour in response to a number of significant exogenous shocks, including: the 1970s oil shocks; the 2000 UK fuel protests; the California energy crisis; the 2008/9 credit crunch; and the impact in Cuba of the collapse of the Soviet Union.

- There is fairly good evidence that people can and do make marked changes to their consumption habits and travel behaviours in response to energy price shocks and economic crises. This can be seen both from historical data and in recent data from the current financial crisis.
- Evidence from historical data suggests that these behaviour changes tend to return to “normal” once conditions (e.g. prices) return to their previous state. Some evidence suggests that the *expectation* of a return to normal is a factor in helping people make the changes willingly in the first place.
- However, the finding in California that a large proportion of the long-term consumption changes following the energy crisis were due to the purchase of energy efficient appliances implies that such shocks might catalyse the purchase of “greener goods”.
- Changes to consumption patterns generally reflect “cutting back” on retail discretionary spending (i.e. restaurants, hairdressers, foreign holidays) and major purchases discretionary spending (i.e. cars).

- In terms of travel behaviour, research points overwhelmingly to a preference for maintaining private vehicle use and adopting different routes, travel schedules and trip-chaining rather than shifting mode.
- Due to lack of appropriate data, any attempt to judge the influence of individual-level factors is necessarily speculative. However, changes in consumption data are consistent with a situation in which people are “feeling the pinch” and deciding to rein-in their spending on non-essentials, as is the finding that energy use rebounds strongly once prices are capped.
- No evidence was found to suggest that exogenous shock provide an impetus for people *deliberately* to act more pro-environmentally in their daily lives.
- No evidence was found of attempts to encourage pro-environmental behaviours *specifically* during any of the economic or energy shocks considered.
- Cuba’s *Revolución Energética* is an extreme example of an effective government-led intervention to improve pro-environmental behaviour in response to an exogenous shock. However, whilst an interesting case study, it is not obvious how any comparable population-wide intervention could be delivered in the UK, where the role of government agencies in people’s everyday lives is much less extensive.

Future directions

At present, the moments of change hypothesis is very much theory-driven, arising from conceptual models of how habitual behaviours are formed and changed. It was supported by the experience of some of the practitioners who were interviewed. Although there were some promising findings, verifying the hypothesis will require much more research. Specifically, more empirical evidence is required that: 1) tracks the same people over time; 2) starts from before the moment of change occurred; and 3) involves detailed attitudinal and behavioural measures. We suggest that this should come from practical, action-oriented research based around real-world interventions. Based on our review, we outline some *priority concerns* for future research into the moments of change hypothesis. These are not recommendations for specific programmes of research, but are important issues that future research should attempt to address if it is to build effectively on our existing knowledge. In exploring the potential of ‘moments of change’ interventions, it is important that they

always draw on wider principles on how to effectively influence behaviour. The efficacy of 'moments of change' interventions should be considered not only in absolute terms, but also in relation to other approaches that could be employed as part of an overall package of interventions to influence behaviour over time.

- Conducting qualitative research with people who have already changed their behaviours in order to understand the motivating factors, especially in relation to the *timing* of behaviour changes.
- Developing action-research projects based on real-world situations and interventions.
- "Mapping" the life course in terms of people's contact with service and organisations that could potentially deliver a behaviour change intervention.
- Exploring the relationship between people's receptivity to interventions at different "moments" and the message content and framing.
- Exploring whether the source of the intervention impacts on its acceptability and efficacy.
- Exploring whether upstream or downstream interventions are most effective at moments of change.
- Bearing in mind the need to demonstrate the efficacy of a moments of change intervention not only in absolute terms, but also in relation to other approaches that could be employed instead.

Part 1

Background and theory

1 Habitual behaviour and moments of change

What is habitual behaviour?

- 1.1 Navigating the world is a complicated business. We are bombarded with information and choices virtually from the moment we wake up to the moment we go to sleep. If we were to attempt to make conscious decisions about every individual action and behaviour we undertook, our cognitive apparatus would be overwhelmed and we would get little done.
- 1.2 Of course, as a moment's introspection makes obvious, we do not make conscious decisions about every action. Rather, actions that need to be repeated frequently tend to become automatic – that is, guided without need of conscious direction – and can thus be regarded as *habitual*.
- 1.3 The word “habit” has come to have negative connotations. Health professionals talk about “bad habits” such as smoking, over-eating and nail-biting. Clinical psychologists (or at least those working within a cognitive paradigm) refer to the persistent negative thoughts that can accompany depression, anxiety and obsessive-compulsive conditions as habitual (Beck, 1967). However, habitual behaviours are a useful and adaptive way of dealing with the complexity of the world around us and because so many of our daily actions are relatively repetitious and mundane, may in fact account for a relatively large proportion of everyday behaviour. One empirical study asked respondents to write down what they were doing once every hour for several days. Analysis of these reports found that around 45 per cent of the behaviours recorded were repeated at around the same time, in the same place, everyday (Wood *et al*, 2002). Other researchers have suggested that the proportion of our daily behaviour that is conducted automatically and more-or-less without conscious direction may be the considerable majority (Bargh & Chartrand, 1999), perhaps as much as 95 per cent (Baumeister *et al*, 1998).
- 1.4 Social psychologist Bas Verplanken has argued that whilst habitual behaviours are often performed frequently, frequency *per se* should not be regarded as their defining characteristic. Rather,

[w]hat really matters is the smoothness and fluency of behaviour; that is, the fact that we do not need to think about what we are doing and can do things in parallel. In other words, whereas repetition of behaviour is a necessary condition for a habit to develop, the defining quality of habit is the automaticity and efficiency of behaviour occurring in stable contexts (Verplanken, 2006, p. 639).

- 1.5 Thus, a habitual behaviour is one for which there exists a well-formed cognitive *schema* – a mental model that guides the relevant action and that can operate “in the background”, without need of conscious direction. In a series of longitudinal studies, Verplanken found support for this hypothesis by demonstrating that the previous frequency of behaviour and self-reported habit strength¹ each independently predicted the likelihood of particular behaviours occurring.
- 1.6 Of course, because repetition is required for the habit to develop in the first place, it is clearly the case that habitual behaviours are likely to be the sorts of behaviours that are performed often – brushing one’s teeth is probably habitual for most people, whereas buying a new toothbrush is not. However, Verplanken’s analysis raises the possibility that as someone’s personal circumstances change, his or her habitual behaviours might persist beyond the point at which they are functional (or, at least, optimal) so long as the controlling schema are consistently triggered.

Habitual elements in environmentally-relevant behaviour

- 1.7 The determinants of individuals’ pro-environmental behaviour have been extensively researched and a recurrent finding is that – at least when considered in isolation – broad environmental values (such as whether people think biodiversity is important) are a relatively poor predictor of pro-environmental behaviour (see, for instance, Nordlund & Garvill, 2003). Many pro-environmental behaviours are strongly habitual; for instance, six of the twelve behaviour change goals identified in Defra’s pro-environmental behaviour framework (Defra, 2008; Table 1.1) relate to habitual everyday

¹ Measured using the Self-report Habit Index (Verplanken & Orbell, 2003), an inventory assessing subjective reports of performance frequency, difficulty of control and extent of automaticity for a given behaviour.

behaviours (and there are, arguably, habitual elements to several of the remaining six).² Given that environmental attitudes are most likely to influence behaviours *before* they have become habitual (Dahlstrand & Biel, 1997) and that everyday behaviours such as food purchasing and water and energy use are likely to reflect long-standing routines, this might be one reason for the apparent gap between environmental attitudes and behaviours.

- 1.8 In fact, each of these is likely to involve a great many small, relatively discrete behaviours that are undertaken with little or no conscious direction. Consider the example of water efficiency/usage in the home. People use water for a large number of household tasks, many of which are habitual in the sense described above. For instance, individuals who are in the habit of leaving the tap running as they brush their teeth have probably repeated this same action at least twice daily for many years with little or no conscious awareness of doing so. It is extremely unlikely to be the case that each time they reach the sink they think to themselves: “should I leave the tap on, or not?” Rather, the decision to brush their teeth (which, it could be assumed for the sake of argument, is itself taken consciously) activates a sequence of well-learned constituent behaviours which proceed automatically – one of these is turning on the tap to wet the toothbrush, another is turning the tap off after rinsing.³ In this example, the behaviour we would like to change is a small part of a larger set, governed by a higher level intention which is desirable – in other words, we do not wish to stop people brushing their teeth, just have them do it differently. Other examples of habitually inefficient water use may be flushing the toilet twice, over-filling the washing-up bowl or using the dishwasher every night even when only half full. In these and other cases, the problematic behaviour is embedded within a large sequence and well below the level of conscious intention.

² Defra has undertaken a refresh of the Framework including reviewing the behaviours that constitute sustainable lifestyle, the Framework for Sustainable Lifestyles (2011). See also Defra Habits, Routines and Sustainable Lifestyles (EVO502) a summary of findings from an extensive literature review on the role of habit in relation to sustainable behaviours.

³ In a famous article, Lashley (1951) showed that complex behavioural sequences such as that described are not actually *triggered* sequentially, but are organised hierarchically underneath higher-level intentions (“schema”). In other words, it is not the case that picking up the toothbrush necessarily triggers turning on the tap, which triggers opening the toothpaste, and so on – rather, the conscious intention “brush teeth” activates all of these.

Table 1.1: Headline behaviour goals identified in Defra’s pro-environmental behaviour framework (2008). Note that six of the behaviours are described as “habitual”.

Consumption cluster	Behaviour group	Behaviour	Behaviour type
Homes	Energy efficiency/usage in the home	Install insulation products	One-off purchasing decision
Homes	Energy efficiency/usage in the home	Better energy management and usage	Habitual everyday lifestyle
Homes	Energy efficiency/usage in the home	Install domestic micro-generation through renewables	One-off purchasing decision
Homes	Waste and recycling	Increase recycling and segregation	Regular everyday lifestyle
Food	Waste and recycling	Waste less (food)	Habitual everyday lifestyle
Homes	Water efficiency/usage in the home	More responsible water usage	Habitual everyday lifestyle
Transport	Personal transport	Buy/use more energy efficient (low carbon) vehicles	Occasional purchasing decision; Habitual everyday lifestyle
Transport	Personal transport	Use car less – seek alternatives for short trips (<3 miles)	Habitual everyday lifestyle
Tourism	Personal transport	Reduce non-essential flying (short haul)	Occasional lifestyle decision
Homes	Purchase of eco-friendly products	Buy energy efficient products	Occasional purchasing decisions
Food	Purchase of eco-friendly products	Eat food locally in season	Habitual purchasing decisions
Food	Purchase of eco-friendly products	Adopt diet with lower GHG/env impacts	Habitual everyday lifestyle

1.9 These kinds of behaviours are relatively small scale, even if their net impact can be significant since they are typically repeated daily. But the problem of habit does not only apply at this micro-level. Transport choice, for instance, has a strongly habitual component – studies show that habitual car drivers are extremely resistant to changing travel mode, even when faced with significant obstacles to their usual routes. Similarly, people fall (or fail to fall) “into the habit” of recycling (Knussen & Yule, 2008). In short, any successful pro-environmental behaviour change strategy must consider possible ways to

overcome old, environmentally-damaging habits and encourage new, better ones.

Changing habits: Introducing the Moments of Change hypothesis

- 1.10 As noted above, the defining characteristics of habitual behaviours are that they become deeply entrenched through constant repetition and are then activated with little conscious intent. Like any such behaviours, behaviours with negative environmental consequences can remain stubbornly in place long after they have ceased to be useful.
- 1.11 At the same time, however, habitual behaviours clearly can, and often do, change. Research in applied psychology, especially health psychology, has led to the development of numerous conceptual models of the process through which behaviour change comes about, with the intention of devising interventions that can expedite or catalyse the process. The success of these models and their associated interventions has been mixed, and there is considerable debate about which are most useful in which kinds of setting (see, e.g. Baranowski *et al*, 2003). Over the years, a number of these models have been applied to the problem of changing environmental behaviours. Again, success has been somewhat mixed (see, for instance, Beatty *et al*, 2002).
- 1.12 Whether applied to health, environmental or other behaviours, a feature of many behaviour change models is that they assume that the change is to some degree *intentional* (i.e. deliberate) on the part of the individual. To that end, they have tended to give primacy to the mental processes that are assumed to underlie successful behaviour change and pay rather less attention to the role of the external circumstances in which the person finds themselves.
- 1.13 However, recent research suggests that previously existing habits may be more easily broken, and new habits more easily formed, at so-called “moments of change” (sometimes referred to as “habit discontinuities”; Verplanken & Wood, 2006). “Moments of change” are occasions where the circumstances of an individual’s life change considerably within a relatively short time frame. The reasoning underlying this hypothesis is that most

habitual behaviours involve interactions with stable features of the individual's immediate physical and social environment; as such, they are only possible to maintain if these environments *remain* relatively stable (Verplanken & Wood, 2006). When something interrupts performance of the old behaviour, the need for some degree of conscious direction returns – and once this has happened, the behaviour may be more susceptible to change.

- 1.14 Although this is a relatively new hypothesis, several empirical studies have set-out to test it. Wood *et al* (2005) studied the TV watching, newspaper reading and exercise habits of students who moved from one university to another. They found that old habits were more likely to persist after the move when the new environment was similar to the old one; where it was different, there was more chance that new habits would be formed.
- 1.15 Verplanken *et al* (2008) compared the travel mode choices of university staff who had and had not recently moved house. As predicted, the evidence suggested that moving house had led many to reconsider and change their habitual travel behaviours. Further, those who held more pro-environmental views were more likely to make pro-environmental travel choices after the move than those who did not. This finding is interesting, for it suggests that the nature of the behavioural change undertaken following a moment of change may be dependent on the attitudes and beliefs that a person holds *prior* to the change occurring (although the study was based on a single cross-sectional survey, so this could be tested explicitly) This research is discussed in more detail on page 66.
- 1.16 In a study reported by Bamberg (2006), recently-arrived residents to an urban area were provided with a number of free bus tickets, plus personalised travel schedule information. Compared to a control group, who had also moved house but not been given the tickets or the information, the intervention group were found to be significantly more likely to use public transport.
- 1.17 Two further recent studies have explored the moments of change hypothesis in the context of food consumption. In Berlin, Herde and Schäfer (2006) surveyed a range of both prospective and recent (within the last three years) first-time parents about their attitudes to food and nutrition, combining this research with focus groups. Limitations of the sample were such that the data could not be properly considered representative (e.g. levels of income and

education were higher than the Berlin average and the immigrant community were not well represented). Yet the researchers found evidence that parents became more interested both in the nutritional content and also in the “sustainability” and sourcing of their food following the transition to parenthood. Moreover, there was some evidence (albeit self-reported) that these changes in attitude were reflected in actual consumption patterns. Results from this study are reviewed in more detail in Chapter 5.

- 1.18 Another study from Germany, Brunner *et al* (2006), used a combination of short telephone interviews, in-depth interviews and workshops to consider food consumption behaviour in relation to four distinct events: parenthood, serious illness, retirement and in response to public “food scandals”. As with Herde and Schäfer’s (2006) study, some evidence was found to suggest that all four events were associated with changes to previous food purchase and consumption behaviours. Again, results from this study are reviewed in Chapters 4 and 5.

Aims of this project

- 1.19 Although the studies cited above offer encouraging support for the moments of chance hypothesis, they must be regarded as inconclusive since they are few in number and limited in scope. Nevertheless, a number of authors have already suggested that targeting individuals who are undergoing a moment of change may be a promising focus (Maio *et al*, 2007; Schäfer & Bamberg, 2008; Verplanken & Wood, 2006).
- 1.20 The aim of the project was to consider the extent to which available evidence supports this suggestion. In particular, the aims were:
- To review relevant literature so as to develop a more nuanced understanding of *why* moments of change might serve as an effective intervention point.
 - To explore the extent to which the moments of change hypothesis is supported by existing empirical evidence, by drawing on concrete examples of individuals’ responses both to personal life changes and to wider socio-economic changes.

- In light of this evidence, to consider the practical feasibility of intervening at moments of change so as to facilitate and encourage pro-environmental behaviours.

1.21 These aims are addressed in the report as follows:

- Part 1 (Chapter 1 and 2) outlines a conceptual framework describing factors that could influence behaviour at moments of change.
- Part 2 (Chapters 3-6) reviews a broad range of evidence for the occurrence of environmentally-relevant behaviour changes at four major life events common to many people: leaving home; having a baby; moving house; and retiring.
- Part 3 (Chapters 7-9) reviews evidence for behaviour changes made in response to a number of major exogenous shocks, including disruptions to energy supply in California and fuel supply in the UK in 2000 and the 2008/9 “credit crunch”. As a contrast, it also considers a recent example of post-crisis intervention in Cuba.
- Part 4 (Chapter 10) considers the implications of the previous chapters for future research into the moments of change hypothesis.

2 A theoretical framework for understanding moments of change

Introduction

- 2.1 This chapter reviews several strands of theoretical research that relate – directly or indirectly – to the moments of change hypothesis. From this review, a number of dimensions are drawn out that, together, comprise a framework for understanding the way that behaviours may, or may not, change with significant events.
- 2.2 It is important to point out that this framework is theoretical in nature. Properly establishing all of the psycho-social factors that might predict behaviour modification at a given moment of life change (let alone how they interact with one another) would be a very significant task. Current empirical research has barely begun to scratch the surface. As such, the framework represents an initial assessment, based on an informed reading of the habit and behaviour literature and extrapolation from popular theoretical approaches.

The Transtheoretical Model: Motivation to change and planning for change

- 2.3 In the clinical health promotion literature, perhaps the dominant approach to behaviour change has been the so-called Transtheoretical (or sometimes Stages-of-Change) Model (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997). Developed and refined over several decades, this model was originally derived from a comparative analysis of individual change processes, as described in different theories of psychotherapy (hence “transtheoretical”). It describes five stages through which people who are successful in changing their behaviour are assumed to pass:
- Pre-contemplation
 - Contemplation

- Preparation
- Action
- Maintenance

2.4 In the Transtheoretical Model, positive changes are assumed primarily to result from conscious mediation. In *pre-contemplation*, the idea of changing behaviour is not “on the radar” or is seen as undesirable. In *contemplation*, the individual begins weighing-up the pros and cons of changing. When the pros outweigh the cons, they move to *preparation* in which they lay the groundwork for the change. *Action* is the point at which the behaviour itself is changed. *Maintenance* is the period after the initial change, during which the new behaviour is embedded and becomes habitual or the “default” option. Whilst presented as a linear sequence, in fact it is possible – and quite usual – for people to move forward and back between the stages.

2.5 Evidence for the efficacy of this model in describing behaviour change in the context of health behaviours is somewhat mixed. It has been strongly critiqued on conceptual grounds (West, 2005) and a number of meta-analyses of intervention studies have suggested that stage-based interventions may be no more effective than those based on other models (Riemsma *et al*, 2003; Horowitz, 2003). However, other studies suggest that it is useful, at least for some people (e.g. Lichtenstein & Hollis, 1992; Prochaska *et al*, 1993) and it remains the most widely used model in the health promotion literature and is commonly taught to healthcare professionals.⁴ Moreover, the few theory-driven intervention studies to explore the moments of change hypothesis (e.g. Bamberg, 2006; the *Life Events* project⁵) have been designed around the model.

2.6 How can this model be applied to the moments of change concept? There seem to be two possibilities, relating to two key elements of the model: individual motivation to make a change and making plans for implementing the change.

⁴ Although the incorporation of this kind of teaching into already overburdened medical curricula has not been without problems; see Wylie & Thompson (2007).

⁵ www.lifeevents.de/

- 2.7 Firstly, and in common with most other competing change models, the Transtheoretical Model supposes that the individual has some conscious motivation to change their behaviour. When it is used in healthcare settings, for instance, techniques such as Motivational Interviewing (Miller & Rollnick, 2002) are now frequently used as a means to help people “find” their own motivation and so move from pre-contemplation through contemplation and preparation. But a significant life event – moving house, say – may be totally unrelated to the individual’s motivation to change a given environmentally-relevant behaviour. In this case, there would be no reason to expect the change event to coincide with the “action” stage of the model. In other words, the individual’s motivation to change *that particular behaviour* may be anywhere from pre-contemplation (not, or barely, having considered it) to maintenance (having recently made the change). There is therefore a question of which stage of the model an individual is at when a moment of change occurs.
- 2.8 The first dimension in the behaviour change framework thus reflects the degree to which, at the point when the change event occurs, the individual happens to be motivated to change a given environmentally-relevant behaviour. This is shown in Table 2.1. Note that whilst the specific language of the Transtheoretical Model has not been used in the table (so as to retain more general applicability), *low* motivation corresponds approximately to “pre-contemplation”, *moderate* to “contemplation” and *high* to “preparation”, in terms of the individual’s state of readiness to change.
- 2.9 It is important to note that there is no assumption here that the change event itself is *in any way responsible* for influencing motivation one way or another – only that it represents a more generalised disruption. Thus, for instance, if a person is highly motivated to change a given behaviour, they may be more likely to do so at a moment when “everything is changing”; but there is every possibility they would have made the change anyway at some point. Conversely, if they have very low motivation, they may be unlikely to change that behaviour even given a significant life event that interrupts a number of different aspects of their normal behaviour patterns.
- 2.10 Further, it is interesting to highlight one difference between the kinds of behaviour for which this model was developed and the kinds of environmentally-relevant behaviours that are the focus of the present report.

The model was devised to help change behaviours that the individual themselves feels are undesirable because they impact negatively on his or her own life in some way – smoking, excessive drinking, poor diet, failure to exercise and so on. The individual’s conscious desire to change the behaviour is an explicit part of the model and his or her self-efficacy in relation to the behaviour – that is, belief in his or her own ability to make changes – is assumed to be crucial. Whilst a number of “processes of change” are posited, all assume that the individual wants to change the behaviour in question because, in some tangible way, they can envisage a *personal benefit* from doing so.

Table 2.1: Degree of motivation to modify behaviour at the point that the moment of change occurs

Behaviour: Adopt a sustainable and healthier diet

Specific example: Proportion of vegetables, grains and pulses in diet (a balanced diet)

Level of motivation	Definition	Example
High	Strong, conscious intention to change existing behaviour significantly or to begin a wholly new behaviour	Deciding to become vegetarian
Moderate	Conscious intention to modify existing behaviour in some respects	Deciding to increase proportion of vegetables, grains and pulses in the diet
Low	Little or no conscious intention to change existing behaviour	No intention to change diet

2.11 The second approach to combining the moments of change hypothesis with the Transtheoretical Model is to assume that the life event is connected in some way with the individual’s motivation to change the behaviour in question. The intended behaviour change could be a central reason that the life event is occurring, as in the case of someone who decides to move to a smaller, more energy efficient house because he or she wishes to reduce his or her carbon footprint. Alternatively it could be tangential, as in the case of someone who is planning to move house for family reasons, but decides that it is also a good opportunity to start using the car a bit less and cycling a bit more. Critically, though, the assumption here would be that combining the proposed behaviour change with the life event was to some degree intentional

and planned-for. Some possible degrees of pre-planning are described in Table 2.2.

Table 2.2: Extent of pre-planning for anticipated behaviour modification at moment of change

Behaviour: *Using a car less – seek alternatives for short trips*

Specific example: *Transport options following a move*

Level of planning	Definition	Example
Considerable	Substantial preparation and planning in anticipation of change	Consideration of transport options plays an important role in earliest decisions about when and where to move house
Moderate	Some preparation and planning	Considering transport option in advance of move, but only after location and timescale have been decided
Little	Little or no preparation and planning	Little thought given to transport plan until move has actually taken place

The Theory of Planned Behaviour: Beliefs about the behaviour and ease of adoption

- 2.12 Another extremely popular model for conceptualising behaviour and behaviour change is the Theory of Planned Behaviour⁶ (Ajzen, 1991). The Theory of Planned Behaviour has been applied successfully to the problem of changing habitual health-related behaviours (e.g. Godin & Kok, 1996) and has since been applied to environmental behaviour (e.g. Bamberg *et al*, 2003).
- 2.13 In the Theory of Planned Behaviour, three distinct components are assumed to influence individuals' intentions to act and therefore, their subsequent behaviours. First are their own personal beliefs about the behaviour in question – their attitudes. Second are their normative beliefs – their perceptions of the wider social pressure to behave in a certain way. Thirdly are their control beliefs – their perception of their own ability to perform a given behaviour.

⁶ Although we follow convention in the literature by treating this as a proper name, we use the UK spelling of "behaviour".

- 2.14 Clearly, personal beliefs about the behaviour in question are likely to be important at a moment of change. A person who strongly believes that recycling is a complete waste of time is unlikely to be easily persuaded to begin recycling irrespective of how their personal circumstances change, whereas someone who believes that recycling is worthwhile may be more open to “giving it a go”.
- 2.15 However, it is also well-known that positive attitudes alone are insufficient to change behaviour. Professor Wendy Wood of Duke University (personal communication) argues that habits can act as a constraint, trapping people into certain modes of behaviour and preventing people from acting in accordance with beliefs and values. She suggests that moments of change may, in effect, “free” people to act in accordance with their values.
- 2.16 Following Wood’s argument and also Verplanken *et al* (2008), it can be suggested that personal beliefs held *prior* to the moment of change are likely to influence any subsequent behaviour change. This may apply to beliefs about the specific behaviour, or to beliefs about the environment more generally. Table 2.3 describes this dimension.

Table 2.3: Personal beliefs about new behaviour

Behaviour: Eating food locally in season

Specific example: Food shopping behaviour in retirement

Level of belief	Definition	Example
Positive	The new behaviour is strongly in line with own beliefs/attitudes	Given more time following retirement, time is devoted to shopping in local farmers’ markets
Neutral	No strong beliefs/attitudes concerning the behaviour in question	Food shopping is not a priority and conducted on the basis of mood and convenience. This may include local / seasonal food
Negative	The new behaviour is opposed to the individual’s beliefs/attitudes	Following significant reduction of income as a result of retirement, food shopping is restricted to a low cost supermarket. Price is the only factor and sourcing/seasonality are of no concern

- 2.17 As for the remaining two dimensions of the Theory of Planned Behaviour, there is some debate in the literature about their status. Some have argued

that perceived behavioural control should really be considered as two separate components relating to perceived difficulty and self-efficacy (e.g. Trafimow *et al*, 2002). As for social norm, some researchers (e.g. Cialdini *et al*, 1991) have suggested that this too should be considered as comprising two components: *injunctive* norms, reflecting a person's perceptions of how others expect them to behave; and *descriptive* norms, reflecting perceptions of how other people themselves behave. One recent paper found that descriptive but not injunctive social norms predicted intentions to recycle, but neither were significant independent predictors of actual recycling behaviour (White *et al*, 2009).

- 2.18 For present purposes, however, it seems sensible to collapse them into a single dimension relating to the perceived ease of adopting a given new behaviour at a moment of change (Table 2.4). The rationale here is that when it comes to deciding to develop a new behaviour, social norms intuitively function in the same way as beliefs about control and difficulty, i.e., as barriers to getting started. For instance, Kurz *et al* (2005a) conducted a qualitative analysis of interviews with homeowners in Perth (Australia) on the subject of water and energy conservation in the home. A major finding was of a dichotomy between (claimed) personal desire to save water and social "obligations", such as to keep up appearance of the garden and maintain accepted standards (e.g. of hygiene). In other words, beliefs about the social acceptability of water conservation made it seem "difficult" and thus served to dissuade people from trying.
- 2.19 In general, a sense of efficacy seems to be important for environmental behaviours as any others. de Young (1996), for instance, emphasises that attempts to increase the likelihood of individuals engaging in environmentally sustainable behaviours should not overlook whether the task feels relatively easy and straightforward. Whilst, for instance, recycling household waste appropriately is not difficult, neither is it obvious or intuitive at first. Attempts to promote recycling must therefore not only encourage people's motivations to act, but should recognise that many individuals will not feel especially competent when they try activities new to them; this feeling of incompetence, in turn, is likely to interfere with their persistence at the new behaviours.
- 2.20 Of course, practical considerations can make certain kinds of behaviour seem easier. For instance, in another study Kurz *et al* (2005b) showed that energy

saving behaviour in the home was more frequent and more effective, when labels were actually placed on household items that both served as reminder to residents to curb their energy use but also, crucially, detailed how they should go about it. In terms of the Theory of Planned Behaviour, this approach influenced the ease with which people were able to adopt the new behaviour by increasing the extent to which they perceived themselves to have control over the situation.

Table 2.4: Ease (perceived and actual) of adopting new behaviour

Behaviour: *Increasing recycling and segregation*

Specific example: *Waste recycling following a house move*

Level of ease	Definition	Example
High	Features of context (e.g. provision of information, social norms, infrastructure, etc) mean that positive environmental behaviour seems the “easiest” choice	Recycling and segregation facilities (e.g. a multi-compartment kitchen bin, coloured bags) and simple user guides are provided free to residents by the Local Authority. There is a regular collection regime for recycled waste
Moderate	Features of context support positive environmental behaviour but require some mental/physical effort	Recycling facilities are available but must be specifically requested from the Local Authority. Collection is sporadic
Low	Features of context make it difficult to adopt positive behaviour without considerable mental and/or physical effort	The only recycling facilities are several miles away and no explicit marketing or information is provided by the Local Authority to encourage their use

Behaviour cueing: Degree of change of context in which behaviour is performed

2.21 The two models considered above suggest that behaviour change comes about because – to some degree – people have decided that they *want* to change. However, a central assumption of the moments of change hypothesis as described is that changes external to the individual may lead to changes in existing behavioural patterns and habits, or to the take-up of new behaviours, without requiring (necessarily) prior intention or motivation to change. How might this happen?

- 2.22 As Verplanken (2006) argues, habitual behaviours are controlled by mental constructs⁷; as a matter of definition, therefore, they are performed with little conscious awareness or deliberate intent. One implication of this conjecture is that removing or changing the trigger will inhibit performance of the behaviour. Understanding how schema are triggered thus seems to be vital for understanding how existing behaviour might be changed and how new behaviours can be influenced.
- 2.23 Wood and Neal (2007) argue that “contexts activate habitual responses directly, *without* the mediation of goal states” (p. 843; emphasis added). Contexts – that is, situations in which the habitual behaviour is usually performed – contain cues, either in the form of certain physical features or objects, of certain particular people, or of certain preceding behaviours. When a person encounters these cues, the behaviour in question is triggered without the individual needing to have consciously decided to act.
- 2.24 Wood and Neal (2007) propose that contexts trigger habitual behaviour in one of two ways: direct cuing and motivated cuing. The process of direct cuing is essentially one of learned association between the context and associated behaviour. The authors give the example of buckling the seatbelt when getting into a car. At first, this has to be done consciously, but over time the mere act of getting into the car “triggers” the action of putting on the seatbelt.
- 2.25 Motivated cuing occurs when a particular context has become associated with performance of a goal-directed behaviour – that is, a behaviour that yields a desired outcome of some kind. An example (from Wood and Neal, 2007) is buying popcorn at the cinema. At first, the act of buying popcorn is deliberate and is motivated by a rewarding goal (eating tasty popcorn). However, because this behaviour is always done at the cinema, over time the context becomes associated with the behaviour and people end up buying popcorn automatically when they go to watch a film, irrespective of whether they particularly wanted it or not.

⁷ The term “construct” is often used by psychologists to reflect a mental system or set of rules that causes people to act a certain way in a given situation, usually without their conscious awareness. Mental constructs cannot be observed directly and are not assumed (necessarily) to reflect actual physiological structures in the brain; rather, they are a hypothetical “construction” that is useful in explaining observed behaviour.

- 2.26 Whatever the particular nature of the cuing mechanism, the theory suggests that habitual behaviour will be interrupted if a moment of change involves some element of change to the context in which the behaviour is usually performed. Extent of context change is thus taken to be an important consideration for a theoretical framework, as described in Table 2.5.
- 2.27 Notably, deliberate removal or avoidance of the contextual cues that trigger certain behaviours is a technique that features in the Transtheoretical Model, where it is usually referred to as “stimulus control”; (Prochaska *et al*, 1988). This is seen as a way of ensuring maintenance of the new behaviour (e.g. taking a different route home to avoid driving past the takeaway shop). In that model, the assumption is that the context change is *intentional* – part of a wider strategy to effect a change in some behaviour. Here, though, the question is whether the life event itself gives rise to changes in the way in which a behaviour is usually performed, irrespective of whether or not the individual intended to change their behaviour.

Table 2.5: Change in performance context

Behaviour: *More responsible water usage*

Specific example: *Shower usage after moving to a shared flat at university*

Level of performance	Definition	Example behaviour
Completely	Previous behaviour is no longer possible in the new context, necessitating development of an entirely new behaviour	The new flat does not have a shower
Significant	Previous behaviour is seriously disrupted by changes in performance context such that conscious modifications are required	The new flat has a small water tank and cannot store enough hot water for everyone to shower in the morning
Moderate	Previous behaviour is moderately disrupted such that it is no longer optimal but could feasibly continue with relatively little conscious readjustment	The heating system in the new flat means that the boiler must be turned on an hour before the shower can be used
Insignificant/ not at all	Relevant aspects of performance context have not changed, or have changed in such a way that they do not affect performance of existing behaviour	The new flat has a shower and heating system similar to that in the previous residence

Habit strength and conscious awareness

- 2.28 As noted above, Verplanken (2006) has argued that habits are mental constructs rather than mere stimulus response patterns. As such, whilst frequency of performance may be a useful proxy for habit strength in many instances, it is not literally synonymous with it.
- 2.29 It is known from previous research that habit strength leads to more resistance to behaviour change. In Wood *et al's* (2005) study of university students transferring to a new college, for instance, habit strength mediated the relationship between intention and action. Similar results have been found both by Klöckner and Matthies (2004) in the context of daily commuting and by Bamberg (2006) in relation to travel mode choice following a house move.
- 2.30 Broadly speaking, it is expected that the more strongly habitual a particular behaviour has been, the more likely it is that some form of the behaviour will persist in spite of the change event.

Table 2.6: Habit strength and conscious awareness

Behaviour: Better energy management and usage
Specific example: Patterns of domestic appliance use

Level of habit strength	Definition	Example
Strong	Previous behaviour was performed very frequently (e.g. daily) and/or with very little conscious direction	Putting the dishwasher on every night, irrespective of how full it is
Moderate	Previous behaviour was performed quite frequently (e.g. every few days) and/or with a moderate level of conscious direction	Using the dishwasher every few days, once it is full
Weak/not habitual	Previous behaviour was performed very infrequently or as a one a "one-off", with full conscious direction	Only using the dishwasher on particular occasions, e.g. after having guests over

Stress, self-regulation and "ego depletion"

- 2.31 Although the use of Freudian terminology makes it sound old, the concept of ego depletion (or sometimes "active coping") is in fact relatively recent. Based chiefly on the work of social psychologist Roy Baumeister (Baumeister *et al*,

1998; 2000), the theory posits that exercising conscious and deliberate self-control over behaviours requires effort and energy. People's reserves of this energy are limited and can become depleted when called upon to self-regulate their behaviour, such that for a certain time afterwards their ability to self-regulate subsequent behaviours will be limited. Ego depletion is thus, in a sense, an explanation for why habits are useful in the first place – without them, finite cognitive resources would be totally used-up simply getting through day-to-day life.

- 2.32 Wood (personal communication) has suggested that ego depletion could be an important concept for the moments of change hypothesis. If the change is particularly stressful and makes high demands on cognitive resources, the likelihood of someone slipping into comfortable and automatic behaviours (where possible) is high. Moreover, they may be less willing or able to accept new behaviours that are not directly related to the main issue at hand. For instance, perhaps the stress of looking after a new baby will be such that people simply do not have the cognitive resources available to consider making changes in areas of their lives that are not directly concerned with childcare.
- 2.33 In Table 2.7, several “levels” of ego depletion are described. The point is also made that the relative priority of the behaviour in question is an important factor – when resources of self-regulation are limited, those behaviours that are judged to be more important are likely to command most attention.

Table 2.7: Ego depletion and the relative priority of behaviour

Behaviour: Environmentally-relevant food shopping behaviours

Specific example: Response to different moments of change

Level of ego-depletion and/or priority of behaviour	Definition	Example
High ego depletion and/or low priority	High number of demands on attention (i.e. lots to think about at the same time) and/or behaviour is a low priority	After having a baby, increasing purchases of packaged convenience food, due to not having time / mental space for shopping and cooking
Moderate ego depletion and/or moderate priority	Some demands on attention and/or behaviour is a moderate priority	Working out the best places to shop for food after moving to a new area
Low ego depletion and/or high priority	Few demands on attention and/or behaviour is a high priority	Increasing the amount of food shopping done in local stores due to closure of nearby supermarket

Summary

2.34 Our review of the theoretical literature relating to habitual behaviour and behaviour change has produced a framework with seven dimensions. Together they provide the basis for a more nuanced understanding of the ways in which behaviours either change or remain the same during significant events. In summary, the seven dimensions are:

- Degree of motivation to modify behaviour at the point that the moment of change occurs
- Extent of pre-planning for anticipated behaviour modification at moment of change
- Personal beliefs about new behaviour
- Ease (perceived and actual) of adopting new behaviour
- Change in context in which behaviour is performed
- Habit strength and conscious awareness of behaviour
- Level of ego depletion and/or the relative priority of the behaviour

Table 2.8: Summary of the habitual behaviour change framework

Dimension	Levels	Definition	Example
Degree of motivation to modify behaviour at the point that the moment of change occurs	High	Strong, conscious intention to change existing behaviour significantly or to begin a wholly new behaviour	<i>Adopt a sustainable and healthier diet</i> Deciding to become vegetarian
	Moderate	Conscious intention to modify existing behaviour in some respects	Deciding to increase the proportion of vegetables, pulses, and grains in the diet
	Low	Little or no conscious intention to change existing behaviour	No intention to change diet
Extent of pre-planning for anticipated behaviour modification at moment of change	Considerable	Substantial preparation and planning in anticipation of change	<i>Using a car less – seek alternatives for short trips: Transport options following a move</i> Consideration of transport options plays an important role in earliest decisions about when and where to move house
	Moderate	Some preparation and planning	Considering transport option in advance of move, but only after location and timescale have been decided
	Little	Little or no preparation and planning	Little thought given to transport plan until move has actually taken place
Personal beliefs about new behaviour	Positive	The new behaviour is strongly in line with own beliefs/attitudes	<i>Eating food locally in season: Food shopping behaviour in retirement</i> Given more time following retirement, time is devoted to shopping in local farmers' markets
	Neutral	No strong beliefs/attitudes concerning the behaviour in question	Food shopping is not a priority and conducted on the basis of mood and convenience. This may include local / seasonal food
	Negative	The new behaviour is opposed to the individual's beliefs/attitudes	Following significant reduction of income as a result of retirement, food shopping is restricted to a low cost supermarket. Price is the only factor and sourcing / seasonality are of no concern
Ease (perceived and actual) of adopting new behaviour	High	Features of context (e.g. provision of information, social norms, infrastructure, etc) mean that positive environmental behaviour seems the "easiest" choice	<i>Increasing recycling and segregation: Waste recycling following a house move</i> Recycling and segregation facilities (e.g. a multi-compartment kitchen bin, coloured bags) and simple user guides are provided free to residents by the Local Authority. There is a regular collection regime for recycled waste
	Moderate	Features of context support positive environmental behaviour but require some mental/physical effort	Recycling facilities are available but must be specifically requested from the Local Authority. Collection is sporadic
	Low	Features of context make it difficult to adopt positive behaviour without considerable mental and/or physical effort	The only recycling facilities are several miles away and no explicit marketing or information is provided by the Local Authority to encourage their use

Table 2.8 continued

Change in performance context	Completely	Previous behaviour is no longer possible in the new context, necessitating development of an entirely new behaviour	<i>More responsible water usage: Adjustments to existing shower usage after moving to a shared flat at university</i> The new flat does not have a shower
	Significant	Previous behaviour is seriously disrupted by changes in performance context such that conscious modifications are required	The new flat has a small water tank and cannot store enough hot water for everyone to shower in the morning
	Moderate	Previous behaviour is moderately disrupted such that it is no longer optimal but could feasibly continue with relatively little conscious readjustment	The heating system in the new flat means that the boiler must be turned on an hour before the shower can be used
	Insignificant/not at all	Relevant aspects of performance context have not changed, or have changed in such a way that they do not affect performance of existing behaviour	The new flat has a shower and heating system similar to that in the previous residence
Habit strength and conscious awareness	Strong	Previous behaviour was performed very frequently (e.g. daily) and / or with very little conscious direction	<i>Better energy management and usage: Patterns of domestic appliance use</i> Putting the dishwasher on every night, irrespective of how full it is
	Moderate	Previous behaviour was performed quite frequently (e.g. every few days) and / or with a moderate level of conscious direction	Using the dishwasher every few days, once it is full
	Weak/not habitual	Previous behaviour was performed very infrequently or as a one a "one-off", with full conscious direction	Only using the dishwasher on particular occasions, e.g. after having guests over
Level of ego depletion and / or relative priority of the behaviour	High ego depletion and/or low priority	High number of demands on attention (i.e. lots to think about at the same time) and/or behaviour is a low priority	<i>Environmentally-relevant food shopping behaviours in response to different moments of change</i> After having a baby, increasing purchases of packaged convenience food, due to not having time / mental space for shopping and cooking
	Moderate ego depletion and/or moderate priority	Some demands on attention and/or behaviour is a moderate priority	Working out the best places to shop for food after moving to a new area
	Low ego depletion and/or high priority	Few demands on attention and/or behaviour is a high priority	Increasing the amount of food shopping done in local stores due to closure of nearby supermarket

Part 2

Personal life events as moments of change

3 Leaving home for the first time

Introduction

Background

- 3.1 Conventionally, at least in the UK, a more-or-less sharp distinction has often been drawn between childhood and adulthood. This is reflected to some extent in the law. For instance, individual responsibility for behaviours such as smoking and drinking, is granted abruptly on reaching a given age – there is no transition period.
- 3.2 However, some researchers argue that the period from 18-25 should be considered as a separate developmental phase in its own right – “emerging adulthood” (Arnett, 1998). This is characterised by “the age of identity explorations, the age of instability, the age of self-focus, the age of feeling in-between and the age of possibilities” (p. 235). During this time, people begin to forge independent identities and develop the competencies and skills that will guide them through later life.
- 3.3 Leaving the parental home for the first time is often seen as a key rite of passage between childhood and adulthood. However, although trend data suggest that young people – especially men – are now leaving home later and later, for many people “moving out” coincides with the emerging adulthood described by Arnett (1998). In the context of this project, it seems reasonable to hypothesise that leaving home for the first time functions as a moment of change. Firstly, of course, leaving home means people must learn to do things for themselves that might previously have been done for them by parents or guardians: shopping for food, cooking, cleaning, washing clothes, managing a household budget and getting to and from places. In practice, this means developing a suite of new habitual behaviours, many of which are related to the headline behaviour goals outlined by Defra.
- 3.4 Secondly, aside from these practical issues, living apart from parents for the first time may be the first opportunity young adults have to choose behaviours that are in accordance with their beliefs and values. Hence, to the extent that

it coincides with a developmental period in which people are discovering “who they are”, moving out may be a crucial moment of change for developing pro-environmental attitudes.

Approach to research

- 3.5 For this case study, two avenues of research were pursued. Firstly, searches were conducted on academic literature for research pertaining to behaviour changes after first leaving home. Secondly, sources of advice for young people leaving home were reviewed, with a particular focus on university students’ unions, since they are well placed to have a direct impact on behaviour.

One component of this project has been undertaking interviews with a number of practitioners working in areas related to the ‘moments of change’. It is important to note that some of the material from interviews reflects the personal experiences and views of those consulted. Where this is the case, quotations and/or paraphrases from interviewees are given *in indented, italicised type*.

Material presented in this way should not be regarded as representative of the views of any other person or group or organisation for which they work. In addition such material should not be regarded as the expert view in this field.

Academic literature

Environmental behaviours

- 3.6 A number of studies have considered environmental attitudes and behaviours in young adults. For instance, even older studies (i.e. those conducted before the environment and climate change were so prominent in the public consciousness) have typically found that young people display good environmental knowledge and positive environmental attitudes (e.g. Arcury & Christianson, 1990).
- 3.7 At the same time, studies of pro-environmental behaviours have often found that young people are less actively engaged. For instance, a recurrent finding

(albeit from research that was not particularly looking for it) is that young people are less likely to recycle than older people (e.g. Biswas *et al*, 2000; Meneses & Palacio, 2005; Saphores *et al*, 2006). It may be that the often cited “attitude-behaviour gap” (for a review, see Webb & Sheeran, 2006) is present for young people and may even be wider than for older age groups.

- 3.8 Despite this body of research, in our review only two academic studies were identified that explicitly considered changes in environmental behaviour that may have occurred after recently leaving home. Ojala (2008) used a questionnaire methodology to explore environmental behaviours in young people in Sweden who had moved out of their parents’ homes. In particular, she was interested in exploring the idea of *attitudinal ambivalence* (Thompson *et al*, 1995) – the state of having mixed, although potentially both strong and opposing, feelings on a given subject – as a possible explanation for the gap observed between young adults’ pro-environmental attitudes and behaviours. 422 young adults between the ages of 20-29 were asked to report on their own recycling behaviour, the ease of recycling (in terms of where the nearest facilities were located) and also their general attitudes toward and feelings about recycling and the environment. A number of qualitative interviews and focus groups were then conducted to understand these attitudes further.
- 3.9 The questionnaire survey suggested that recycling behaviour was related to worry about the environment, hope for the future and positive emotions associated with the act of recycling. However, it was negatively related to ambivalent attitudes. In the interviews, Ojala found that those young adults expressing ambivalent views often felt a sense of duty to recycle and believed in the environmental benefits of doing so. However, they failed to experience a positive sense of self-efficacy from recycling and/or failed to reconcile their ideals about pro-environmental behaviour with the practicalities of life as a young adult.
- 3.10 Whilst these results are interesting, it is hard to interpret the findings specifically in relation to the moments of change hypothesis. Although the respondents had all left home recently – this was a key rationale for choosing this group – no attempt was made to assess how their behaviours might have changed since leaving home or what the influences on such a change might have been.

- 3.11 Haustein *et al* (2009) conducted an online survey of car use behaviour in 2,612 students who had left home for university. The focus of the study was on the role played by prior “socialisation” into seeing car use as a normal behaviour in predicting current car use. Building on theories of habit strength and the Theory of Planned Behaviour, the researchers hypothesised that previous socialisation from parents and peer group might influence both car choice habits and personal and social norms around car use.
- 3.12 To explore this, the questionnaire asked respondents to report on three aspects of their previous “socialisation” towards car use: 1) their recollection of parents’ discussions of the environmental problems of car use at the age of 15; 2) their recollections of how they felt when first starting to drive and acquiring a licence (“symbolic-affective” importance of cars); and 3) their recollections of discussions about travel mode choice with their peer group at age 18. They were also asked about their current car use behaviours, strength of habit (using a shortened version of the Self-Reported Habit Index; Verplanken & Orbell, 2003) and about their attitudes to travel mode choice and the environment, both individually (“personal norm”) and in terms of other people (“social norm”). Analysis suggested that prior socialisation was related directly to personal and social norms around car use and also to habit strength. Moreover, these constructs mediated the relationship between socialisation and actual car use behaviour.
- 3.13 Again, the results of this study are interesting but difficult to interpret in relation to the moments of change hypothesis. As with the other studies considered, no attempt was made to assess specifically how behaviours might have changed since moving home. Moreover, the use of retrospective measures is challenging as it relies on respondents accurately recalling conversations they may have had with their parents concerning environmental behaviour six to ten years in the past.

Other behaviours

- 3.14 In addition to these studies, some research has dealt with changing health-related behaviours amongst young people who have recently made the transition from home to college. In a US study, White *et al* (2006) used questionnaires to survey prospective students’ behaviours in relation to both

frequency and overall amount of alcohol consumption and also marijuana use. Surveys were conducted shortly toward the end of the final high school year (i.e. before respondents had left home) and then again after six months once they had arrived at college. Data suggested that although there was no overall change in marijuana use, both volume and frequency of alcohol consumption increased significantly over the sample. However, a number of factors were found either to predict or buffer against these changes. Predictors included having friends who also drank or smoked, and having a “sensation seeking” character. Buffers were the level of religiosity of individual students and the extent to which their parents monitored their behaviour whilst at college.

- 3.15 In another longitudinal questionnaire study, this time from the UK, Edwards and Meiselman (2003) explored food consumption behaviour in first year university students at three time-points: in September shortly after they arrived at university, in January, and then again in May. Overall, there seemed to be a decrease in food consumption levels overall, as well as a slight increase in the relative proportion of energy intake from fatty foods. Unfortunately, no data were reported on the reasons underlying these changes, although it seems reasonable to speculate that cost may have been a factor.
- 3.16 A recent study in Germany, Harker *et al* (2010), compared two groups of students between the ages of 18 to 24 who were either living at home whilst studying or who had moved out and were living independently. Those still living in the family home were found to consume more fruit and vegetables compared to those living independently, as well as eating a greater number of servings of each major food group per day (i.e. consuming more food overall). Similar findings were also reported by Beasley *et al* (2004), in a study of students at Liverpool University.

University-based interventions

- 3.17 For many young people, the first time they leave home is when they go to university. According to data from NUS Services (2008), every year over 200,000 new students move into university halls of residence, during which time they have to develop a range of new habits and behaviours relating to cooking, cleaning, water-use and so on. Changing the energy use behaviour

of this group could, at the aggregate, lead to significant reductions in carbon emissions⁸. Moreover, the hope would be that intervention at this point might help new students develop pro-environmental habits that persist in later life.

3.18 University authorities, in particular students' unions, are extremely well-placed to provide guidance and support for students in how to manage practical aspects of life at university. To explore the role that students' unions play in helping students develop pro-environmental behaviours and also to find evidence of positive impact, a sample of UK university students' union websites was reviewed for environmental content⁹. For those students' unions with a named environmental officer (or equivalent), attempts were then made to contact them in person. Although not all responded, a number of telephone interviews were conducted. Interviews were also conducted with several other relevant stakeholders. These included the National Union of Students, the organisers of the *Student Switch-off* campaign and *People and Planet*, a student group which campaigns on environmental and global poverty issues and compiles an annual "Green league table" for UK universities.

3.19 The focus of the interviews was on the different ways in which newly arrived students could be persuaded to take-up more positive environmental behaviours and in particular whether there was evidence of efficacy for any particular approach or intervention. Appendix 1 provides more information on the content of the stakeholder interviews.

3.20 From these investigations, three general approaches to influencing the environmental behaviours of new students were observed.

- Information provision and campaign/advocacy initiatives
- Price information
- Harnessing competition

Each of these is considered in more detail below.

⁸ NUS Services estimate that a 5 per cent reduction in energy use across the 506,000 rooms in UK halls of residence would equate to savings of £4.7 million of energy and 25,640 tonnes of carbon.

⁹ Fifteen university websites were reviewed: Aston, Birmingham, Bristol, Cardiff, Cambridge, Coventry, Gloucester, Kings' College London, Loughborough, London School of Economics, Manchester, Plymouth, Sheffield, Sussex, Warwick.

Information provision and campaign/advocacy initiatives

- 3.21 Information alone is generally found to be insufficient to change behaviour. This has meant that information-based marketing campaigns are sometimes maligned as an approach to behaviour change; however, such activities have a role and can make an effective contribution (e.g. Snyder & Hamilton, 2002). One opportunity to influence young adults' pro-environmental behaviour is through the provision of information, engagement, and guidance. This can be directly from university authorities such as the students union or through contact with other organisations involved in campaigning and advocacy.
- 3.22 One means of providing information and guidance is through student union websites. However, there was very considerable variation between students' unions in the extent to which they highlighted green behaviour. At one end of the spectrum, some union websites made little or no mention of environmental issues and/or did not have a named environmental officer listed amongst the executive positions. For others, however, environmental issues were a major theme and extremely prominent on the websites. In Plymouth, for instance, the 2008/9 Union President had been elected on the back of an overtly green campaign and his "Green Agenda" was prominently displayed on the website. Cambridge University Students Union has an extensive "Ethical affairs" website (<http://www.green.cusu.cam.ac.uk/>) that provides a considerable amount of information on green issues.
- 3.23 A number of sites provide practical suggestions to help students adopt greener behaviours. Loughborough Students Union, for instance, provided ten "Top Tips" (see Figure 3.1). Notably, however, where green living advice was given on union websites it was not typically integrated with the "Advice", "Support" or "Welfare" sections. As such, students would be unlikely to come across it were they not looking for it deliberately.

Top Tips to reduce YOUR impact

Where to begin? There are so many little steps you can take to make your print on the Earth more sustainable.

Here's a quick Top 10 list:

- Use compact fluorescent light bulbs in ALL lamps.
- Change the power settings on your computer to automatically go to stand-by if left alone for a short while – and otherwise switch it off when you leave it for more than an hour.
- Don't leave chargers plugged in and devices on standby unnecessarily. These use a surprising amount of energy.
- Think before you shop: do you really need this? Look for local, organic, and Fairtrade foods. Ask how your clothes and shoes are produced – and, again, look and ask for organic and Fairtrade labels. It doesn't necessarily become more expensive just because it's ethical. Use charity shops (there are about 10 in Loughborough). Look for the Energy Star label when you shop for electrical goods. Use *Gumtree*, *ebay*, & *Freecycle* for other second-hand goods. Elf Foods in town is our local health foods store. Also check out the monthly Farmers' Market in town: Dates in 2009: February 11th, March 11th, April 8th.
- Sort your rubbish (click here if you're in halls/here if you're a Community Student for details on how the recycling works in Loughborough.)
- Go vegetarian/vegan or just reduce the amount of meat you eat. (It has been argued that this is the one single thing you can do to reduce your carbon footprint the most.)
- Consider your means of transport: Most of Europe can be reached easily and cheaply by coach and train if you book in advance. Get a bike for those short trips around town and campus. Keep an eye out for free Bike Doc sessions by Cogz to keep your bike well tuned.
- Think about your water usage: Turn off the tap when you brush your teeth. Don't fill the kettle all the way when you boil water for one cup of tea (it also wastes energy and time). Have a shower instead of a bath.
- Ask your bank how they invest your money. Check out a People & Planet campaign Loughborough has previously been involved with: Ditch Dirty Development.
- Buy natural cleaning and body care products. Good brands include Ecover and Faith in Nature.

Figure 3.1: “Top Tips” for reducing environmental impact from Loughborough University Students Union (<http://www.lufbra.net/eande/tips/>)

- 3.24 From interviews with a small sample of union representatives (this methodology is outlined on p.42), it seems that some universities have begun to regard their green credentials as an important component of their “unique selling point”.

According to Fletcher (one of the interviewees), Plymouth University has been deliberately trying to cultivate a reputation as one of the “greenest” universities in the country. Through the work of their Centre for Sustainable Futures (<http://csf.plymouth.ac.uk/>), they have endeavoured to embed concepts of sustainability through all areas of the university’s activities. A new first year course is currently being designed that will cover core principles of environmental sustainability and is intended to be compulsory for all students, irrespective of the subject they are studying.

- 3.25 It seems possible that the relative “greenness” of a university as a whole might serve to provide additional inducement to prospective students who are already environmentally minded (although, even in these cases, it is still likely to be lower priority than other issues – the type of course, the university’s location and so on). However, knowledge of and interest in environmental issues is variable amongst new students.

The Go Greener officer for the Cambridge University Students Union Ethical Affairs team felt that there was a “depressing amount of apathy” amongst students when it came to environmental behaviour.

- 3.26 Despite the efforts made by some student unions to provide information to students about environmental issues, in general there was some scepticism about the power of information provision alone which is supported by the wider evidence base. There was support for the importance of involving people in practical activities. To this end, a number of unions were involved in promoting student activism, through campaigning and advocacy initiatives.
- 3.27 In some cases these were independent initiatives. The Ethical Affairs team at Cambridge, for instance, organises three campaigns across the university, including *Go Greener* (www.camgogreener.org.uk/), which tries to encourage the main university authorities to promote sustainability and take action on the university’s own environmental footprint and performance.

- 3.28 More often, however, initiatives of this kind were part of wider campaigns. People and Planet (e.g. <http://peopleandplanet.org/>), for instance, is a student network that campaigns on issues relating to world poverty, human rights and the environment. It has official groups at 58 universities around the country. The overall aim of their campaigning is to encourage students to get involved through engaging them in activities. To this end, People and Planet organise an annual conference, *Shared Planet*, which involves various “hands-on” activities. They also provide guidance and support materials for practical workshops and campaigning ideas. For instance, one recent campaign encouraged students to lobby their university authorities to improve their environmental performance by sending “Love your climate” cards to Vice-Chancellors on Valentine’s day.
- 3.29 None of the Student Union representatives we spoke to had yet collected data on environmental attitudes or behaviours amongst students or on the efficacy of their information and campaigning activities in terms of environmental behaviours.

Price information

- 3.30 Several of the union representatives we interviewed felt that money and price were important drivers of behaviour for students and that the most significant “moment of change” in relation to much environmentally-relevant behaviour was not the point of leaving home but the point at which they had to start paying bills themselves.

One example of this was given by the Environment Campaigns Officer at Warwick University Students Union, who noted that she had encountered students whose energy-saving behaviour changed dramatically in their second year of university. Her assessment was that in the first year, they had lived in halls with unmetered energy and did not develop energy saving habitual behaviours since they were not responsible for paying the bills and did not appreciate the financial costs. When they lived independently, they would at first continue with the same behaviours but revise these dramatically upon receiving their first energy bill.

3.31 The same problem was noted by a representative from the National Union of Students Services Ltd, who are leading an action research project for Defra.¹⁰ According to his figures, around 95 per cent of first year tenancies at halls of residence have a flat rate for energy use. As such, students have no financial incentive to save energy. He reported that a trial project had been conducted at the University of Sunderland, in which rooms in some halls of residence had been individually metered and students required to pay for their energy use according to the meter. This led to a dramatic 35 per cent reduction in energy use.

3.32 Individual metering is a “stick” rather than a “carrot” incentive, in that it penalises bad behaviour rather than rewarding good behaviour. An interesting, albeit small-scale, initiative of the latter kind has been developed by Plymouth University students’ union, called *One-Less Cup*. Noticing that hot beverages served on campus usually came in paper cups, the union paid for the production of 400 thermal mugs, which students could buy from the union shop at a low cost. By presenting their mug at any catering outlet across campus, students get a 10p discount on their drink whilst saving a paper cup.

According to the Plymouth University Students’ Union President, all 400 mugs were sold very quickly and feedback from the caterers suggested that they were being used as intended. At the time of writing, the Vice-Chancellor of the university was exploring the idea of giving a free mug to every new student as part of the introductory pack.

3.33 Clearly, price incentives are one means to encourage students into better environmental behaviours. It is well known, of course, that there is a role for using price information to signal potential losses and gains to influence behaviour in many groups, not just students. However, it may be that students who have recently left home and for whom money is scarce are particular sensitive to this kind of intervention.

¹⁰ This project, currently underway, will compare five different approaches aimed at encouraging energy efficiency amongst students living in halls of residence: 1) General awareness campaigns; 2) Peer-to-peer encouragement; 3) Low-carbon buildings and energy-efficient halls of residence; 4) Comparative and competitive approaches; 5) Financial incentives. Electricity meter data will be analysed to establish the effect of each approach in reducing energy consumption. Focus groups and questionnaire surveys will be conducted with students from each approach in order to thoroughly investigate the dimensions of each approach that were effective in bringing about a behavioural change.

Harnessing competition

- 3.34 Aside from monetary incentives, another idea is to harness students' competitive instincts. Several competitive initiatives were described by people we spoke to; much the largest and most well-developed initiative of these was the *Student Switch-Off* initiative.¹¹ This was developed by a PhD graduate from the Tyndall Centre for Climate Change Research at the University of East Anglia.
- 3.35 The idea of the initiative is for halls of residence within a university to compete against one another to save energy. First year students are recruited to take part in the competition during Fresher's week and other induction events, becoming "eco power-rangers" whose mission is to try to save as much energy in their hall as possible. In the marketing and recruitment material, an effort is made not to appeal solely on an environmental basis. Other benefits of energy-efficient behaviour are highlighted such as, for instance, the time savings from putting lids on pans when cooking.

The director of Student Switch-Off described how the aim was to make "an irrefutable case" for environmentally-sound behaviour. He also emphasised the importance of reaching students early, as soon as possible after they arrive at university, so as to give the impression that taking part is the norm – just what is expected of them.

- 3.36 The competition itself is based around meter readings for each hall of residence. Baseline data is provided by the previous three to four years of meter readings and then compared with monthly (or quarterly) readings. Feedback on each hall's performance is given to participating students.

The Student Switch-Off director felt that the feedback element was an important factor in helping to overcome students' sense of not being able to make a difference (i.e. collective action problem).

- 3.37 To-date, the initiative has run in 11 universities with 20 further universities on the waiting list. Observed reductions in energy use for halls of residence participating in the scheme have varied, but have typically been in the order of

¹¹ www.studentswitchoff.org

8 per cent. This is particularly striking given that participation rates have been relatively low, at around 15 per cent of residents in each hall.

The Student Switch-Off director noted that university authorities have been generally positive toward the initiative. They are required to pay £1 per student who signs-up. Given that savings to-date work out at over £5 per student, this makes good financial sense for universities. However, he also notes the importance of getting buy-in from student unions, who are more likely to have credibility with students.

- 3.38 Although the scheme has been relatively successful, to date no data have been collected on the particular behaviours changed or the motivations of participating students. Moreover, no data have been collected on whether better behaviours “stick” once students leave university accommodation.

The Student Switch-Off director estimated from his personal contact with students that about 1/3rd of participants were “Positive Greens”, with most of the rest being “Cautious Participants”, although he did not have data to support this.

Summary

Which pro-environmental (or other) behaviours seem to change at this moment, if any?

- Overall, too few studies of behaviour were found to enable identification of typical or common changes in behaviour as people leave home for the first time (other than, for students, increases in alcohol consumption and decreases in diet quality).
- Evidence from the academic literature is relatively thin, but suggests that some behaviour changes occur more or less spontaneously (i.e. without intervention), such as those relating to food consumption.
- Findings from a small number of interviews with practitioners suggest that students may moderate their energy use, although this may be a function of when students gain financial responsibility for their bills rather than the change associated with leaving home itself (i.e. where students are in halls in the first year, it can apply more to second year university students as they move out of halls).

What are the factors that make behaviour change more or less likely at this moment?

Interviews undertaken in this research provided anecdotal support that:

- Social norms (within the peer group) relating to environmental behaviours are thought to be an important determinant of pro-environmental behaviours. This is consistent with research suggesting that during “emerging adulthood” (c. 18-25) young people are beginning to forge their own identities in relation to those around them.
- Interventions based on awareness, price and competition may all influence students’ environmental behaviour to some degree. For instance, initiatives such as Student Switch-off suggest that interventions with new university students can be effective in helping students develop good energy use behaviours, although robust evidence of efficacy is still relatively scarce.

How feasible – in terms of delivery and likely efficacy – would it be to make an intervention at this moment of change?

- Feedback from interviewees suggested that interventions are best led by the students’ union rather than the university authorities since this may have more credibility with students.
- University students are a “captive audience”, so targeting them with interventions should be relatively straightforward. By contrast, people who leave home but who do not go into higher education and who are not otherwise in contact with some other institution (e.g. social services) are hard to identify and thus may be difficult to target with an intervention.

4 Transition to parenthood

Introduction

Background

- 4.1 The transition to parenthood is a life event which has been the focus of substantial amounts of research. Much is known about the emotional and relationship changes that commonly occur on becoming a parent, as well as the behaviour changes that relate directly to the care of a new baby. Although most of these changes do not have an obvious impact on pro-environmental goals, understanding them is an important element of understanding the broader context of the transition to parenthood and therefore the broader context within which any pro-environmental intervention at this moment of change would be taking place.
- 4.2 Much less research has been focused on the behaviour changes during the transition that have an environmental impact, either positive or negative, but it has been possible to identify five such behaviours for which there is some evidence of change. However for most of these behaviours this evidence is limited and does not strongly suggest that the changes observed are likely to be maintained in the long-term.

Approach to research

- 4.3 This case study involved a broad review of the literature pertaining to the transition to parenthood, focusing on evidence of behaviour changes and particularly those which are environmentally-related. Other evidence used included sources of advice to new parents, including websites and magazines.

One component of this project has been undertaking interviews with a number of practitioners working in areas related to the 'moments of change'. It is important to note that some of the material from interviews reflects the personal experiences and views of those consulted. Where this is the case, quotations and/or paraphrases from interviewees are given *in indented, italicised type*.

Material presented in this way should not be regarded as representative of the views of any other person or group or organisation for which they work. In addition such material should not be regarded as the expert view in this field.

- 4.4 A small number of consultation interviews were carried out with health-care professionals and others who work providing advice and support to new parents. The focus was on interviewees' personal experiences of seeing how people react to becoming parents and to the information and advice which they receive. Attendance at a parent and baby session also allowed conversations to take place with a small number of mothers experiencing their first year of being a parent. See Appendix 1 for a list of people consulted and interview questions.
- 4.5 All these interviews were achieved through an opportunistic sampling approach and this, as well as the small numbers of people consulted, mean that the findings should not be regarded as representative of the full range of views among professionals and new parents. Instead they are indicative of some existing attitudes and are used here for exploratory comparison with the findings from published studies. Emotional changes on the transition to parenthood
- 4.6 The most prominent finding describing the overall emotional impact of the transition to parenthood is that it is "overwhelming". It is also described as a revolution; unpredictable; all-consuming; a stressful event; a "crisis and opportunity"; and a period of disequilibrium and reorganization. Although often experiencing feelings of complete love, amazement and enjoyment of a new baby, new parents generally feel unprepared for the extent of the changes the baby brings to their lives (Fägerskiöld, 2008; Nyström & Öhring, 2003; Horne *et al*, 2005). For mothers (who typically bear primary responsibility for care of the child) the all-consuming nature of mothering coupled with the stress

caused by having unmet personal needs can lead to physical and emotional exhaustion. Fathers also experience strain in living up to the new demands of childcare and experience feelings of exclusion from the close mother-infant bond (Nyström & Öhring, 2003). New mothers have a number of dimensions of concern, including family health, return to work, their own well-being, relationship/support, infant care and their relationship with their spouse (Kaitz, 2007). Cowan and Cowan (1995) have developed a model of five domains which should be considered in studying the success of the transition to parenthood, with new parents experiencing shifts in each domain. These are:

- The quality of relationships in new parents' family of origin
- The quality of new parents' relationship as a couple
- The quality of the relationship each parent develops with the baby
- The balance between life stress and social support in the new family
- The well-being of each parent and child as individuals

4.7 One of the key areas of change, for example, is in the couple relationship between new parents, with marital satisfaction declining following the birth of a first child (Deave *et al*, 2008; Shulz *et al*, 2006).

4.8 It is possible to identify some factors that affect the extent to which people successfully adjust to the transition to parenthood. Using a model from the stress-and-coping literature, Levy-Shiff and colleagues show how the ways in which parents cognitively appraise a situation, the sorts of coping strategies they use and the level of social support to which they have access affect the degree to which they find the transition to parenthood stressful (Levy-Shiff, 1999; Levy-Shiff *et al* 1998). For example, viewing parenthood as a challenge rather than a threat is associated, for fathers, with experiencing it as less stressful and, for mothers, with higher well-being. Using activity-focused rather than emotion-focused ways of coping is associated with more effective maternal behaviours and having more social support is linked to better maternal well-being.

Behaviour changes without clear environmental impacts

- 4.9 The literature discusses many examples of behaviour change that occur during the transition to parenthood, although most do not have clear positive or negative environmental impacts. In their study of occupational change in first time motherhood, Horne *et al* (2005) found that “the 'ordinary and familiar things that people do everyday' were disrupted immediately after the baby was born" (p. 276). Many of the changes they identify seem somewhat self-evident but are nonetheless important to note, such as changes to employment patterns and new routines around caring for the baby as well as around household tasks and meals.
- 4.10 Substantial time and energy are required to become skilful in the work of caring for infants, with considerable shifts in time use for both parents towards childcare activities and the consequent finding that parenting is associated with a “time crunch” (Barclay & Lupton, 1999; Sanchez & Thomson, 1997). Barclay and Lupton (1999) also note the reorganisation required regarding domestic tasks, with fathers reporting that they need to do more given new mothers’ reduced ability to undertake household labour. Other evidence suggests that mothers in fact spend increased hours on housework and that mothers and fathers both become more involved in domestic activities, with the division of labour becoming more traditional (Sanchez & Thomson, 1997; Sevin & Ladwein, 1999; Cowan & Cowan, 1995). Some evidence suggests that men spend longer both undertaking paid work and participating in community and voluntary activities when they become fathers (Knoester & Eggebeen, 2006).
- 4.11 A key change which should not be overlooked is the substantial reduction in the amount of sleep experienced by new parents and the general fatigue and exhaustion experienced, which can lead to feelings of being drained of physical and emotional energy, stress, increased irritability towards problems and feeling the situation is unbearable (Nyström & Öhring, 2003; Fägerskiöld, 2008). There are also changes to other health-related behaviours, with pregnant women often giving up tobacco and alcohol and new mothers showing high readiness to join smoking cessation counselling when recruited from the maternity ward (Sevin & Ladwein, 2008; Roske *et al*, 2004). However, there is evidence indicating that many pregnant women who stop smoking resume after delivery (Lu *et al*, 2001).

Behaviour changes with environmental impacts

4.12 It has been possible to identify five key behaviour types for which there is some evidence of change during the transition to parenthood and which have environmental impacts. Each of these is discussed below. The behaviours are:

- Travel behaviour
- Purchasing baby equipment
- Nappy choices
- Food-related behaviour
- Self-care behaviour

Travel behaviour

4.13 There is relatively little published evidence about changes in travel behaviour on becoming a parent. However, implications for travel behaviour can be gleaned from evidence that new parents carry out more activities in their homes and local areas.

4.14 Horne *et al* (2005) describe the reduction in engagement for new mothers in social activities such as attending parties and going to public venues and events such as pubs, plays and concerts, with activities pursued post-motherhood being those typically carried out in the home: gardening, housework, watching television, ironing, cooking and childcare. Sevin and Ladwein (2008) suggest that the process of becoming more home-focused can start during pregnancy when some pregnant women experience a cocooning attitude which leads them to adopt more home-based activities such as internet shopping, home delivery and watching DVDs at home. They note that pregnancy causes a decrease in social commitments as part of the transition between former and future social roles. Knoester and Eggebeen (2006) note that men too experience a decline in frequency of social activities on the arrival of a new child.

4.15 Accounts from practitioners and the grey literature also suggest that new mothers spend considerably more time in their local areas than prior to becoming a parent.

4.16 The popular Netmums website provides the following advice in its 'Baby...what happens next?' section:

“As a new mother, you join what we call the “day people”. The same streets that you know so well during rush hour and evenings out become a strange unknown territory between the hours of 9 and 5 when all “normal” people are at work. There has never been much reason to know too much about your area ... apart from the pub, restaurants, takeaway and video shop. But there is a rich and varied life taking place “underground” which is primarily for us mums and our children. It can be quite hard to break into this strange new world and find out what is going on for mums, but Netmums can introduce you to your local community.”¹²

This was echoed by one of the practitioners we consulted (a community midwife) who emphasised the importance the local area has to new mothers – they “discover their local area” and meet people in the local community despite often previously not knowing other people based locally, especially if they had formerly been working outside the area. Another interviewee, the convenor of a parents and babies group, described one of its important functions as enabling parents to meet others in the local area.

4.17 These reductions in the amount of time spent outside the home and increase in the time spent in their local area rather than further afield, imply a reduction in the amount of travel undertaken by new parents in terms of number and length of journeys, respectively. However, they do not necessarily imply any impacts on new mothers' attitudes to, or decisions about, travel mode choice on those occasions when they need or want to travel. Changes in habitual travel behaviours may simply represent a reduction in the requirement to travel and therefore do not necessarily imply that changes to travel behaviour

¹² http://www.netmums.com/baby/Baby__what_happens_next_.271/

would persist when new parents return to participating in more activities outside the home.

- 4.18 Evidence from the field of travel research confirms the transition to parenthood as a life event which produces changes in travel behaviour. Klöckner (2004) found that the birth of a first child was reported as a life event that had a moderate impact on travel behaviour, tending to increase car use. This was confirmed by Prillwitz *et al* (2006) who reported that the birth of a first child considerably increases car ownership.
- 4.19 Zwerts *et al* (2008) used data from a large-scale survey in Belgium to provide evidence that parents with a child under six stayed at home more often compared both to people without children and parents of older children. Mothers were more likely to report making no trips than fathers. While the mean number of trips per person per day was not lower for parents of young children compared to those with no children (which perhaps suggests that the parent who was not the main carer made more trips to compensate for the reduction of trips of the other parent), there was a significant reduction in mean distance travelled, indicating that trips became focused on the local area. However, as children became older, the distance travelled by parents increased. The paper suggests that this is because parents, especially mothers, start acting as “taxi drivers” for their children, transporting them between various activities and locations before they are old enough to transport themselves around independently. These findings suggest that changes to travel behaviour on becoming a parent may not lead to permanent shifts in travel mode choice. The paper also presented some evidence from a small-scale qualitative study which suggested that use of a car as *driver* decreased for men and increased for women following childbirth.

The issue of travel mode choices was explored with a number of the practitioners we consulted and attendees at the parent and baby morning observed. All were London-based and therefore in the context of an urban environment with generally good public transport links. A key theme to emerge from their accounts was the difficulties of negotiating public transport with prams and buggies. A particular problem was the lack of space on buses, with the restrictions to two prams per bus coupled with the need to avoid standard rush hours leading to peak travel periods for prams. These problems led parents

to avoid choosing to travel by public transport, instead walking where possible and then driving.

A community midwife reported car-sharing among mothers who had got to know each other in a local area. In the opposite direction, two mothers reported having bought bigger cars to accommodate all the equipment they needed to take when going away with their babies. The midwife said that she wouldn't expect new parents to be receptive to advice about sustainable transport behaviour while public transport services were not designed to accommodate their needs.

Purchasing baby equipment

- 4.20 The need to acquire the equipment required for caring for a baby is a key issue for new parents and has a clear environmental impact through increased consumption of resources. Particular attention has been paid to the consumer choices of new parents around nappies and food. Each of these issues is considered separately in sections below. However, parents' general requirements for the other products needed to clothe, feed, transport, wash their babies and provide somewhere for them to sleep represent a major new area of consumption behaviour. The topic features prominently in advice for expectant parents. For example, "What you will need for the baby" is listed as one of the main issues in the "You and your baby" section of the NHS pregnancy care planner website.¹³ Pregnancy and baby magazines also give significant attention to baby-related products, both through articles and advertising space (e.g., *Prima Baby*, 2009; *Junior Pregnancy and Baby*, 2009). It seems clear that acquiring equipment to care for a new baby is a universal need among people transitioning to parenthood.
- 4.21 Sevin and Ladwein (2008) examined the issue of consumption among first-time pregnant women and contend that it plays a key role in the transition to a new social role. They cite previous work which shows that life transitions can be experienced through the consumption of goods and services, when objects facilitate the identification of status and act as a support for social standards (such as the example given by Solomon, 1985, of a suit acting as an

¹³ <http://www.nhs.uk/Planners/pregnancycareplanner/Pages/After.aspx>

accessory to the entry into a professional environment). Sevin and Ladwein describe consumption during pregnancy as part of social learning about the role of mother. Consumption of goods helps to establish the role of mother in other people's eyes and facilitates the performance of the role before the child's arrival. They point out that the commercial market for child's welfare products is unknown to pregnant women, creating a need for a lot of information and placing importance on direct and indirect role models who serve to help pregnant women decide what to consume and exert considerable influence on their purchases. Other studies also show the effects of the purchasing of baby equipment such as prams on the acquisition, acceptance and maintenance of the role of motherhood and the expression of the nesting instinct through consumption (Thomsen & Sorensen, 2006; Jennings & O'Malley, 2003).

- 4.22 The finding about the importance of role models suggests a potentially good opportunity to intervene to steer mothers' consumption in more pro-environmental directions. According to Sevin and Ladwein, indirect role models identified through information sources such as television, the press and the internet also play a part in helping guide new parents through the previously unknown child's welfare market. If, therefore, advice from the NHS and other national and local organisations (presuming that these were seen as credible) were to highlight sources of second-hand goods and other environmentally-sound products, it could help to reduce the resource burden created by the equipment needs of new parents.

Nappy choices and reusable nappies

- 4.23 The issue of reusable nappies is by far the most prominent sustainability-linked issue in popular discourse around becoming a parent. It was consistently raised by the new mothers and practitioners we consulted when they were directly asked whether the transition to parenthood was a good time to steer people towards pro-environmental behaviours. The only instance of pro-environmental choices mentioned on the NHS pregnancy care planner website is in relation to nappies.¹⁴ The Women's Environmental Network¹⁵,

¹⁴ <http://www.nhs.uk/Planners/pregnancycareplanner/pages/Buynappies.aspx>

the leading UK organisation campaigning on environmental issues affecting women, has also focused its campaigning work on issues relating to parenting on the topic of nappies. Many local authorities commit resources to promoting reusable nappies through voucher schemes, outreach work, nappy discussion sessions and so on.

- 4.24 All new parents are faced with the need to use nappies, which is not an issue they are likely to have dealt with previously in their adult lives. This is therefore a clear case where new habits will be formed upon becoming a parent, with different environmental consequences linked to the different options available. It is worth noting, however, that the environmental benefits of reusable nappies are not as clear-cut as might be imagined. The Environment Agency's recent lifecycle assessment study of reusable and disposable nappies (Aumônier *et al*, 2008) found that the impact on climate change of using the average type of 2006 disposable nappy for the first two and a half years of a child's life was approximately 550kg of carbon dioxide equivalents. The equivalent impact of reusable nappies depended heavily on how they were laundered. Based on average patterns of washer and drier use, reusable nappies had a higher global warming impact than disposables, at 570kg of carbon dioxide equivalents over two and half years. But washing the nappies in fuller loads or line-drying them outdoors reduced this figure by 16 per cent. The most eco-conscious laundry behaviour, plus re-using the nappies on a second child, would lower the impact by 40 per cent.

However, as our consultation with a local authority sustainability officer made clear, reusable nappies were often promoted because of the savings they represent to household waste and landfill, with disposable nappy waste said to constitute a third of the household waste of households with young children.¹⁶

- 4.25 A 2004 report from the Women's Environmental Network argued that the NHS does not provide impartial information on nappy choices. Disposable nappies are treated as the default option and demonstrated in parenting classes,

¹⁵ <http://www.wen.org.uk/index.htm>

¹⁶ North London Waste Authority Reusable Nappy Campaign Report: <http://www.nondon-waste.gov.uk/admin/uploads/20041013/REPORT%20-%20NAPPY%20RE-USE%20CAMPAIGN.pdf>

offered free in the Bounty Packs given to new mothers and are the only nappies in use on maternity and paediatric wards. However, research by Uzzell and Leach (2003) examining the effects of promoting reusable nappies on maternity wards has not shown clear effects. The study examined how mothers' intended and actual nappy behaviour was affected following a change in policy on an English maternity ward from a situation where parents were expected to bring their own disposable nappies to one where cloth nappies were provided free on the ward. Some parents, both before and after the policy change, were also offered the opportunity to take part in a free trial of a cloth nappy laundering service. Results showed that both before and after the policy change, 85 per cent of parents stated an intention to use disposable nappies, even though cotton nappies were thought easier to use by parents who had tried them compared to those who had not. Mothers who both had access to reusable nappies on the maternity ward *and* who took part in the free laundry trial were more likely to continue using cotton nappies than those who had just taken part in the laundry trial. However a large majority (75 per cent) of this "double intervention" group used mainly disposable nappies since leaving the hospital. The factors influencing nappy choice seemed to vary by type of nappy used: those using disposable nappies cited convenience, whereas those choosing reusable nappies stated that waste was the most important factor in their decision. First time parents choosing to use reusable nappies tended to have made the decision early on during pregnancy, whereas those using disposables described deciding to buy them as part of their preparations for going to hospital to give birth.

An interview with a Real Nappy Campaign outreach worker reported that parents who respond to outreach work about nappies tend to be those who are already aware of reusable nappies and/or who have pre-existing pro-environmental attitudes. Interviews with this Real Nappy Campaign outreach worker and a community midwife reported their experiences of high levels of interest in reusable nappies which did not translate into decisions to use them.

Feedback from an attendee at a parents and baby group and from a convenor of a parents and baby group suggested that when people become new parents, for many, it is about doing what makes life easier.

- 4.26 Several interviewees mentioned the initial financial outlay required for reusable nappies as a barrier to using them.
- 4.27 A number of local authorities now run voucher schemes to help parents meet some of these costs and therefore encourage take up. Uzzell and Leach (2003) found that parents who used disposables claimed that cost was the least important factor in their decision. Initially, parents using reusable nappies also did not rate cost as an important factor in their choice. However, when the maternity ward in their study changed its policy to provide free reusable nappies, parents who afterwards chose to use reusable nappies were significantly more likely to cite cost as a factor than those choosing reusable nappies before the policy change. In the context of this study, which did not see an increase in the proportion of parents choosing reusable nappies after the policy change, this therefore suggests that price incentives such as free provision (and beyond this particular study, other mechanisms such as voucher schemes) may not be effective in persuading parents to switch from disposable to reusable nappies, but may serve to provide people with a readily available post hoc rationalisation of their decision to choose reusables.
- 4.28 The case for interventions around nappy choices is therefore decidedly mixed. Arguments in favour include parents' interest in nappy issues, the existing intervention routes established by local authorities and campaign groups and the reduction in landfill waste and methane production. There is a scarcity of robust evidence about the effectiveness of interventions, but the evidence we have identified suggests that they might not be effective in changing parents' decisions about nappies. The lack of clear-cut environmental benefits of reusable nappies, at least in terms of carbon emissions, should also be noted.

Food-related behaviour

- 4.29 As Schäfer *et al* (2007) point out, most decision-making around food is highly habitual and embedded in routines. However, some evidence from studies carried out in Germany and France suggests that food purchasing and consumption behaviour change during the transition to parenthood.

- 4.30 Parents become more open to information about food issues during pregnancy and the first months after childbirth. They also display a high level of awareness about, and interest in, nutrition. However, they can feel stressed by the amount of information available (Schäfer and Bamberg, 2008; Schäfer *et al*, 2007). Two studies provide some qualitative and exploratory quantitative evidence that “young parents” purchase more organic, seasonal, fresh and regional products (“sustainable food”), visit alternatives to supermarkets, adopt a more balanced diet and consume more healthy and less processed food (Herde, 2007, cited in Schäfer and Bamberg, 2008; Schäfer *et al*, 2007; Sevin and Ladwein, 2008). The exploratory study also showed that level of education was found to affect this behaviour: those with higher levels of education are more likely to purchase sustainable food (Herde, 2007, cited in Schäfer and Bamberg, 2008; Schäfer *et al*, 2007). Sevin and Ladwein highlight the importance for parents in being able to trust foods, leading to them preferring brands, food with labels and organic food.
- 4.31 Schäfer *et al* (2007) also suggest that new parents have different attitudes to purchasing food as compared with before pregnancy. They have slightly higher awareness of fair prices for food and less concern about buying low-cost food and the non-affordability of high quality products. However, only a few parents impose the same rigid standards that they maintain for their children on their own nutritional habits.
- 4.32 *Feedback from an attendee we interviewed at a parent and baby group supported this, describing her food shopping behaviour as attempting to buy organic food for the baby “and for us when we can afford it”.*

Changes to self-care behaviours

- 4.33 Horne *et al* (2005) identify self-care activities, such as having a shower or bath, putting on make-up, eating breakfast and getting dressed, as a key area where a baby will impact on new mothers’ habits and routines, particularly as they are “often conducted in private” (p. 279). These activities are often curtailed after the birth of a first baby, with significantly reduced amounts of time available. The literature review conducted by Nyström & Öhring (2004) also found that women struggled with limited time available for oneself and having unmet personal needs.

- 4.34 These findings are borne out by the grey literature and our consultees. *Prima Baby* magazine, in an article titled “Mums need pampering”, cites a poll finding that 76 per cent of mothers neglect themselves in favour of putting their families first (Prima Baby, 2009, p.15).

One mother consulted at the parents and babies group said that “just doing two things in one day – like washing your hair and going to the supermarket – is difficult” with a new baby. Another mother described often forgetting or having no time to eat lunch when spending the day alone caring for her baby. A midwife we consulted also mentioned the difficulties new parents have with finding a moment to shower.

- 4.35 Reduced shower and bathing has clear environmental benefits in terms of water and energy conservation though there may be wider implications for well-being; what is far from clear however is whether these changes of behaviour are maintained as children become older and require less intensive care from parents.

Other behaviour changes

- 4.36 A small number of examples of other behaviour changes with potential environmental impacts emerged during the research, although little evidence was found for each. Briefly, they are:

- The tendency for people to move house during or shortly after the transition to parenthood. This was mentioned by a community midwife whom we consulted and is alluded to by Schäfer and Bamberg (2008) who note that their results suggest “that the life event ‘birth of a child’ is influenced by other life events” such as relocation. This change is clearly of interest from the point of view that it coincides with another moment of change considered in the current study.
- Reduction in comfort-limiting pro-environmental behaviour.

One new mother consulted at the parents and babies group reported a high level of concern for environmental issues. She said that prior to her baby’s birth, she and her partner would limit the amount they heated their home for environmental reasons, but felt unable to do this following the

birth of their child. She implied that they were prepared to sacrifice their own comfort for environmental reasons but not risk the health of their baby.

- 4.37 This raises the potential that the transition to parenthood may in fact *reverse* some existing pro-environmental behaviours because of a new sense of priorities.

General lessons about intervention with new parents

- 4.38 A considerable amount of evidence was found that is pertinent to the issue of effective intervention with new parents *in general*, rather than with regard to any particular kind of behaviour. This evidence is summarised here.
- 4.39 A number of studies find that the transition to parenthood provides many opportunities for intervention. This is often discussed in relation to interventions that aim to support parents as they are developing an “emergent family system” and “co-parenting relationship” (Feinberg, 2002, p. 178). The transition is a period when couples are motivated to seek out information in preparation for their role as new parents and they are also in contact with “existing resource networks” (Schulz *et al*, 2006, p. 29). There is also evidence that new parents can be motivated to interact with interventions not directly dealing with parenting issues. One study found that women showed high readiness to join smoking cessation counselling when recruited from a maternity ward (Roske *et al*, 2004). An evaluation of UK pilot projects aimed at encouraging waste minimisation behaviour among four different “life stage” communities found that the new parent group were most receptive to behavioural campaigns because of their desire for social contact with other parents, although re-evaluation of lifestyles was also found to be a factor (Brook Lyndhurst 2008). A further element of the opportunity for intervention is that new and expecting parents are already involved, because of this status, in a number of existing support structures and networks, such as through nursing provision (Nyström & Öhring, 2003; Schulz *et al*, 2006).
- 4.40 However, the transition may not always be an opportune moment for intervention, at least if carried out in the format of providing information and advice. While there are certainly a plethora of sources of advice for new

parents available, such as NHS information, commercial pregnancy and baby books, magazines and specialist websites, Barclay and Lupton (1999) note that new fathers found the advice received from hospitals about breastfeeding confusing.

A convenor of a parents and babies group who we interviewed expressed her opinion that new parents find advice very difficult to deal with while their baby is under six months, because the situation is so overwhelming that they find it difficult to deal with extra information.

A new mother who we interviewed at one of the groups commented that it was very difficult to absorb advice that relates to a stage of development later than the one her own child had reached at the time of hearing it.

4.41 Schulz *et al* (2006) state that effective interventions aimed at parenting and relationship support work not through delivering information, but via helping couples make sense of their experience. Cowan and Cowan (1995) produce findings which support those of Heinicke: that the most effective programs aimed at new parents provided 11 or more contacts over 3 month periods, with ongoing, nurturing and supportive relationships with staff. They conclude that the intensity of the intervention and ability of sensitive staff to develop ongoing, meaningful relationships with parents is important. On the other hand, in discussing co-parenting interventions Feinberg (2002) found that many parents prefer an approach based on information and advice rather than a support-based approach and that universal interventions should be framed within an educational approach because interventions that appear too psychological or that involve techniques such as counselling, a support group or personal revelation may not appeal to all. However it is not clear that any of these findings are directly applicable to potential environmental behaviour change interventions, which would not focus on issues as intimate as couples' relationships or parenting styles.

4.42 The work of Cowan and Cowan (1995) has also uncovered some findings about the timings of interventions, although again deriving from relationship-focused programs. They have found that new parents can take time to experiment with new ideas and strategies, so that in one study no statistically significant effects were found three months after the end of the intervention,

but substantial effects were observed one year later. In another study they note the importance of beginning interventions pre-birth, to allow expecting parents to anticipate change and continuing after birth to allow the opportunity for parents to recognize the common challenges they face (Schulz *et al*, 2006). Relevant here is the finding of Uzzell and Leach (2003) that first-time parents who chose cotton nappies tended to have made the decision early on in the pregnancy, whereas those choosing to use disposable nappies took the decisions relatively late on. However, it is also worth noting that smoking cessation interventions which often have a considerable degree of success during pregnancies often do not succeed in maintaining non-smoking behaviour after the birth of the child (Lu *et al*, 2001).

Summary

Which pro-environmental (or other) behaviours seem to change at this moment, if any? Some evidence was found for changes to habitual travel, food purchasing and self-care behaviour. New parents also buy a significant amount of baby equipment and develop habitual behaviour around nappies.

- Of previously-existing behaviours in these areas, all seem to change in directions which have positive environmental impacts. However, purchasing new baby equipment beyond previous purchasing levels is likely to have a negative environmental impact.
- In the case of nappies, most parents choose to use disposables which have a clear environmental disadvantage from the point of view of waste volume, but a much less clear cut impact on carbon emissions.

What are the factors that make behaviour change more or less likely at this moment? Amongst the environmentally-positive behaviour changes, two – reductions in travel and less time spent on self-care – appear to arise from necessary practical considerations (i.e. focusing on the baby), rather than individual motivation to change. It is feasible that these changes have negative impacts on wellbeing and in addition some evidence suggests that such changes are not maintained as children get older.

- Previously-held pro-environmental convictions can influence decisions about baby-related consumption behaviour. However, these may be offset by social norms and resulting feelings of guilt about providing for the baby, particularly influencing decisions about purchasing new equipment.
- Interviewees reported that having a new baby is often characterised as “overwhelming” and mentally and physically exhausting. This may influence receptivity of new parents to behavioural interventions.

How feasible – in terms of delivery and likely efficacy – would it be to make an intervention at this moment of change? The transition to parenthood offers a number of opportunities for intervention, since most new parents come into contact with existing services and support networks.

- Relatively undesirable behaviour changes which are “forced” on new parents (e.g. reduced time for self-care, disturbed sleep patterns) may constitute a barrier to external interventions aimed at creating further changes (people feel they have “enough to deal with already”).
- Interviewees reported that for some people the demands of becoming a parent mean they assess what is essential to meet the demands of their new situation. If further environmental behaviour changes are perceived as non-essential they are likely to be given considerably lower priority.
- Interventions must be sympathetic to the fact that the transition to parenthood is a challenging moment in most adult lives, where attention and effort is focused narrowly on the baby. Advice and support must be seen to be relevant to these concerns if it is to be taken on board.

5 Moving house

Introduction

Background

- 5.1 Moving house (often referred to in the research literature as “residential relocation”) could be described as the archetypal example of a moment of change. Not only is there a significant change in the physical context in which environmentally-relevant behaviours in the home are performed, there is also – often, although not always – a need to purchase new appliances, to consider new travel options and develop new habits for food and shopping behaviour.
- 5.2 In the social science literature, residential relocation has been little studied as a life event in its own right, although significant attention has been paid to how it interacts with particular stages of the life course. Specifically, researchers have studied the effects of residential relocation during adolescence on developmental pathways and youth outcomes. Some of these studies have examined the effects of changes in neighbourhood-level characteristics (Keels, 2008; Leventhal *et al*, 2005) and type of housing (Lee, 2007), whereas others have found evidence linking relocation to unfavourable outcomes such as impaired adjustment, higher levels of school drop out and (particularly for experiences of frequent moving) early initiation of illicit drug use (Humke & Schaefer, 1995; South *et al*, 2007; DeWit, 1998). At the other end of the life course, researchers have also looked at the effects of residential relocation among older people, particularly in relation to moving into designated or protected housing (Rossen and Knafel, 2003; Smith & Sylvestre, 2008). However, little attention has been paid to how residential relocation impacts on the lives of adults in general.
- 5.3 Nevertheless, among researchers considering the moments of change hypothesis, a number of studies, using qualitative, longitudinal, experimental and quasi-experimental methodologies, have begun to establish that moving house is a life event which seems to play a role in shifting travel behaviours and to shed light on some of the pathways via which these effects take place.

Approach to research

- 5.4 Moving house is the life event that has been most extensively studied by those researchers explicitly addressing the moments of change hypothesis. To this end, the present case study focuses mainly on an exploration of the relevant academic research. In addition, we have included information obtained from our contacts with people involved with the small number of interventions currently being implemented based on the moments of change hypothesis.

One component of this project has been undertaking interviews with a number of practitioners working in areas related to the 'moments of change'. It is important to note that some of the material from interviews reflects the personal experiences and views of those consulted. Where this is the case, quotations and/or paraphrases from interviewees are given *in indented, italicised type*.

Material presented in this way should not be regarded as representative of the views of any other person or group or organisation for which they work. In addition such material should not be regarded as the expert view in this field.

Moving house and changes in travel behaviour

Studies using panel data

- 5.5 Some of the basic findings about residential relocation and resulting changes in behaviour come from the general field of transport research. This often examines changes in the quantity of total travel or commuter distances following residential relocation. For example, Murakami and Watterson (1992), using data from the Puget Sound Transportation Panel in an urban area of the US, found that residential relocation tended to increase the distance travelled from home to work. Research looking at residential relocation in an area of Switzerland showed that it was associated with changes in commuting distances by car, fairly evenly balanced between increased and decreased distances (Arend & Gotardi, 1994, cited in Scheiner, 2006).

- 5.6 A number of studies link changes in travel quantity following residential relocation to the characteristics of the new residential area. A review of German research on residential relocation cites evidence that on average people travel 140km further per week after moving to a less dense area, controlling for socio-demographics, car availability and spatial structure (the characteristics of the locations involved). It also found that an increase in second car ownership was observed among movers to suburbs of certain German cities (Kloas *et al*, 2001, Herfert, 1997, both cited in Scheiner 2006). Prillwitz *et al* (2007) also used German data to show that residential relocation leads to increased commuting distances, particularly moves from core urban regions – those urban municipalities which are the destination of a significant share of commuters from other municipalities (Prillwitz *et al*, 2006) – to non-core urban regions.
- 5.7 Krizek (2003) uses the concepts of neighbourhood accessibility and regional accessibility to examine residential relocation in urban areas. An urban environment has high neighbourhood accessibility if it provides a variety of different transport options of different modes (such as public transport, cycling and walking) for travelling within and between different neighbourhoods, and therefore reduces the need for travel by car. Regional accessibility is a measure of the accessibility of a neighbourhood considered within its larger surrounding region. Krizek's findings showed that households that moved to areas with both higher neighbourhood accessibility and higher regional accessibility reduced their total vehicle miles travelled and total distance travelled by any mode. He also found that moves to areas of higher neighbourhood accessibility were associated with an increase in the number of trips made, with fewer destinations per trip. This, he suggests, is because people make more journeys to local amenities and are less likely to link journeys with different purposes together: they "are more likely to go to the corner store to buy a pint of milk ...and are less likely to link this trip for milk with a trip to the dry cleaner" (p. 277).

Survey research

- 5.8 These studies reveal important aspects of how area characteristics affect travel behaviour following residential relocation. They are of limited

applicability when it is less feasible to include policy mechanisms such as urban planning or regional transport design and the focus is on encouraging individuals and communities to act differently. Hence, much of the research looking directly at residential relocation as a moment of change has focused on the issue of its effect on the travel mode decisions of individuals. Travel mode decision is itself a widely-researched topic which is often explicitly linked to the environmental benefits of persuading people to choose more sustainable modes of transport such as public transport, cycling and walking, rather than private car use (e.g., Verplanken *et al*, 2008). This has become linked to the moments of change agenda in general and residential relocation in particular, through research by authors such as Rölle, Weber and Bamberg. As Scheiner explains, in a key paper the authors identify residential relocations as key life events when familiar routines are broken. They provide evidence that a high proportion of people who moved to the city of Stuttgart used public transport although they had not done so at their former place of residence (Rölle *et al*, 2001, cited in Scheiner, 2006). A paper published by the same authors the following year identified moving house as one of the “natural events” that are presumed to be effective at unfreezing transport habits (Rölle *et al*, 2002).

- 5.9 Some studies have identified moving house as just one of several key life events that influence transport mode choice. Klöckner (2004) found that experiencing any of 18 major life events within the previous year (including moving to a new town), especially those which respondents assessed as important, was associated with reduced strength of car use habit. Car use habit was measured according to an early habit measure developed by Verplanken and colleagues. It is notable that “moving to a new town” was the most frequently cited life event when respondents were asked in an open-ended way to name events in their lives which had changed the way they travelled. Prillwitz *et al* (2006), using data from the German Socio-Economic Panel study, found a number of life events that were associated with increased car ownership (which was treated as a proxy for car use), including residential relocation. Moving house was seen to increase levels of car ownership, but when other variables were controlled for, only relocation within or between core urban regions was shown to have an effect on car ownership, leading to a reduction in car ownership growth. This study also

showed the strong influence on car ownership of a change in the number of adults per household, birth of first child and change in income, which has implications for the other life event moments of change being considered in the current research.

- 5.10 Research has only recently begun to address the mechanisms through which moving house can lead to changes in travel behaviour. In a study cited earlier, Verplanken *et al* (2008) conducted web-based research among employees of an English university to examine moving house in the light of two intersecting hypotheses about behaviour change. The study considered residential relocation as an example of a change in performance context (see Chapter 2), reasoning that a house move causes disruption to the stable context in which transport habits are associated and thus provides a window within which behaviour may have a higher likelihood of being reconsidered. It also considered the “self-activation hypothesis”, which states that values influence choices and behaviour only when the value is part of a person’s self-concept and when it is “cognitively activated” – that is, when people are consciously thinking about it. Participants were categorised according to two criteria relating to the two hypotheses: whether or not they had moved in the last year and whether they had high or low environmental concern. This created a two-by-two group design.
- 5.11 The results found that those who had both recently moved *and* who in general had high environmental concern undertook less car travel than those in any other group. This suggests that the habit discontinuity (i.e. the house move) interacted with existing values, leading to a stronger behavioural impact than would either factor have done on its own. The authors suggest that a context change leading to disruption of habits serves to “(re)boost the decision weight of ecological values in comparison with the more stable weight of individual interests” (p125). Thus, the context change of residential relocation activates pre-existing ecological values and beliefs. As the authors note, however, the evidence they present is correlational only: there is a need for longitudinal and/or experimental studies to confirm these findings.

Qualitative research

- 5.12 Stanbridge *et al* (2004) took as their starting point the importance of habits as inhibitors to travel behaviour change and examined how recent home movers considered alternative travel modes during the moving process. They carried out in-depth qualitative interviews with people who had recently bought a home in a UK town (Bristol) to investigate their accounts of their reasons for moving, priorities when searching for a property, experiences of the moving process and travel behaviour for a variety of journey purposes. They showed that residential relocation can prompt consideration of alternative travel modes. In many instances people are consciously considering travel mode implications during the course of moving home and, even if there is no subsequent behaviour change, the findings highlight a propensity to change travel behaviour.
- 5.13 The conceptual framework that they devise from their data illustrates that consideration of alternative travel modes can occur at a number of different stages during the moving process, from deliberate, when a house move is actually prompted by a desire to change travel mode, to designed and planned, when travel mode is considered at the start of or during the process of searching for a new property, to being considered during the selection stage or after the move has occurred. Journey purpose can influence the point on the timeline at which mode choice is first considered, with commuting journeys being considered much earlier than journeys for reasons such as food shopping. Car ownership also affects timing of mode choice, as people who rely on public transport, walking or cycling need to consider the availability of suitable services at an earlier stage. Car ownership also creates more opportunities for compromise when selecting between properties, so that intentions to use alternative travel modes may not be followed through if a property is subsequently selected that relies on use of an existing car.

Travel interventions targeted at residential relocation

- 5.14 Bamberg (2006) describes findings from an experimental study among people planning to move to Stuttgart, Germany (see also Rolle *et al*, 2001, cited in Scheiner, 2006). Participants who planned to move within a six-month period completed a questionnaire. About six weeks after their move, participants

randomly assigned to the experimental group received a free one-day public transport ticket together with locally-tailored travel information. This intervention came from the local transport company and was not identifiably linked to the research project. All the participants who moved to Stuttgart received a second questionnaire about 12 weeks after the move. At this follow-up point, participants' use of public transport was found to have increased, as did the perceived attractiveness of public transport use, while the preference for car use declined. The experimental group displayed a sizeable increase in its public transport use which was considerably greater than the small and non-statistically significant increase seen among the control group, who did not receive the intervention. This indicates that the intervention had its intended effect of increasing public transport use.

- 5.15 The study tested attitudes to public transport according to the Theory of Planned Behaviour (see Chapter 2). The attitudes tested therefore included general attitudes to using public transport, subjective norms about public transport use, control beliefs about respondents' degree of difficulty and freedom in using public transport. The results show that before residential relocation, both intention to use public transport and control beliefs were strong determinants of travel behaviour; after the move control beliefs impacted on intention to use public transport but not directly on behaviour. Bamberg suggests that this may be because after the move the choice to use public transport was more under volitional control, particularly for participants previously living in villages and small towns.
- 5.16 The intervention showed no effects on control beliefs, subjective norms or attitudes, but did show strengthened intention to use public transport. Bamberg therefore suggests that the intervention operates less by providing new information, but by acting as a 'last push' for people to try public transport at their new residence. While the direct effect of the intervention on the intention was moderate, there was evidence of an interaction between previously having lived in a small village or town, having a high intention to change to public transport before the move and the intervention. The group displaying these characteristics reacted more strongly when receiving the intervention. It is likely that many of the people in this group experienced a large improvement in the availability of public transport after moving to Stuttgart compared to what had been on offer in their previous location (i.e. in

a smaller village or town). This may indicate that the degree of a change in local public transport provision following a residential relocation is a factor in producing behaviour change. This interaction also “provides additional support for the interpretation of the intervention as a last push” (p. 837), with the intervention acting in conjunction with previous experiences and current intentions. No evidence was found to support a link between change in car habit strength and public transport use, although Bamberg notes that this may be due to inadequacy of the measure of habit strength used.

- 5.17 In addition to the intervention reported by Bamberg, several other interventions have begun to be developed that build on the idea of residential relocation as an opportunity to change travel behaviour. To-date, no solid evidence for the efficacy of these interventions has been made available, which may suggest that they were not subject to robust evaluation. However, a number of useful lessons can be learned from the design and rationale of those interventions that have been proposed and implemented.
- 5.18 In the US context, Verplanken and Wood (2006) cite the example of programmes such as “welcome wagons” that contact new residents soon after they move to provide them with information about local products and services. They note that while these programs are typically commercially-motivated with the aim of steering residents’ purchases, they could be adapted to provide information about healthy lifestyles, including public transport, as well as incentives and social benefits. They also give the example of US bus system operators who provide free bus passes to new city residents, although note the lack of evidence from these schemes.
- 5.19 Ampt *et al* (2006) discuss an intervention aimed at “households on the move” in two areas of Canberra, Australia (see also Australian Greenhouse Office, 2005). This involved identifying households who were shortly planning to move house or who had recently moved and targeting them with an individualised travel planning intervention involving tailored advice and information. An early phase of the project involved running a focus group to understand experiences of moving. One of its key findings was that moving house was both exciting and stressful. Participants identified finding out about available services and activities in the area and access to them as the thing that would make the moving process easier. Although the study aimed to gather both self-reported travel data and data from GPS devices before and

after house moves, low completion rates meant that no robust findings on effectiveness could be reported.

5.20 The authors discuss in some detail the different strategies used to identify “households on the move” and encourage participation in the project. This process was far from straightforward and multiple tactics were adopted, such as: asking estate agents to pass details about the project to their clients; identifying recently sold houses from a property website (a relatively successful method); arranging for a letter including information about the project to be sent by the local utility company a week after they had started providing their services to new residents; and contacting, via letter and face-to-face visits, households in a newly established area. Other identification strategies that were considered or pursued only to a limited extent, were liaison with the Defence Housing Department responsible for the movement of large numbers of military personnel to the city (but only at certain times of the year); making a brochure available at the visitor centre; liaising with a welfare agency providing housing to refugees; and asking the local university housing manager to pass on information about the project to students. Removal companies were also consulted about their strategies for identifying movers but their solution, contacting people living at houses listed for sale, was not appropriate for the study which concentrated on in-movers to an area rather than movers from an area – however, the tactic was noted as a potential strategy for interventions operating over a wider area. Overall, the project achieved a 54 per cent participation rate among households offered the intervention face-to-face and also identified a small number of other participants through other forms of contact.

5.21 A small number of relevant interventions have been implemented in the UK. Essex County Council has implemented a policy which requires developers of residential sites containing 10 or more dwellings to provide a pack of travel information to form part of the house purchaser’s welcome pack for each new dwelling, including a voucher for 12-month’s worth of free travel on local bus services. The council prepared travel packs for sale to developers. Recent figures show that 700 packs covering eight developments have so far been sold, generating £14,000 of revenue, with all profits re-invested into promotion of sustainable transport. A similar scheme has been implemented in West Yorkshire, where developers pay 50 per cent of the usual price to provide a

free regional annual travel card to the house occupier for the first year of occupancy, with reduced discounts available to either the developer or card holder in the second and third years¹⁷.

- 5.22 A more intensive intervention approach was taken in the Arbury Park development in Cambridge, through a personalised travel planning behaviour change project. Just over 300 new dwellings were targeted for repeated engagement visits from three travel officers, resulting in 274 households successfully contacted, of whom 200 participated. They were each provided with a travel information pack, with further offers including a free public transport weekly ticket and cycle training. Questionnaires, completed by 43 per cent of the participating households, showed that sizeable proportions of respondents reported increasing their number of trips by means of sustainable transport as a result of the project. Over half (58 per cent) reported that they had increased their bus trips, 42 per cent reported increasing trips by foot and 39 per cent reported increasing trips by bicycle. Thirty-five per cent of respondents said that they had reduced the number of trips they made as the driver of a car without passengers¹⁸. A full evaluation report is due to be published by Cambridgeshire County Council in the near future.

Other behaviour changes

- 5.23 Residential relocation by definition involves a wholesale change in the context in which many behaviours are performed. For the travel behaviours discussed, the change in performance context relates to the different location of the new residence in relation to the broader area in which it is situated. However, residential relocation also involves changes to the physical surroundings in which people carry out all of the behaviours that they perform at home. As this will undoubtedly include many frequently repeated, habitual behaviours, the moments of change hypothesis suggests that we might expect residential relocation to provide an opportunity for many of them to change. However, we were unable to identify any existing research evidence addressing the question of whether and how habitual, non-travel behaviours

¹⁷ Information provided by JMP consultants

¹⁸ Information provided by Cambridgeshire County Council and JMP Consultants

might change following relocation. Notably, we contacted Waste Watch, one of the most prominent UK organisations involved in trying to improve efficiency of energy use and reduce waste in homes, who indicated that they had not considered the possibility of targeting people moving home.

- 5.24 There is some, albeit limited evidence to suggest that interventions that act by changing defaults across a whole residential area – and thus apply to new residents – can be effective in changing the behaviour of all residents across the area. For example, Pichert and Katsikopoulos (2008) report that when green tariffs were set as the default in Schönau, Germany, 99 per cent of residents were found to have stayed with them 8 years later. Similarly 94 per cent of customers stayed with the green tariff set as a default by Energiedienst GmbH. Given that green providers hold only 2 per cent of the standard market in Germany, with brown tariffs as the default, this suggests that the default option has a large effect on tariff choice. It is therefore possible to hypothesise, by extension, that there would be an effect of such interventions on people moving into areas with similar defaults. However the research evidence to support this claim is currently lacking and the UK green energy tariff providers we contacted were unable to provide market research data on whether people were more likely to switch tariffs on moving house.

Summary

Which pro-environmental (or other) behaviours seem to change at this moment, if any?

- There is reasonable evidence to show that residential relocation is linked to changes in travel behaviour, but little evidence was found specifically relating it to other behaviour changes.
- Researchers who have explicitly addressed the moment of change hypothesis by examining travel mode choice during and following residential relocation have found evidence of a number of effects including increased use of public transport, reduced strength of car use habit, activation of pro-environmental values leading to a desire to change travel behaviours and, at the group level, reduction in the growth of car ownership.

What are the factors that make behaviour change more or less likely at this moment?

- Characteristics of the new residential area can influence travel mode choice, e.g. whether the new area has good public transport links. Interventions designed to make alternatives to car driving easier, such as providing free public transport tickets, have shown some success with people who have recently moved home.
- Some evidence suggests that travel options are often considered during the early stages of planning for a house move. This means that people may have already made their decisions about travel behaviour before the move actually occurs.

How feasible – in terms of delivery and likely efficacy – would it be to make an intervention at this moment of change?

- The most successful interventions have involved the provision of personally-tailored support and advice, but this is – potentially, at least – a somewhat time and resource intensive approach.
- Identifying people who are about to move house is difficult. One study found that identifying recently sold houses from a property website was relatively successful. Other approaches have been tried (e.g., working with estate agents and utility companies to identify new householders) but with less success.
- One approach, currently being tried in two UK areas, is for the local authorities to require developers of new housing to cover some or all of the costs of public transport for the initial period of occupancy and also provide personal travel planning advice.

6 Retirement

Introduction

Background

- 6.1 Retirement is a key life event that is, by definition, marked by a dramatic change in behaviour: an end to spending time in paid employment. Beyond the changes to participation in employment, we would expect retirement to have substantial implications for several key areas of people's lives, including their travel behaviour, availability of free time, disposable income and social life.
- 6.2 Research shows that the transition to retirement involves both adjusting to the loss of the work role and the social ties associated with working and also the development of a post-retirement lifestyle (van Solinge & Henkens, 2008). Roles and relationships associated with factors such as pre-retirement self-esteem, retirement planning, whether or not the retirement was taken voluntarily and health have been found to affect different stages of the adjustment to retirement (Reitzes & Mutran, 2004). There is also evidence that different retirees follow different retirement transition and adjustment processes, depending on individual factors such as whether they have retired from a highly physically demanding or stressful job and the employment status of their spouse (Wang, 2007).
- 6.3 It should be noted that retirement is not always an event marked by a single transition point, but in fact involves complex flows between nonretirement, partial retirement and complete retirement, with a substantial proportion of self-defined retirees experiencing a change from less to more work and evidence of considerable continuities between working and post-work life (Gustman & Steinmeier, 2000; Hyde *et al*, 2004). The move into retirement has therefore been examined in terms of transition pathways between work and retirement, emotional reactions to retiring and satisfaction with new retirement status. However, research has rarely extended into extensive exploration of behaviour changes that could be taken to have a significant environmental impact.

- 6.4 Retirement is, however, discussed regularly in policy circles as a challenge. The retired population in Europe is set to continue growing as the proportion of people over 65 increases from 17 per cent in 2008 to 19 per cent in 2015 and 30 per cent by 2050¹⁹. To put this figure in context, the latest figures for the average ages at which people withdrew from the labour force in the UK (for the second quarter of 2008), were 64.6 for men and 61.9 for women²⁰. While, in studying retirement, there is a need to distinguish between age-related and specifically retirement-related behaviour changes, some of what follows is nevertheless based on age-related differences where that is the only available evidence. Even where retirement is the focus of research, in many analyses where the effects of age are not controlled for it is not possible to disentangle the effects of retirement specifically from those of age on the behaviours being studied.
- 6.5 The limited available evidence on pro-environmental behaviour change in retirement tends to focus on travel behaviour and is discussed here alongside research examining travel among older age groups in general. There is also some evidence of less consumption-focused, more socially oriented values among older generations, such as reduced materialism and being motivated by concern for others²¹, which corroborates evidence of more energy efficient, responsible behaviours in some areas. However there are also indications that increasing frailty might require greater reliance on car-based transport and greater heating needs.

Research strategy

- 6.6 Two main avenues of research were pursued for this case study. Firstly, searches were conducted of academic literature for research pertaining to behaviour change associated with retirement and aging. Secondly, a number of agencies involved in providing help and support for older people were consulted.

¹⁹ Based on Eurostat's 2004 baseline variant population projection for EU-25 countries.

²⁰ *Pension Trends*, chapter 4 (data published on 22.10.08, and downloaded on 06.05.09 from www.statistics.gov.uk/cci/nugget.asp?id=1273).

²¹ European Social Survey, 2004.

Changes in travel behaviour

Evidence from standard data sets

- 6.7 Evidence from UK survey data shows that people who have retired undertake less travel by car than those in employment. Data from Defra's *Survey of Public Attitudes and Behaviours toward the Environment* (Defra, 2007) reveals that retired people report using cars, both as drivers and as passengers, less than other groups. Strikingly, this reduction is not wholly due to reduced commuting behaviour. For example, for travel relating to shopping trips, fewer retired people report driving than people in employment (59 per cent compared to 67 per cent) and more report using public transport (10 per cent compared to 5 per cent). Importantly, this difference remains significant even when controlling for age²². Meanwhile, the *National Transport Surveys* from 2007 and 2006 show reduced car travel among people aged 70 and over and the 2000 *Time Use Survey* shows that retired people spend less time travelling, controlling for age²³.
- 6.8 However, transport data show that there is still substantial car use among older people. For example, 41 per cent of people over 60 report having used a bus, the main alternative mode of transport for moderate distances, less than once a year or never (DfT, 2007, Chart 3.4). Absolute levels of walking amongst people aged 60-69 appear to be the same as for younger groups and people over 70 tend to walk less. A lower proportion of people aged over 60 report using bicycles than those from younger age groups.

Targeted research

- 6.9 A small number of studies have been undertaken which help explain the differences in travel behaviour observed among older people. Retirement is found to be cited by older drivers as one of the main reasons to reduce driving, alongside deteriorating health (Raitanen *et al*, 2003; Antin *et al*, 2008). What is not clear from this evidence is whether factors associated with

²² Based on the significance of the 'working status' parameter in a logit regression to predict mode of transport.

²³ Demonstrated using a linear regression with age and retirement status as independent variables, and time spent travelling as the dependent variable.

retirement itself reduce driving behaviour *other* than by removing the need for commuting journeys.

- 6.10 A relevant distinction in this context is one made between two sets of older people in terms of the reasons why they cease to drive: those whose behaviour change arises mainly due to “push” factors and those who are motivated mainly by “pull” factors (Adler & Rotunda, 2006; Knight *et al*, 2007). Those in the “push factors” group drive up to the last possible moment and only stop driving when they are told to by a doctor or when they suffer an accident. Some demonstrate very strong emotional attachment to their cars, feeling like they were “losing an arm” when they were not able to drive any more. For some in this group, driving provided a sense of pride and of identity, allowing them to demonstrate that, despite aging, they were still independent. It may therefore be very hard to encourage people in this group out of their cars. The research suggests that it may be necessary to quite explicitly replace their identity as a driver with some other form of identity, or, at the very least, help them to build their identity in other dimensions. More practically, to encourage alternatives to driving among this group it would be essential to ensure they are able to be independent without their car. Given that the push factors show that it is inevitable for many that they will at some point lose the ability to drive, this suggests that being helped to become accustomed to alternative modes of transport before the point of being forced to do so would be advantageous for this group.
- 6.11 Indeed, it is the case for the many older people who comprise the second, “pull factors” group that they willingly choose to stop driving before they are completely unable to do so. These people do report some “push factors” such as finding driving more stressful than before and finding it too expensive, but they also identify “pull factors” towards public or active transport such as free bus passes and not needing to use the car or rush any more. For example, one respondent in a qualitative study in Sweden reported having decided at age 60 to give up driving when he reached 70, a resolution he stuck to:

“I love to go by bus or train. I can read, speak with other travellers or just look out and keep my eyes on other things than the road. It was with great satisfaction I sold the car. No more change of tires, oil, petrol, car repairs. There are so many other things to do. And with the

driving, I mean it's such a soul-destroying, deadly boring work to drive a car on the road." (Levin, 2008, p. 26).

- 6.12 Qualitative evidence highlights the importance of easy, cheap and safe public transport in encouraging older people out of their cars. For example Levin (2008) notes the need for low-floor buses with space for wheelchairs, and a short distance to bus stops. Knight *et al* (2007) highlight the importance of free bus passes, but note reservations regarding buses due to perceptions of crime, physical difficulty in their use and lack of information or awareness.
- 6.13 It is worth noting that the academic and grey literature on transport for older people almost entirely ignores the challenges that high car use presents for environmental sustainability. The only explicit mention we were able to find was a report prepared for the DfT where a respondent (one out of 63) identified the environment as a reason to reduce their driving (Knight *et al*, 2007). The Defra survey cited earlier (Defra, 2007) contains some data that bear on this issue indirectly. Retired people are more likely to agree with the statement "driving my car is too convenient to give up for the sake of the environment".²⁴ Meanwhile, people aged 65 and over are more likely to agree that "people should be allowed to use their cars as much as they like, even if it causes damage to the environment" and *less* likely to agree that "for the sake of the environment, car users should pay higher taxes".²⁵
- 6.14 It may be worth investigating why environmental aspects of transport behaviour in retirement have not been given greater prominence. One possible reason is that environmental concerns might seem low down in the priority list for those concerned with the mobility options of older people; both older people themselves, as well as researchers and policy makers. More frequently the concern is for how to ensure people maintain their mobility in later years. A typical view (particularly in the US) seems to be that "extending the years of safe driving in older populations" (Ragland *et al*. 2004) is the best way to address mobility issues.

²⁴ Item B14.10 in the survey. Independent samples t-test: $t = 4.65$, $p < 0.001$ with equal variances not assumed.

²⁵ Items B14.7 and B14.9 in the survey. Independent samples t-test: $t = 1.98$, $p < 0.05$ and $t = 2.11$, $p < 0.05$ respectively, both with equal variances not assumed.

Travel-focused interventions

- 6.15 As noted in the moving house case study, there are some examples of a moments of change approach being taken by those implementing interventions aimed at changing travel-related behaviour. However, consultations with a number of people involved in delivering and evaluating personal travel planning programmes did not reveal any evidence that retirement, or any other particular life stage, apart from residential relocation, had been given special consideration or methodological assessment as an opportune moment to intervene and shift travel patterns.

A staff member at Transport for Quality of Life said that she considered the question of “who responds best to personal travel planning” to be the “next question on the list”.

- 6.16 We were able to find one evaluation of who responds best to personal travel planning, by transport consultants Stear Davies Gleave. The evaluation considered a three-year personal travel planning programme in Darlington. Unfortunately the report is not publicly available.

An interview with a representative from Stear Davies Gleave, suggested that retirement was not a particularly important determinant of whether an individual was likely to change their travel behaviour following the personal travel planning intervention.

- 6.17 The research conducted by Knight *et al* on behalf of DfT identifies a number of needs which transport helps older people to fulfil, including independence, freedom, social contact and the ability to get out of the house (Knight *et al*, 2007). The study proposes a number of recommendations for policy actions to help meet these needs, which include possible interventions to encourage and enable older people to use public transport. Some, such as design modifications to public transport to minimise the impact of declining health and improving access to public transport in rural areas, are not specific to a moments of change approach, but there are others for which it might be worth exploring the effectiveness of targeting around retirement. These include preparing drivers for the impact of driving cessation and improving awareness about provision of community and specialist transport.

Changes to other behaviours

- 6.18 Evidence on the impact of retirement on other environmentally-related behaviours is even more sparse than that relating to travel behaviour. The broadest set of data comes from Defra's survey of pro-environmental behaviours (Defra, 2007). Generally, retired people engage more in various pro-environmental behaviours, including energy-saving behaviours, waste-related behaviours and sourcing local produce.²⁶ However, when age is controlled for (using a linear regression model) the only differences in behaviour which remain significant are some of the energy saving behaviours, including use of energy-saving light bulbs, and not filling the kettle too much. Retired people are also less likely to throw away food and tend to donate old clothes to charity shops or friends and family more. Only one recycling behaviour (glass) remains significant when controlling for age.²⁷
- 6.19 The implication is that retirement itself leads to increased energy-saving behaviour, not aging. By contrast, generally greater recycling, increased composting and the purchase of local food is predicted by aging, not retirement *per se*. Indeed, having controlled for age, people who have retired tend to be slightly *less* likely to engage in some pro-environmental behaviours such as composting, seeking local produce and buying energy-efficient goods, though we did not find these differences to be statistically significant. As will be discussed in the following section on attitudes, it is likely that

²⁶ Based on independent samples t-tests for various behaviours, comparing retired people with all other groups. Retired people have more energy-saving light bulbs (question C6, $t = 6.49$, $p < 0.001$); and are less likely to leave their TV on standby overnight (question C25.1, $t = 6.15$, $p < 0.001$), leave lights on in rooms not being used (C25.2, $t = 9.79$, $p < 0.001$), leave mobile phone chargers switched on when not in use (C25.3, $t = 15.72$, $p < 0.001$), overfill kettles (C25.4, $t = 10.89$, $p < 0.001$), leave the tap running when brushing their teeth (C25.5, $t = 5.86$, $p < 0.001$), and throw away food (C25.9, $t = 12.15$, $p < 0.001$). They are *more* likely to reuse shopping bags (C25.11, $t = -14.01$, $p < 0.001$), and recycle paper (D2.1, $t = 9.33$, $p < 0.001$), glass (D2.2, $t = 5.63$, $p < 0.001$), cans (D2.3, $t = 7.89$, $p < 0.001$), cardboard (D2.4, $t = 2.85$, $p < 0.01$), and plastic bottles (D2.7, $t = 2.71$, $p < 0.01$). They are more likely to both have their own composting facilities at home (D3, $t = -5.27$, $p < 0.001$) and to put out garden waste for collection for composting (D2.9, $t = 4.83$, $p < 0.001$). They are marginally more likely to shop at farmers' markets (E2.5, $t = 2.09$, $p < 0.05$), but less likely to get a vegetable box delivered (E2.8, $t = -2.87$, $p < 0.01$). They give away unwanted items to charity shops or friends (E8.2, $t = -5.55$, $p < 0.001$), and buy things from local producers (E8.8, $t = -6.19$, $p < 0.001$). In all cases, equal variances not assumed.

²⁷ Age controlled for by entering both an age variable and a retirement variable into linear regressions with pro-environmental behaviour as dependent variables. Age included as an ordinal categorical variable, whereas retirement is coded as 1 for retired and 0 for not retired. Retirement is considered to remain significant if beta coefficient is significant at $p < 0.05$ level. This is the case for questions C6, C25.4, C25.9, E8.2 and D2.2).

attitudes towards saving money are important in explaining this difference in patterns.

- 6.20 An important contextual difference between older and younger people with regards pro-environmental behaviour is the use of heating. We do not have data on gas bills, but the survey suggests that older people tend to leave their heating on for longer than others. For example 25 per cent of people over 65 reported leaving their heating on when leaving the house for a few hours quite often or more. Given that housing-related energy use accounts for approximately one-third of the UK's carbon emissions²⁸, of which heating is a significant proportion, this is a potentially important behaviour to investigate further.
- 6.21 Some research has sought to assess the specific impact of retirement on environmentally-related behaviours. For example, Mein *et al* (1995) and Midanik *et al* (2005) carried out regression analyses on large samples and found that retirees, controlling for age, engage in more physical activity. The authors attribute this to retirees having more free time. This suggests that it may be worth exploring interventions which incorporate physical activities, such as those encouraging walking and cycling, and growing one's own food, into the suite of physical activities that retirees begin to engage in.
- 6.22 Meanwhile, research in Germany (Brunner *et al*, 2006) reports retirees making use of their increased free time by what might be called 'slow shopping', shopping from smaller specialist shops where there is a more personal touch and seeking out local produce so as to support their local economy (not, it should be noted, because of environmental motives). However, one should note that this is not corroborated by data from the Defra survey in the UK, which showed that whilst retired people *do* tend to purchase local goods and shop in smaller shops more often, this may be a difference by age rather than retirement per se.
- 6.23 The intervention by Hampshire County Council, Brook Lyndhurst and Project Integra which explored the ability to exploit various moments of change with regards waste behaviour, included retired people as one 'life stage' community explored (as well as new parents, as mentioned in the earlier case

²⁸ Stockholm Environment Institute data.

study). The summary report suggests that little behaviour change was found for the retirement group (Brook Lyndhurst, 2010).

Pro-environmental attitudes

- 6.24 Interestingly and in contrast with the stereotype that environmentalists are generally younger people, the Defra survey data also shows older people to have a greener image of themselves and report caring about the environment more than other groups (Defra, 2007).²⁹ Having said that, having controlled for age, *retirees* tend to have less pro-environmental attitudes in some areas. For example, whilst they consider themselves greener than non-retirees of the same age³⁰, they are less motivated to do more. They are happier with their current pro-environmental behaviours, feel less guilty about their environmental impact, feel the effects of climate change are too far away to worry about, and do not believe their behaviours contribute to it. Most importantly, they report the environment as being a low priority “compared with a lot of other things” in their lives, and are more likely to say that it is “only worth doing environmentally-friendly things if they save you money”.³¹ Note that these effects are often in the opposite direction to the effects of age.
- 6.25 In summary, whilst older people in general seem to report caring about the environment more and to be more motivated not to waste – fitting with the “Waste Watcher” segment identified by Defra in the segmentation model (Defra, 2008) – retired people seem to be more specifically motivated by saving money. Where environmentally-friendly behaviours coincide with those that save money (such as energy-saving, not throwing away food) they are more likely to adopt them. Where they may cost more (such as making an outlay to purchase an energy-saving product) they are less keen.

²⁹ For example, they more often report that they are environmentally-friendly in what they do (question F7, $t = 12.48$, $p < 0.001$) and that they feel that “humans are severely abusing the environment” (question F8.3, $t = -2.30$, $p < 0.05$). Equal variances not assumed in either case.

³⁰ Retirement variable significant at $p < 0.01$ in linear regression with question F7 as the dependent variable, and age group and retirement as independent variables.

³¹ In all cases, results based on linear regressions with pro-environmental attitudes as dependent variables, and age group and retirement status as independent variables. Questions used: F6, F8.15, F8.16, F8.17, F8.19, F8.26. In all cases retirement variable significant at $p < 0.001$ level, except for F8.26 (behaviour does not contribute to climate change, $p < 0.01$) and F8.17 (only worth doing environmentally-friendly things if they save you money, $p < 0.05$).

Two of our consultees felt that retirement can prompt more pro-environmental attitudes to be adopted. One of the co-developers of the US-based 'Green Seniors' website noted that many older people are the product of a pre-consumerist society who recall times of thrift. He feels that on retiring people have both a new opportunity to pursue their goals and also have a 'sense of their own mortality', which leads some to discover a new green identity. However he also noted that 'green' terminology can fail to resonate with many older people, whereas emphasising 'connections' and 'community' is often more successful.

Another consultee was the leader of a green US retirement community. He believes that such contexts provide a perfect opportunity to mobilise people and to ensure that environmental concern is part of what defines the community. He considers this older generation to have more 'civic' attitudes. In his experience, though, it is only at the retirement centre that engagement in green issues begins. It has not been possible to find data which clearly demonstrates that retirees or older people are more involved with environmental movements. Friends of the Earth UK report that 70 per cent of their regular donors are over 50, but Greenpeace and WWF were unable to supply similar data.

Summary

Which pro-environmental (or other) behaviours seem to change at this moment, if any?

- Overall, there is a lack of evidence regarding the impact of retirement on everyday and habitual behaviours. No interventions, successful or otherwise, were found that specifically targeted recent retirees (as opposed to older people in general).
- However, there is some evidence of differences between retired people and other groups, *controlling* for age, which suggests a specific effect of retirement. Beyond the obvious reduction in car use resulting from not having to commute to work there is evidence that, even controlling for age, retirees use cars less for non-commuting travel than working people. Some evidence suggests that retired people engage in more pro-environmental behaviours – such as energy saving in the home and reducing food waste – than other groups.

What are the factors that make behaviour change more or less likely at this moment?

- Where there are differences specifically linked to being retired, they appear to be more motivated by money-saving than by environmental concern. For example, increased energy-saving behaviours and less throwing away of food.
- Reduction in car use may be related to internal factors such as emotional attachment to personal vehicles and external factors such as availability and ease of use of public transport. However, evidence on this is extremely limited.

How feasible – in terms of delivery and likely efficacy – would it be to make an intervention at this moment of change?

- The importance of cost factors for retired people suggests that interventions that help them make savings, particularly regarding energy, are likely to be successful. Moreover, the increased time affluence of retirees has, in some cases, been found to lead to the possibility of more pro-environmental behaviour (e.g. “slow shopping”, walking rather than driving). Interventions could be targeted to make the most of this.

Part 3

Exogenous shocks as moments of change

7 Energy price shocks, fuel crises and other disruptions

Introduction

Background

- 7.1 Global energy markets and integrated energy systems are susceptible to disruption to supply. For example, the International Energy Agency suggests that, on average there are two or three significant episodes of disruption to world oil supply per decade (IEA, 2005). There are a number of potential causes of disruptions to supply, which affect energy prices. Such disruptions are often related to the global nature of the oil and coal markets. Furthermore, their supply also influences the price of regionally traded fuels vis-à-vis gas. National or regional energy shocks can also be caused by unforeseen meteorological conditions (extreme temperatures or weather events and drought). These have the potential to rapidly change demand or damage electricity (and gas) supply infrastructure. During these times rapid changes in consumption patterns are necessary in order to maintain supply and in the case of electricity, avoid indiscriminate power outages (blackouts).
- 7.2 The energy crises in the 1970s and more recent disruptions to supply (shocks) offer the opportunity to explore how consumers prioritise their activities and trips and reorganise them when they are unable to follow their intended routine (Chatterjee & Lyons, 2002). They also have the potential to expose limits to adaptation during these episodes (Noland *et al*, 2003). For example, establishing how households change their habitual electricity use when supply is disrupted is useful because demand for electricity is widely considered to be less elastic than for other forms of energy.³²

³² There is a necessary distinction to be made between discretionary and non-discretionary energy use. Discretionary use refers to activities that can easily be curtailed. For example, in the case of domestic energy consumption discretionary energy use includes space heating/cooling (i.e. changing the thermostat) or non-essential electrical equipment (e.g. TVs, pool pumps). Conversely, non-discretionary use refers to energy use or trips that cannot be easily curtailed (e.g. refrigeration or commuting). As such, the price elasticity is different for discretionary and non-discretionary energy use.

- 7.3 Prior to the 1970s oil shocks, very little was known about public perception of energy supply and consumption. After the two crises, however, there was a realisation that energy is not just a technological problem but also a social one. Specifically, focusing on short-term changes to energy consumption (defined as one day to a year) the International Energy Agency report *Saving Electricity in a Hurry* (Meier, 2005) suggests that a combination of interventions involving increases in price encouraged behavioural change and the introduction of more energy efficient technologies have the potential to reduce demand for electricity by up to 20 per cent. The report refers to a number of short-term supply shortages caused by a diverse array of factors.
- 7.4 In addition to energy shocks, disruption to transport infrastructure through one-time extreme events has the potential to change travel behaviour. There are a number of examples that explore the impact of short-term coercive disruptions to travel behaviour, such as bridge collapse, reduction to capacity (i.e. road maintenance), earthquake damage or fuel crises (Noland, 2001). For example, Thorpe *et al* (2002) described the fuel crisis of 2000 as:
- “a unique opportunity to study adaptation to the progressive removal of the car thereby providing evidence of the barriers to the use of more sustainable modes of transport.”*
- 7.5 Given this, exploring changes in behaviour of consumers during energy crises or “coercive disruptions” to supply is a potentially effective way to highlight behaviours that are most amenable to change.

Research strategy

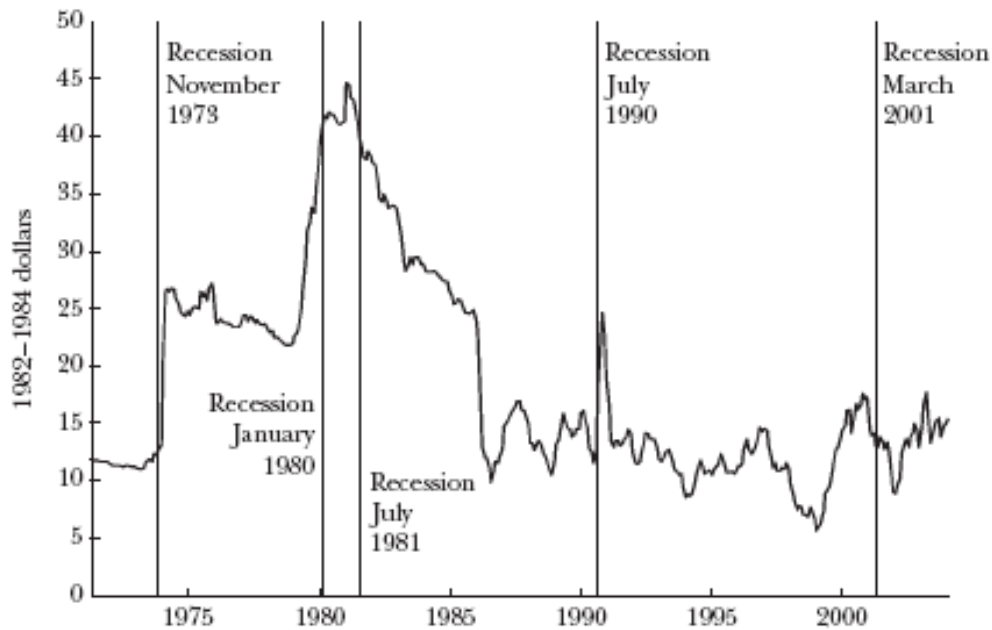
- 7.6 The strategy for this case study was to explore a number of different examples of “coercive situations” that required rapid adaptation strategies both by the public and by policy makers. We describe the events to set the context, and explore the reported impact on consumption patterns. While there are many examples to draw from this chapter focuses on:
- The 1970s oil shocks
 - The 2000 UK Fuel Protests
 - The 2000 Californian Electricity Crisis
 - Damage or coercive disruptions to transport infrastructure

The 1970s oil shocks

Context

- 7.7 Perhaps the most serious post-World War II energy shocks occurred in the 1970s. The first oil shock occurred in 1973-1974, caused by the Arab-Israeli war and resulted in more than a four-fold increase in crude oil prices. The second crises of the 1970s began in 1979 and lasted through 1980 until deregulation of the US's crude oil prices in January 1981 led to an eventual worldwide drop in prices. The 1979 oil shock began with the suspension of oil exports by Iran, caused by the revolution. While Saudi Arabia temporarily increased production, in March 1979 coordinated action of the Organisation of Petroleum Exporting Countries (OPEC) to reduce production forced the price of oil upwards. Further disputes between Iran and the US led to sanctions against the US and Europe and supplies were disrupted further during the Iran-Iraq war in 1981.³³
- 7.8 In a review of the impact of oil prices on the macroeconomy, Barsky and Kilian (2004) argue that increases in oil prices have been held responsible for recessions, periods of excessive inflation, reduced productivity and a subsequent impact on the growth of the economy. This is illustrated in Figure 7.1, which shows the real price of US crude oil imports and timing of associated recessions.

³³ Later price shocks were caused by the Iraqi invasion of Kuwait in August 1990, an OPEC meeting in 1999 and the 2003 Iraq war.



Source: Department of Energy, Federal Reserve Economic Database (FRED), and National Bureau of Economic Research. The oil price data are constructed as in Barsky and Kilian (2002). The oil price has been deflated by the U.S. CPI for urban consumers.

Figure 7.1: Real value of US crude oil imports over time (Barsky & Killian, 2004)

7.9 In the UK, petrol rationing was implemented between 23 September 1939 and 26 May 1950 due to the Second World War and again during the Suez Crisis in 1956. It was almost adopted during the oil shocks of 1973 and 1979 (Harman, 2002). In the event, whilst plans were put in place for fuel rationing (to be distributed through the Post Office), the government was reluctant to impose restraining measures. This was perhaps because motoring and car ownership had moved from a minority to the vast majority over the previous 50 years.

7.10 Instead, during both shocks of the 1970s, the state opted for voluntary codes, such as reduced speeds, lift-sharing and reduced “leisure driving” (i.e. encouraging individuals not to drive on Sundays) – despite the oil industry and motoring organisations calling for stronger measures. Indeed, according to Harman (2002), rationing would have largely eliminated growing discontent and “hoarding” amongst the public, by providing some certainty and allowed individuals to plan. Interestingly, the oil crises in the 1970s had minimal effect on average miles driven during the period and growth of motoring in the UK (ibid.)

Analysis

- 7.11 Iverson *et al* (1981) conducted telephone interviews with 2,500 residents in the State of Washington from metropolitan, urban and rural areas. The interview protocol explored travel habits two years prior to the interview, in addition to current behaviour and future travel plans, specifically focusing on travel to work, local, intermediate and long distance travel, recreational travel and use of public transport. In addition, vehicle ownership trends were explored. The research found that 58 per cent of the respondents reported modified travel habits of household members following the rise in energy prices. The most frequent response was a reduction in the demand for travel, with 25 per cent reporting a switch in their form of travel and 30 per cent implying that they would do so in the future.
- 7.12 The research identified an increase in the use of local transit patronage: a 20 and 14 per cent growth between 1978-1979 and 1979-1980 respectively. Furthermore, set against a long-term decline of 22 per cent, an 8 per cent increase in usage of intercity bus lines was observed between 1978-1979. However, usage fell by 6 per cent the following year.
- 7.13 The study also identified a reversal of the long-term trend (over six years) of total vehicle miles travelled. In 1979 the total fell by 1 per cent and by 1.5 per cent in 1980. However, over the same period there was a 7 per cent increase in licensed drivers and vehicle registrations. In addition, the number of vehicles owned by a household also remained stable, and respondents believed this would continue in the future. In other words, the oil shocks did not have any effect on vehicle ownership or desire to own a vehicle. This may imply that adaptive measures made to the price shock were only short-term or that curtailment of discrete trips was a sufficient response. It is noteworthy, however, that when a new vehicle was purchased, in over 65 per cent (almost two-thirds) of cases, the vehicle was more efficient. However, this may be a reflection of a changing market, rather than an adaptive response.
- 7.14 Hartgen and Neven (1980) explored changes to travel behaviour during the 1979 fuel crises in New York. The authors found a reduction in consumption of gasoline (i.e. petrol) by 6 per cent during the crisis. Public transport accounted for 31 per cent of the savings in New York City. Public transport

and car-pooling (ride sharing) accounted for 24 per cent of the saving in the rest of the state. The authors also found that switching to more fuel efficient cars had an effect on fuel consumption.

The 2000 UK Fuel Protests

Context

7.15 In 2000, fuel protests resulted in a fortnight-long fuel crisis in the UK. The crisis began with a blockade of oil refineries in response to rising fuel prices. Protests resulted in severe fuel supply disruptions, intensifying over the course of the week.

7.16 The 2000 Fuel Crisis was described by Hathaway (2000) as follows:

“The first rumblings ... were heard on 5 September when it was announced that fuel prices were to rise again following a rise in the price of crude oil. The Channel Tunnel was blockaded in protest on 6 September and on 7 September the first oil refinery, at Stanlow, Cheshire, was blockaded. The protest spread very rapidly. More refineries were blockaded on the 8 September and on 9 September nation-wide panic-buying began. On Sunday 10 September protests had closed Britain’s largest inland oil terminal at Kingsbury, West Midlands and huge queues at garages were reported. By Tuesday 12 September protesters had blocked six of the UK’s eight refineries and over half of Britain’s filling stations were shut.

The protest ended almost as quickly as it had begun. On Thursday 14 September the Stanlow blockade ended and on Friday 15 September the first deliveries were reaching some garages, although it was estimated that 90 per cent of filling stations were empty of fuel. (p. 1)”

7.17 Towards the end of the episode on the 14 September, data collected from automatic traffic data collection system identified a 39 per cent drop in traffic volumes on motorways, a 25 per cent drop on major roads and a 16 per cent drop on minor roads (Hathaway, 2000). In total, road traffic was 2 per cent lower in the third quarter of 2000 because of the fuel protests, which amounts to a 0.4 per cent drop for 2000 as a whole. Goods traffic was less affected,

dropping by 13 per cent on motorways, 13 per cent on major roads and 9 per cent on minor roads. In addition, some motorists voluntarily reduced their average speeds.

Analysis

7.18 According to Polak *et al* (2001), during the peak of the crisis travel by car was severely curtailed, as car users made a number of short-term adaptations to travel plans. These included:

- Using public transport for community and local journeys
- Conserving/rationing fuel use (e.g. driving more slowly)
- Using older vehicles that could use leaded/diesel
- Transferring fuel between vehicles
- Cutting discretionary journeys and making only essential trips
- Car-pooling (school runs and commutes)
- Shopping locally and buying small quantities each day
- Re-planning to maximise the productivity of trips (trip chaining)
- Changing work patterns – working from home, cancelling long-trips, video-conferencing

7.19 Polak *et al* (2001) analysed survey data collected by MORI about two months after the fuel crisis. These data comprised 1001 telephone interviews across London, the South East and the North East of England. Almost three-quarters of the 582 respondents who stated that their main mode of transport was car, as driver, did not change their travel behaviour during the crisis, while 9 per cent shifted to public transport, 5 per cent walked and 3 per cent went by car as passenger. However, the survey also showed that 10 per cent of respondents shifted from public transport to car as driver. The authors argue this may have been due to overcrowding on public transport and reduced congestion.

7.20 Table 7.1 shows the changes in mode choice before and during the fuel crisis for journeys to work, school or college, as reported in the survey.

Table 7.1: Changes in travel mode during the 2000 fuel crisis (from Polak *et al*, 2001)

Mode of travel	Number of respondents normally using this mode	Number of respondents using this mode during the fuel crisis	Percentage change
Car as driver	563	429	-24
Car as passenger	22	36	+63
Motorcycle	4	4	0
Public transport	84	119	+42
Bicycle	19	29	+53
Walk	73	100	+37
Van/truck	5	4	-20
Other	16	5	-69
Worked from home	3	19	+633
Don't know	0	1	-
Total	789	746	

(33 respondents provided more than one answer)

7.21 The survey also explored the likelihood of various behavioural responses to a longer-lasting fuel crisis. Almost two thirds of the respondents felt that they could easily travel to work by foot, cycling or public transport. The same proportion felt they could carry out their grocery shopping on foot. However there was a strong aversion to food shopping using public transport. This was also true for lift-sharing as a longer-term solution. Furthermore, in the context of commuting, over 50 per cent of respondents felt that better planning of trips would allow them to make better use of public transport.³⁴ Chatterjee and Lyons (2002) carried out a postal survey following the fuel protests of 2000. Overall, the authors found that there were mode changes to a limited amount of business and leisure travel, in addition to the travel that was simply curtailed. Between 12 and 16 per cent of car users made fewer trips for commuting, business and grocery shopping travel and 51 per cent made fewer trips for other purposes (mainly leisure). About 40 per cent of car users making commuting, business and school escort trips made at least one major change to car use by changing their mode of transport or lift-sharing. This figure was lower for grocery shopping trips (31 per cent) and higher for travel

³⁴ It worth noting the finding that 20 per cent of car trips are marginal and could easily be undertaken by other means (Goodwin, 1995).

for other purposes (56 per cent). Additionally, 20 per cent of car users also had their children walk to school instead of driving them there.

- 7.22 A number of respondents implied that the fuel crisis had triggered consideration of sustained changes to their travel routine such as longer-term modal shifts to public transport, working from home more frequently or looking for a job closer to home. The survey also showed that when asked, 84 per cent of respondents said they would curb transport use if fuel was rationed, 12 per cent said they would use a more fuel efficient vehicle, while 4 per cent said they would move house. This implies that in a context of rationing, most car users would simply make fewer trips rather than making long-term changes to their transport patterns. However, these findings should be treated with some caution as they are based purely on respondents' predictions of their behaviour in a future hypothetical situation.
- 7.23 Beatty *et al* (2002) surveyed the willingness of employees at Staffordshire University to reduce car use before and after the fuel crisis. The authors found that the fuel crisis had led a number of participants to re-evaluate their use of the car and travel mode choices. In addition, 15 per cent felt that the experience would have long lasting effects on their travel behaviour. However, for many the crisis highlighted the shortcomings of public transport, especially to those who would normally not use it.
- 7.24 Chatterjee and Lyons (2002) argue that because everyone experienced the impacts during the 2000 fuel crisis, social norms may have been temporarily distorted. In other words, during the fuel crisis car users perceived that it was much more acceptable to use other forms of transport. For example, while many car users were happy to car pool during the crisis, they felt a distain towards it at other times. Polak *et al* (2001) found that the largest change to transport mode was lift-sharing. However, when asked if they would consider this as an option in the case of a long-lasting fuel shortage, over half of the respondents in the study strongly disagreed they could easily share a ride with another family member or friend for many trips. Noland *et al* (2003) also found that, while some respondents used teleconferencing or worked from home during this time, there was a general feeling that measures such as teleconferences would never replace important social interactions.

- 7.25 Overall, there is little evidence that the fuel protests had any effect on long-term behaviour. In interviews, respondents felt that for long-term changes, people would have “time to adapt” and would not be expected to make sudden and rapid changes (Noland *et al*, 2003). There was also evidence of general optimism regarding technological fixes. Respondents felt that they would switch to more efficient energy use and transport choices when new products at affordable prices became available – in other words, this was assumed to be more a gradually evolving change rather than an abrupt discontinuity. In general, however, there was a widespread belief that long-term changes in access to private transport were unlikely and that fossil fuels would gradually be replaced by alternatives that would permit personal travel habits to remain largely unaffected (Polak *et al*, 2001).

The Californian electricity crisis

Context

- 7.26 Perhaps the most detailed analysis of changes in consumption patterns in relation to an energy crisis was carried out during and after the electricity crisis in California between the summer of 2000 and 2001. Viewed by the California Energy Commission as a unique opportunity to gather information about people’s decisions to use less electricity, a detailed evaluation of the consumer response was commissioned during the summer of 2001 and beyond.
- 7.27 Once described by the International Energy Agency as a “perfect storm” (Meier, 2005) the Californian electricity crisis was characterised by a number of factors, including: scarcity of generation capacity, flawed market design, venality of electricity producers and the lack of contracts or other long-term supply arrangements (Bushnell, 2004). In addition to periodic power outages or coordinated blackouts (‘rolling blackouts’) across the state over the period 2000-2001, a number of regions within the state experienced large increases in the wholesale and retail price of electricity and natural gas, such as San Diego.
- 7.28 Widespread concerns about the potential for economic disruption and threats to personal health and safety (e.g. failure of traffic control systems, elevators,

hospital blackouts and the provision of cooling to vulnerable populations) resulted in the initiation of a range of state-sponsored programmes, in addition to increased funding to existing energy efficiency and conservation programmes. These included extensive media coverage and information campaigns and policy measures (e.g. social marketing campaigns *Flex Your Power* and *20/20* – customers received a 20 per cent rebate on their electricity bills with a 20 per cent reduction in consumption compared to the same month the previous year). The media proved to be a key source of information to consumers, particularly as the importance of educational and community initiatives and social networks of friends, neighbours and co-workers all lagged behind expectations in terms of their influence (Lutzheiser *et al* 2002). A survey carried out by the Public Policy Institute of California implied that 45 per cent of respondents were closely following new stories about cost, supply, and demand of electricity (Baldassare, 2001a).

- 7.29 In a later survey conducted in July 2001, the Public Policy Institute of California also found that a large proportion of Californians had been affected by the electricity crisis with 77 per cent claiming that rising utility bills had been a problem (37 per cent – major problem; 40 per cent – minor problem), and 44 per cent claiming that rolling blackouts had been a problem (13 per cent – major problem; 31 per cent – minor problem) (Baldassare, 2001b).

Analysis

- 7.30 The review of literature presented below implies that during the crisis, a wide range of energy conservation strategies were undertaken with a diverse number of motivations (see Table 7.2 and Figure 7.2).

Table 7.2: Percentage of people reporting various reasons as important motivations for the conservation of energy (weighted frequencies, n = 1586) (Lutzenheiser et al, 2002)

	Very important	Somewhat important	Unimportant
To keep electricity bills down	76.5	20.4	3.1
To qualify for a utility rebate	33.4	34.9	31.7
To do your part to help Californians through a difficult time	69.1	23.6	7.3
To try to avoid blackouts	76.8	15.8	7.4
To use energy resources as wisely as possible	77.9	18.8	3.3
To protect the environment	70.4	21.0	8.6
To stop energy suppliers from overcharging	78.8	12.8	8.4

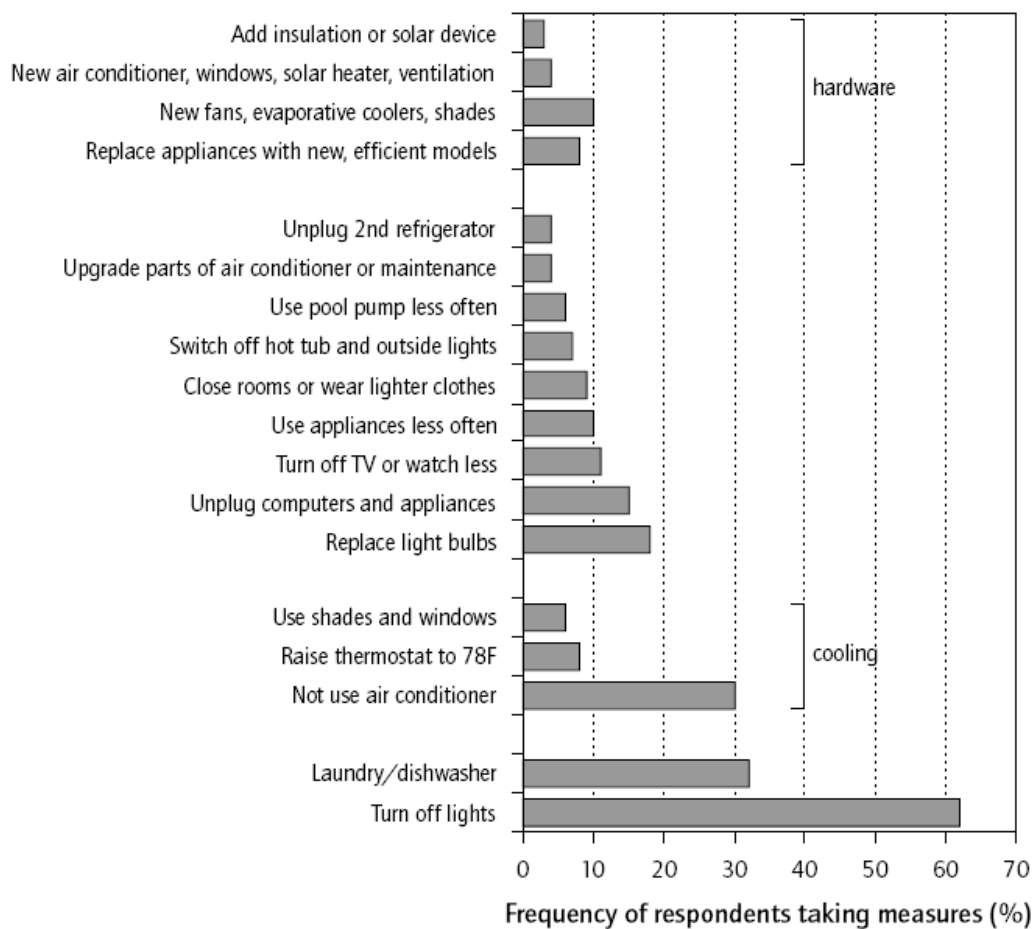


Figure 7.2: Energy conservation measures taken by California households during the 2000-2001 electricity crises (Meier, 2005)

- 7.31 Approximately 25-30 per cent of savings observed between June 2000 and June 2001 can be attributed to investments into energy efficiency measures or onsite generation (Goldman *et al*, 2002; Lutzenhiser *et al*, 2002). For example, a telephone survey of 590 households in southern California by Lutzenhiser *et al* (2002) indicated that one in eight reported purchasing and replacing major appliances with a more energy efficient model during the energy crisis. This is supported by data from appliance sales and press accounts (Reiss and White, 2008). Meier (2005) argues that the energy-labelling scheme already in place – The Energy Star – was also valuable, as it had already identified a group of high-efficiency products. Furthermore, a number of outlets began selling these products exclusively and/or providing specific advice to customers.
- 7.32 The remaining savings were due to the curtailment of energy use, ranging from: switching lights off (indoor and outdoor), increasing the thermostat on air conditioning units, reducing the number of hours watching TV, or switching off other appliances. Adjusting for the economic downturn (due to the collapse of the dotcom bubble and subsequent impact on Silicon Valley) and weather conditions, Goldman *et al* (2002) observed a reduction in monthly peak demand and electricity usage of 10.4 per cent and 7.5 per cent respectively in the summer of 2001 compared to the previous year – sufficient to avert widespread ‘rolling blackouts’ across the state.
- 7.33 Reiss and White (2008) explored the changes in household energy consumption in San Diego during the 2000-2001 energy crisis, during which household energy prices increased from their historical average of approximately 10 cents per kilowatt-hour (KWh) to over 23 cents per KWh over a period of about three months. Their study design is based on five years of disaggregate billing data for a random sample of 70,000 households.
- 7.34 Overall, their analysis showed that in San Diego the average household electricity consumption fell by 12 per cent in approximately 60 days in response to unannounced price hikes. During this time their analysis revealed that, similar to the analyses described above, households either invested in new appliances or changed their behaviour – evidence is particularly strong for the latter. The authors argue that because a large share of electricity consumption is attributable to appliances for which consumption cannot easily be changed (fridges, freezers, electric water heaters), substantial changes

must have taken place in how often other major appliances were used. Reiss and White suggest that likely changes would include: not turning on air conditioning or substantially increasing thermostat temperature, resetting pool filters to operate for far fewer hours, reducing time spent watching TV, turning lights off (indoor and outdoor) and many other similar actions.

- 7.35 There are mixed views regarding the degree of persistence of curtailment activities after the crisis subsided. A common view held by scholars in this field is that voluntary curtailment activities ‘recoil’ after a crisis subsides. More recent research by Reiss and White (2008) focusing on household behaviour in San Diego found that persistent reductions in electricity consumption were primarily due to the purchase and instalment of energy efficiency measures or onsite generation technologies (e.g. wind turbines, solar photovoltaics). While some behavioural changes appeared to ‘recoil’ in the long-term once prices recovered or the energy crises was perceived to subside.
- 7.36 For example, after the legislature imposed a (binding) cap on residential electricity prices, according to Reiss and White, overall consumption rebounded to approximately two thirds of former levels. Reiss and White argue, on the basis of this finding, that when policy makers limit price increases following supply shocks, this may have the effect of disincentivising some potentially substantial and rapid changes in energy consumption behaviour. This implies that the longer-term changes induced by the crisis are likely to be due to changes in appliance stocks, dwelling improvements, on-site generation or persistent changes in consumption decisions. The authors argue, based on Stern and Gardner’s (1981) efficient curtailment or demand shift model, that it is likely most of the observed longer-term changes were due to efficiency improvements rather than curtailment. A similar observation was made during the 1970s oil crises and 2000 UK Fuel Crisis, discussed in previous sections.
- 7.37 Lutzenheiser *et al* (2004), however, found that voluntary curtailment continued beyond the crisis into 2002 at around 50 per cent of the savings during the crisis (controlling for differences in weather). While this implies that ‘crisis’ conditions were required to stimulate these changes, increased awareness of levels of energy consumption led to some prolonged effects in the medium-term. Furthermore, Reiss and White (2008) also found a continued decline in electricity consumption (7 per cent in total compared to pre-crisis levels)

amongst households in San Diego. This was due to both changes to electrical appliances at the time of the crisis but also continued awareness campaigns after the legislature capped the price of electricity – i.e. there was no incentive to cap energy consumption. Lutzenhiser *et al* (2002) also argue that persistence of curtailment activities are dependent on individuals' perception of the continuation of the energy crisis, energy problems or price sensitivity to retail trends of gas or electricity. For example, 80 per cent of 590 respondents to a telephone survey claimed they would keep up their energy conservation actions assuming that the energy situation stayed the same.

- 7.38 Regular telephone surveys taken before, during and after the crisis regarding 'the most important issue facing California today' rose from zero (pre-crisis) to 56 per cent in July 2001 (mid-crisis), before falling to 14 per cent in December 2001 (Goldman *et al*, 2002). Pollsters argued that this was the most dramatic change in the relative importance of the public perception of policy issues in the last 20-30 years in California. While there was a clear drop in the perceived importance of energy-system related problems once the crises subsided, a telephone survey by Lutzenhiser *et al* (2002), found that the majority of Californians felt it was still likely to continue to be a serious problem in the future and therefore energy conservation was still important. Goldman *et al* (2002) also argue that more price sensitive consumers (lower-income groups, consumers who inspect their energy bills) are likely to continue conservation behaviour; but increased awareness of energy consumption may also have resulted in longer-term changes in patterns of consumption, particularly as energy policy was still prominent in the media after the crisis had ended.
- 7.39 As such, the extensive media coverage and widespread experience of a threat of energy crisis through rising electricity prices or "rolling blackouts" (Baldassarre, 2001b) appeared to increase the longevity of voluntary energy conservation behaviour change.
- 7.40 It is also worth noting that improvements in efficiency can be offset by the 'rebound effect', whereby increases in efficiency (saving energy or natural resource per unit of production) lead to lower costs that encourage increases in consumption (Sorrell, 2007). A number of studies also identified a heterogenic response across the population. For example, Reiss and White (2008) observed that approximately two-fifths of the population were

completely price inelastic, with some even showing increases in consumption between pre-crisis and crisis.

- 7.41 Previous analyses by Reiss and White (2005) revealed that two-fifths of the population exhibits no observable consumption decrease in response to even large changes in electricity prices. This also implies that the remaining three fifths of the population made more significant changes to their energy consumption than implied by the aggregated average decrease. Furthermore, the authors suggest that approximately one in three households reduced their consumption by 20 per cent. In other words, most of the savings were made by a minority of the population. This is supported by a telephone survey of 1,860 randomly selected households undertaken by Lutzenheiser *et al* (2002a). The survey showed that while 82 per cent of the respondents undertook one or more measures to cut electricity demand, most of the savings occurred in a smaller group of consumers (37 per cent). This group accounted for 75 per cent of the total residential savings in June 2001 compared to the same month, the previous year (June 2000).
- 7.42 Reiss and White (2008) suggest that this heterogeneity may be related to the scale of consumption. Those using 1000kWh or more per month showed a decrease of 25 per cent, while those using 200kWh or less per month showed little or no decrease in consumption. This is shown in Figure 7.3, below. In line with this view Lutzenhiser *et al* (2002), found that, of the 21 per cent of respondents to a telephone survey of 1,860 households, 66 per cent reported that they had made no changes to their behaviour, as they believed their energy consumption was already low. Only a very small proportion were unaware of how to make changes (5 per cent) or saw no reason to change (9 per cent)

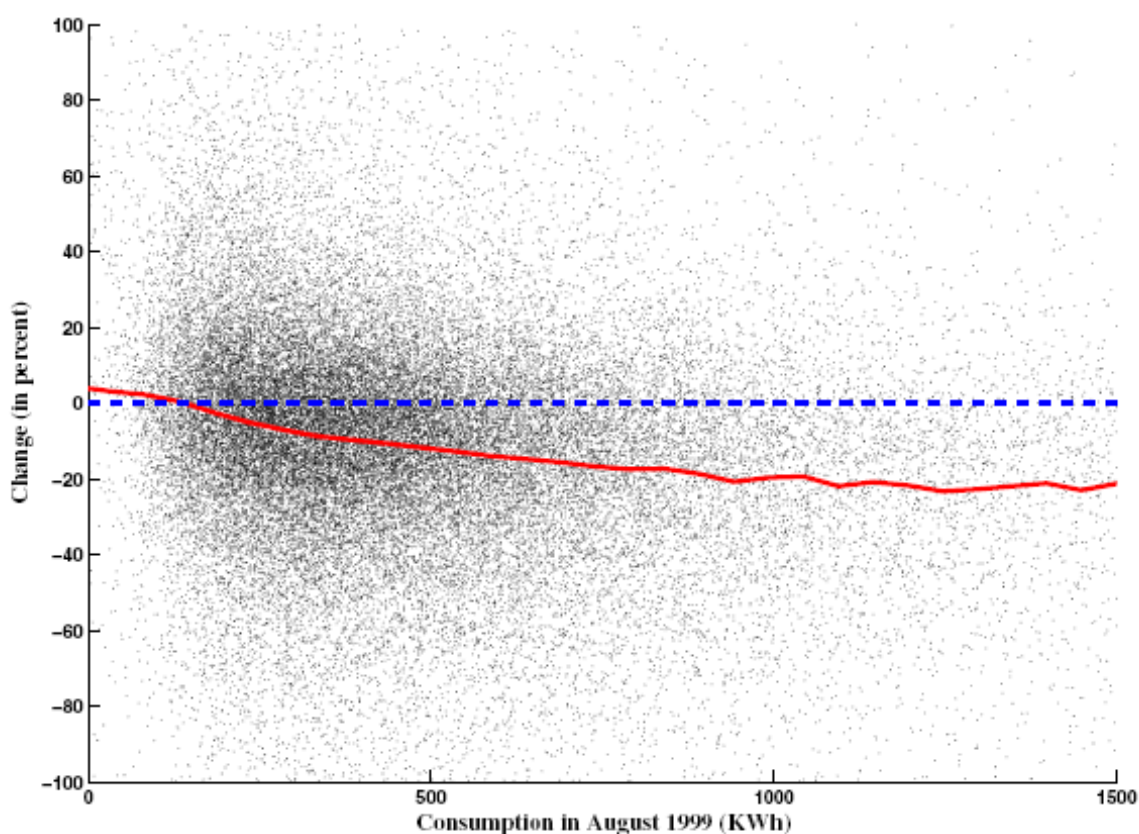


Figure 7.3: Percentage change in electricity consumption and monthly pre-crisis energy use, by household (from Reiss & White, 2005)

7.43 To date, no research provides a clear profile of the minority group responsible for the most significant savings, although key factors that shape conservation actions have been speculated to include literacy (awareness of information, or those who check their energy bills) and capacity to adapt (Lutzenheiser, 2002b). Both these factors are often linked in other fields (e.g. climate change adaptation), to socio-economic circumstance such as economic wellbeing, the degree of human development, education and skills, health, infrastructure, access to other services and political atmosphere (see, for example, Adger *et al*, 2004). Some research suggests that particular groups were more amenable to certain actions. For example, one study found that African Americans, Hispanics and single parent households were more likely, in single-family homes and as homeowners, to turn off televisions, make peak

adjustments and install compact fluorescent light-bulbs and other “low energy” lighting (Lutzenheiser *et al*, 2002).

Damage to transport infrastructure

Context

- 7.44 Earthquakes, road maintenance, policy interventions (i.e., London Ring of Steel³⁵ or congestion charging) all have the potential to disrupt travel patterns. According to Goodwin (1977), in a familiar environment the choice of route by travellers tends to be stable.
- 7.45 It is conventional to use the word “habit” to signify various sources of resistance to a change that, on purely economic or “rational” grounds, would be made. These sources include a reluctance to upset ordered and well-understood routines, perception thresholds below which changes in the relative attractiveness of the modes are not noticed, and barriers to the relevant information reaching the individual (p. 95).
- 7.46 In other words, habit may prevent travellers from carefully and deliberately evaluating their choices when faced with a potential disruption.

Analysis

- 7.47 In 1994, the Northridge earthquake in California (Richter scale of 6.8) resulted in widespread damage to infrastructure including the collapse of four freeways, parking structures, damaged buildings and numerous natural gas distribution lines (Schmitt, 1998).
- 7.48 Giuliano and Golob (1998) examined the travel behaviour responses to the Northridge earthquake in Los Angeles. Specifically, they examined travel patterns in two heavily damaged transportation corridors to determine how trip patterns had changed over the recovery period. Overall, the authors found

³⁵ The security cordon surrounding the City of London. This includes chicanes on all major roads into the City which cause traffic to slow down.

that travellers were very adaptable to short-term disruptions, but returned to pre-disruptive behaviour when transport conditions are returned to normal.

- 7.49 The study also found that travellers were more likely to change route than mode. For example, in one corridor, some commuters switched to rail during the first week, but returned to private vehicles as detour routes were expanded. There was little or no change to bus patronage, although some commuters used emergency bus services. Gordon *et al* (1998) also observed a decrease in frequency of grocery shopping from 2.2 to 1.7 times per week over the same period. However, Giuliano and Golob (1998) found that overall, where possible, commuters remained in their private vehicles and simply changed routes, travel schedules and/or destinations rather than change mode of transport or adopt lift-sharing.
- 7.50 While the authors observed an increase in commuters using rail from 0.2 per cent of commuters to 10 per cent in first week, the share quickly declined to 2 per cent several weeks after the earthquake. Five months later, the share was still four times the original. However, the authors argue that this may have been due to an increase in stations shortly after the earthquake.
- 7.51 Kitamura (1998) reviewed a number of studies exploring the impact of the Hanshin-Awaji earthquake on traffic flows and travel behaviour. The earthquake was much more extensive than Northridge, claiming over 5,000 lives and causing very severe damage to urban infrastructure, including the closure of 27 major highways and all rail lines in the Osaka-Kobe corridor. Comparison of aggregate traffic flow before and after the earthquake showed that outside the Osaka-Kobe corridor, traffic flow rebounded to its original pre-quake flow. Inside, however, traffic flow was still below pre-quake levels. Even five months after the quake, the mobility of residents in the Osaka-Kobe corridor remained reduced relative to elsewhere. This was due to a combination of changes to daily trip rate (with 0.5 fewer trips on average) and a more significant fall in non-work related travel. Overall this implies that for longer-lasting disruptions, changes to non-work related trips are more persistent.
- 7.52 Overall, this evidence suggests that responses of travellers to one-time extreme events result in short-term declines in travel demand and temporary modal shifts. However, overwhelmingly, research points to a preference for

maintaining private vehicle use and adopting different routes, travel schedules, destinations and trip-chaining rather than shifting alternative modes such as public transit, active transport or lift-sharing.

Summary

- 7.53 Since the 1970s oil shocks, there has been an increase in research examining individual behaviour change to energy price shocks and disruptions. There is, however, limited work on long-term consumption adjustments to shocks. This is because historically, shocks have been short-term. As such, policies have focused on maintaining adequate supply with minimal disruption and policy responses have often focused on voluntary measures to curtail energy demand. Curtailment policies are defined as strategies encouraging individual everyday actions taken to reduce energy consumption (i.e. driving more slowly, switching lights off, resetting thermostats at night) and require repeated actions. Our survey of the literature implies that often curtailment actions are stopped once the 'crisis' has been resolved. Thus, patterns of consumption rebound to a similar pre-shock level. Examples of this abound in both the domestic energy sector and transport patterns (in the case of fuel shortages or coercive disruptions to transport infrastructure).
- 7.54 In general, consumers are poor self-monitors of energy or fuel consumption. Given this, in the absence of feedback about their level of consumption, consumers have little awareness of price signals. For example, the only time that price signals for electricity or gas reach consumers is when they receive utility bills. Darby (2006) finds that clear feedback on domestic energy consumption is a key element in increasing literacy on how to control energy consumption more effectively over long periods of time, and that instantaneous direct feedback in combination with frequent and accurate billing is needed for sustained demand reduction. Feedback information on consumption and price through devices such as smart meters are known to result in reductions in energy use of between 15 and 20 per cent and when linked with incentives to conserve energy, can lead to reductions of up to 30 per cent (Darby, 2006; van Raaij & Verhallen, 1983).
- 7.55 In the case of the Californian fuel crisis, consumers would have only realised the impact of the rising cost of electricity in their first monthly bill after the price

shock. However, media coverage grew towards the end of the first month, providing high-profile feedback of energy prices. The combined effect of a price signal through utility bills and media coverage appears to have resulted in a rapid reduction in energy consumption of, on average, 12 per cent in San Diego over a 60-day period, and by 7.5 per cent in June 2001 compared to June 2000 at the state level.

- 7.56 Crises do appear to increase awareness of levels of energy use. For example, following the 2000 electricity crisis, research identified that while electricity consumption initially rebounded to two-thirds of pre-crisis levels once prices were capped, they began to fall again over a six to nine month period (Reiss & White, 2008). What particularly stands out in this case is that there was no pecuniary incentive to reduce consumption; the additional 7 per cent fall in electricity demand is likely to be a result of implementation of the extensive energy conservation awareness programme – such as *Flex Your Power*. This is even more noteworthy given the observation of Reiss and White (2008) that the magnitude of reductions is likely to have caused considerable inconvenience to consumers. It is often difficult to isolate the effects of voluntary measures on energy consumption. In economic terms, voluntary measures require collective action and are therefore subject to the “free-rider” problem. In this case, however, the authors argue that the cost of collective-action failure (i.e. power outages) and the high profile energy conservation campaign encouraged consumers to respond to voluntary appeals.
- 7.57 In the case of transport, due to the high dependency and preference for car use, consumers are almost completely insensitive to the price of fuel. However, when scarcity occurs (i.e. fuel running out at petrol stations) consumers are coerced to make adaptive decisions. Evidence following the UK fuel crisis of 2000 implies that some car users became more aware of their dependence on their car and other modes of transport. While there has been no follow-up analysis to elicit whether this resulted in long-term changes, both examples imply that experience of an energy shock or fuel crisis may make the public more receptive to energy conservation campaigns.
- 7.58 Over short periods of time (weeks to months), research suggests that with the right information, individuals and households are very adaptable to energy shortages. In particular, because the impacts of a crisis are often non-discriminatory, there is a transient distortion of social norms. This creates a

temporary acceptance to change but the evidence suggests that this acceptance does not extend over longer periods of behaviour (Chatterjee & Lyons, 2002; Noland *et al*, 2003).

- 7.59 Crises also appear to support technological change through increased diffusion of new technology that assists adaptation to a crisis (Thorpe *et al*, 2002). For example, there is evidence that following the 1980s postal disputes, there was rapid widespread use of fax machines. In the context of the 2000 fuel crisis, Thorpe *et al* (2002) propose that the fuel crisis may have produced a decisive shift towards the use of telecommunications and the internet for working and shopping and the use of more fuel efficient vehicles. This proposition is supported by Iverson *et al* (1981) and Hartgen and Neven (1980), who observed a shift to more fuel efficient vehicles during the 1970s oil shocks.
- 7.60 Overall, the purchase of more efficient goods during and after crises appears to be responsible for the most significant long-term changes in consumption patterns (e.g. electricity and vehicle fuel).

8 The 2008/9 “Credit Crunch”

Introduction

Background

- 8.1 The International Monetary Fund’s (IMF) projections (October 2009) are that the global economy shrunk by 1.1 per cent in 2009³⁶, the first such global contraction for 60 years.³⁷
- 8.2 The first significant indication of the impending global economic crisis emerged in August 2007, when the European Central Bank pumped €95bn into the Eurozone banking sector.³⁸ Prior to this moment, warning signs were restricted to the sub-prime mortgages sector, which is where the crisis is believed to have begun. The collapse of the UK’s Northern Rock bank in September that year brought the concept of the credit crunch into the public conscience and over the next year a string of bad news stories followed as interest rates were cut and numerous banks were revealed to be in dire financial straits. Arguably, however, it was the collapse of Lehman Brothers, the world’s fourth largest investment bank on 15 September 2008 that signalled the full extent of the crisis. In the weeks that followed panic struck the stock exchanges as various banks, most notably in the UK HBOS, Lloyds TSB and RBS were effectively nationalised. By the last few months of 2008 the impacts of the recession began to be felt by average UK citizens. By November, collapses were beginning to hit the high street, with well-known retailers such as Woolworths, Zavvi and MFI going into administration. In January 2009, ONS figures revealed that the UK was officially in recession (i.e. negative growth recorded in two consecutive quarters).
- 8.3 The current crisis certainly seems to be a moment of change for governments and policy-makers, who have been forced to take extraordinary steps in their

³⁶ IMF. (2009). *World Economic Outlook: October 2009*. Available at www.imf.org/external/pubs/ft/weo/2009/02/pdf/text.pdf

³⁷ <http://news.bbc.co.uk/2/hi/business/7952377.stm>

³⁸ The following summary is based on the BBC’s credit crunch timeline: <http://news.bbc.co.uk/1/hi/business/7521250.stm>

bid to rescue the banking sector. The question addressed here is the extent to which it be considered a moment of change for individuals.

Approach to research

- 8.4 Because the situation was both relatively recent and still unfolding rapidly during the research period, it was recognised that hard evidence of behavioural impacts would be limited and certainly would not have reached the academic literature yet. Therefore, the approach for this case study was different from that taken in the preceding examples. We distinguished between three possible ways the “crunch” might be experienced and through which it might, in turn, be hypothesised to lead to tangible changes in environmentally-relevant behaviour. These were:
- Direct impacts leading to significant changes in personal circumstances
 - Changes in individuals’ utility space (e.g. prices and interest rates)
 - Changes in prevailing attitudes
- 8.5 For each of these, we explored quantitative and qualitative data that we reasoned might serve as proxies for the kinds of behaviour change that could be expected. However, later on in the research process, as new data emerged, we also began exploring some of the direct observable changes in behaviour.
- 8.6 The structure of this chapter is therefore as follows. Firstly direct impacts of the recession are considered, both in terms of individual effects (such as unemployment and loss of home), and in terms of changes in the utility space (in terms of prices and interest rates). Secondly, we consider changes in behaviours and attitudes in key environmentally-related domains, including consumer expenditure, food, travel, energy use, work, housing patterns, waste, and water. Thirdly, we consider broader attitudes, including general attitudes to the environment, individual values, and social capital.
- 8.7 In all cases, we define the recession as having started in September 2008.

Direct impacts of the recession

- 8.8 For an increasing number of individuals, the current economic climate is giving rise to direct and substantial impacts on the personal circumstances of their lives. In the case of someone who loses their job, not only is there a significant financial impact but their daily behaviour patterns are likely to be severely disrupted. For someone whose home is repossessed or who is otherwise in difficult financial circumstances, it may be necessary to move house. In principle, it is likely that the changes associated with losing one's job or home would be of the kind that would interrupt existing environmentally-relevant habitual behaviours and – potentially – require the development of new ones.

Unemployment

- 8.9 Since March 2009, around 4.1 per cent of the British population of working age have been on Job Seekers' Allowance, compared to only 2.4 per cent in August 2008. Based on the Labour Force Survey, unemployment figures are somewhat higher, having been at around 7.8 per cent during this time.³⁹ Meanwhile, the number of unfilled vacancies in Great Britain in the three months from October to December 2009 was approximately 448,000, down from around 690,000 in the first quarter of 2008.⁴⁰ The data reveal a clear shrinking of the job market as a result of the recession, though it is worth noting that the situation has stabilised since about April 2009. Indeed the latest figures reveal a marginal *decrease* in numbers unemployed for the last quarter for which data is available (September to November 2009).

Repossessions

- 8.10 Data from the Financial Services Authority show that the number of home repossessions in the UK in 2008 was 46,750, an increase of 68 per cent over

³⁹ Both figures from the nomis official labour market statistics website (www.nomisweb.co.uk).

⁴⁰ UK National Statistics: www.statistics.gov.uk/cci/nugget.asp?id=12

the previous year.⁴¹ However, in the second quarter of 2009, it appears that numbers of repossessions fell slightly on figures for the first quarter, suggesting a stabilisation.⁴²

- 8.11 We were not able to find any recent data on average household size, which could be taken as an indication of people moving in with family or friends following a forced change in their housing circumstances. However, the most recently available data on the lettings market suggests that although demand for rentals remains reasonably strong, the number of homes available for rent has increased sharply (RICS Economics, 2009).

Interest rates and prices

- 8.12 Even for those who are not directly affected in terms of job losses or housing repossessions, bad macro-economic conditions filter down to individuals in the form of changes in the structure of market and price incentives – the “utility space” in which they make everyday decisions about how much money to save, how much to spend and what to spend it on. Price incentives can have a role in influencing environmentally-relevant behaviour (this was evidenced in the examples of response to energy supply disruption considered earlier).
- 8.13 As of March 2009, the Bank of England base rate remained at 0.5 per cent, having fallen from 5 per cent in the summer of 2008. Whilst good news for some people whose mortgage interest rates track the base rate, these low rates are bad news for savers. In October 2008, the best available cash ISA paid 6.05 per cent, but this had fallen to 3.10 per cent in February 2009.⁴³ Higher rates are becoming available, but these carry further restrictions.
- 8.14 UK Office for National Statistics figures reveal that inflation (both as measured in terms of the Consumer Price Index, and the Retail Price Index) has been lower than usual since the recession began. For example, Retail Price Index

⁴¹ “Repossessions up 68%: FSA” (www.mortgagesolutions-online.com/public/showPage.html?page=847254)

⁴² “Possessions and arrears drop in Q2 2009” (www.mortgagesolutions-online.com/mortgage-solutions/news/1533571/possessions-arrears-fall-q2).

⁴³ “Good news on ISA rates for savers”: <http://www.timesonline.co.uk/tol/money/savings/article5907719.ece>

year-to-year inflation was negative between March 2009 and November 2009. However, in December 2009, both indices saw rapid increases. In the case of the Retail Price Index, inflation is still below pre-recession figures. However, in the case of the Consumer Price Index, the latest figure of 2.9 per cent year-on-year inflation is higher than that seen at the same time two years ago.⁴⁴

Changes in environmentally-related behaviour and attitudes

Retail consumption

- 8.15 The Consumer Trends report from the ONS contains the most recent available data on household final consumption expenditure up to the third quarter of 2009 and is thus the most up-to-date indication of how consumption patterns may have changed since the downturn (note that the report is based on reported spending by consumers, as opposed to by retailers).⁴⁵
- 8.16 The following is a list of consumption categories where there was a significant change in trend in consumer expenditure over the four quarters since the beginning of the recession relative to previous trends.⁴⁶ Constituent goods from each category are given in brackets. (Categories showing a decrease that was either marginal or evidently in-line with existing year-on-year trends have not been listed.)
- Some foods (meat and vegetables – see following section on food)
 - Alcoholic beverages (including spirits and wines, but not beer)
 - Rent, maintenance and repair of dwellings (including materials and labour)
 - Furniture and furnishings, carpets and other floor coverings, household textiles and household appliances (particularly major household

⁴⁴ <http://www.statistics.gov.uk/cci/nugget.asp?ID=19>

⁴⁵ Office of National Statistics (2009) *Consumer Trends: Quarter 3 2009*. Available at www.statistics.gov.uk/downloads/theme_economy/CT2009q3.pdf

⁴⁶ Using chain volume measures, not seasonally adjusted. Year-on-year changes were calculated for the four post-recession quarters, and for the twelve quarters immediately prior to the recession (making up three years). An independent samples t-test was performed to determine if the post-recession changes were significantly different from the pre-recession changes. Items in bold represent significant differences at the 0.05 threshold.

appliances, as opposed to small ones), small tools and equipment for house and garden

- Health (including pharmaceuticals, therapeutic appliances and equipment, and outpatient services, particularly dental services)
- Purchase of vehicles (all vehicles, including motor cars, motor cycles and bicycles). Also operation of vehicles, particularly maintenance and repair, and, to a lesser extent, fuels and lubricants
- All public transport services, including rail, road, air and waterways
- Communication (including postal services, and telephone and telefax services, but not particularly telephone and telefax equipment)
- Audio-visual and recording equipment and information processing equipment
- Other recreational goods (games, toys and hobbies; gardens, plants and flowers)
- Recreational and sporting services, and games of chance (but not cultural services)
- Newspaper, books and stationery (particularly stationery)
- Education
- Restaurants and cafes
- Appliances, articles and products for personal care (but not electrical appliances, hairdressing saloons or personal grooming establishments)
- Tourist expenditure (both of foreign tourists in the UK and UK tourists abroad)
 - Conversely, spending in the following sectors increased significantly relative to previous figures and/or existing trends:
- Sugar, confectionery and ice-cream
- Clothing
- Audio-visual equipment repairs

8.17 Figure 8.1 shows the difference in the year-on-year change post-recession for some of these categories. In effect, this shows how much the economic crisis has disrupted previous consumption trends in the sectors identified above.

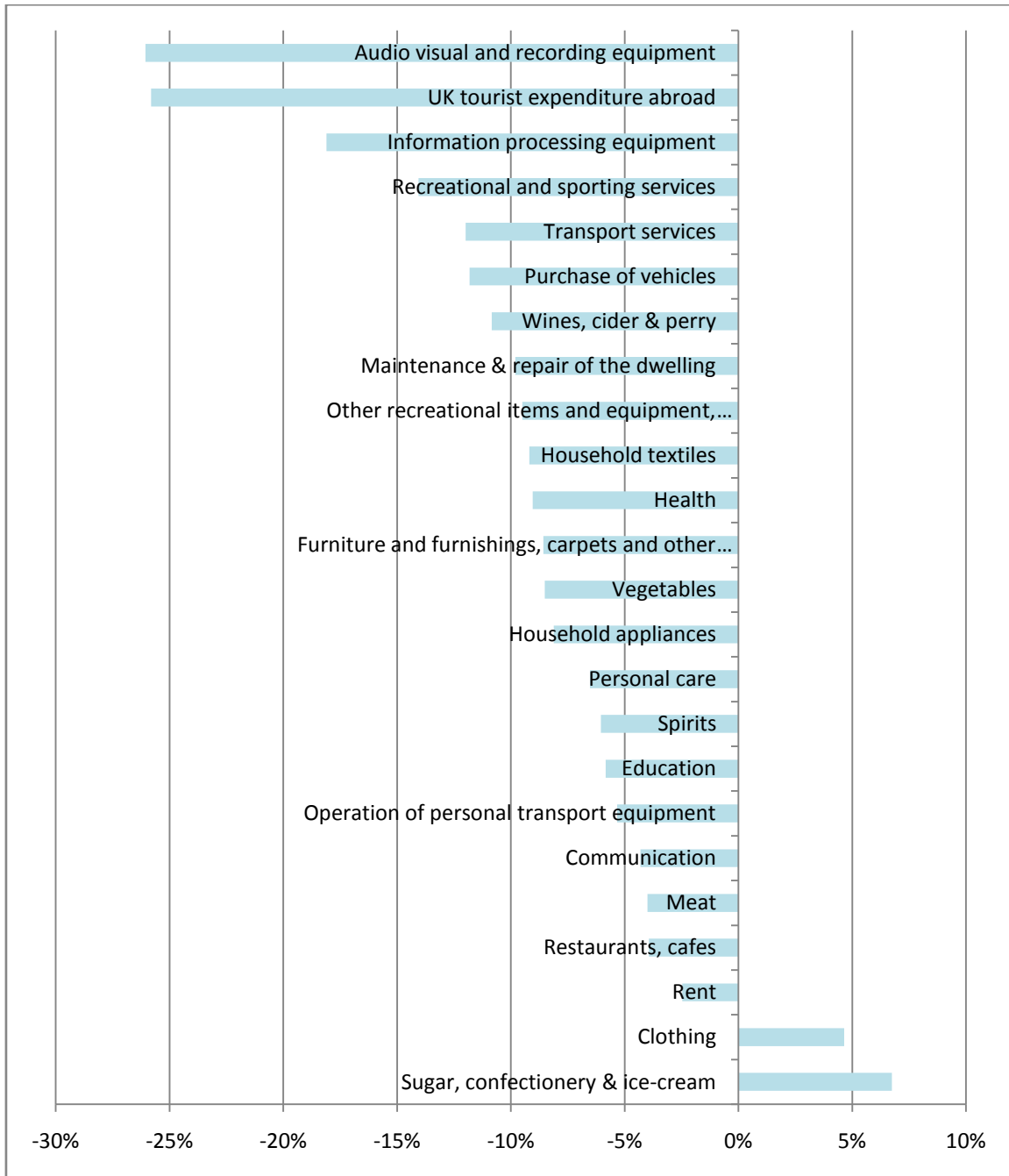


Figure 8.1: Change in year-on-year consumption trends since start of the recession

- 8.18 Retail Sales figures up to January 2009 (also from the ONS, but based on surveys of retailers rather than consumers) confirm these patterns.⁴⁷ Overall retail spending has slowed down since the start of the recession, with the trend post-recession representing a 2 per cent decrease on trends pre-recession. However, this slowing down has only meant the general trend of increasing spending has petered out, rather than having been reversed. No quarter has seen a decline in actual overall spending.
- 8.19 Focusing on non-food spending, however, some sectors have seen absolute declines. For example, year-on-year declines in spending have been seen in at least two quarters between 2008 Q4 and 2009 Q4 in the following types of stores:
- Household goods (including electrical household goods, furniture, lighting, hardware paints and glass)
 - Alcoholic drinks, beverages and tobacco
 - Other specialised stores and other non-food stores
- 8.20 In all these cases, the trend since the start of the recession is significantly different from the trend before.⁴⁸ As with consumer trends data, expenditure on clothing appears to have continued to rise since the start of the recession, though here no significant quickening of the trend is visible. Conversely, retailer data shows a significant increase in spending in stores selling books and newspapers was seen, reversing a substantial declining trend seen prior to the start of the recession.
- 8.21 It is not fully clear why these discrepancies exist between the retailer data and the consumer data. There are slight differences in the time periods considered (retail data is available for one more quarter than consumer data), and of course the categories are very different (based on retailer type rather than specific goods). However, these factors do not account for the difference in overall spending patterns revealed by the two data sets – with overall

⁴⁷ Retail Sales Business Monitor SDM28: <http://www.statistics.gov.uk/STATBASE/Product.asp?vlnk=1478>

⁴⁸ Based on independent sample t-tests comparing the year-on-year change in spending for the five quarters since the start of the recession (2008 Q4 to 2009 Q4) with the eleven quarters prior to the recession (2006 Q1 to 2008 Q3). Significance threshold taken at 0.05.

spending declining according to consumer trends data, but rising, albeit slower than usually, in the retailer data.

- 8.22 The Defra *Public Attitudes and Behaviours Towards the Environment* survey (hereafter referred to as the Defra tracker survey) also provides information on more specifically environmentally related consumer behaviour.⁴⁹ The survey has now completed two iterations, one in 2007 and one in 2009.
- 8.23 One relevant question asked whether respondents were prepared to pay more for environmentally friendly products. In this case, the same question was asked in both the 2007 and 2009 surveys, and no significant difference in results was found.⁵⁰

Food

- 8.24 Focusing on food, the two data sets discussed above present slightly different pictures. Whilst neither set finds a significant decrease in overall spending, the change in consumer trends data almost reaches significance.⁵¹ On average, consumer spending in the four quarters since the start of the recession declined 1.8 per cent year on year, whereas the comparable figure for retail sales was a 0.5 per cent *increase*. This difference may be a result of stores that predominantly sell food increasing their sales of non-food items. If this is the case, then we would suggest the Consumer Trends data being a more reliable picture of food spending patterns.
- 8.25 The Consumer Trends data also allows us to break down food spending according to categories. As has already been discussed, spending on meat and vegetables has declined significantly, whilst spending on sugar, confectionary and ice-cream has increased significantly.
- 8.26 However, data on spending cannot be directly translated into an understanding of the quantities purchased. Findings from an online shopper

⁴⁹ Thornton A. (2009). *Public attitudes and behaviours towards the environment - tracker survey: A report to the Department for Environment, Food and Rural Affairs*. London: TNS, Defra. Original data from both the 2007 and 2009 Defra surveys available from the UK Data Archive (www.esds.ac.uk)

⁵⁰ $t = -1.0$, $p = 0.32$

⁵¹ $t = 0.10$

survey commissioned by the Food Policy unit of Defra suggest that most people sense an increase in food prices over recent times.⁵² This is particularly the case for meat, dairy items and bread. If this is the case, then people may actually be purchasing less of certain items without spending less.

- 8.27 The survey also suggests that many people have changed their food purchasing patterns. Three out of ten respondents claimed to be buying less food as a result of higher prices. Six out of ten surveyed claimed to throw away less food. Many also anticipated future changes in their food patterns: for example, five out of ten expected to change their meat consumption as a result of rising prices. Also, several respondents reported spending less on other aspects of their life (including holidays, clothing and eating out) to cope with increasing prices. Whilst cutting spending on holidays and eating out is corroborated by Consumer Trends data (see above), the same data suggests the opposite is the case for clothing.
- 8.28 However, these figures must be treated with caution, as we do not have any trend data allowing comparisons to be made with data prior to the recession.
- 8.29 The Defra tracker survey has the advantage of including some comparable data between 2007 and 2009. The finding that people are throwing away less food seems to be corroborated, as the percentage of people who claim to throw away less food increased from 66 per cent in 2007 to 88 per cent in 2009.⁵³

Work

- 8.30 Work *per se* does not have a specific positive or negative impact on the environment. However, it has been suggested that long working hours may contribute to environmental impact, partly by preventing people from having the time to adopt pro-environmental behaviours. Other aspects of work which may be relevant relate to commuting – both in terms of mode of commuting, and indeed the prevalence of home-working.

⁵² Data provided by Cassandra Chessum at Defra on 11/02/10.

⁵³ The questions used were slightly different, but this is unlikely to have had a major effect on the results.

- 8.31 Data on these issues is available from the Labour Force Survey – a quarterly survey that benefits from a huge sample size (over 100,000 individuals per quarter). The last eight quarters for which data were available were reviewed, which includes four quarters predominantly pre-recession (2007 Q4 to 2008 Q3) and four quarters post-recession (2008 Q4 to 2009 Q3).⁵⁴
- 8.32 For most relevant variables, no pattern was obvious. If anything, the percentage of respondents who reported commuting to work by driving increased slightly, from 60.4 per cent pre-recession to 61.4 per cent post-recession.⁵⁵

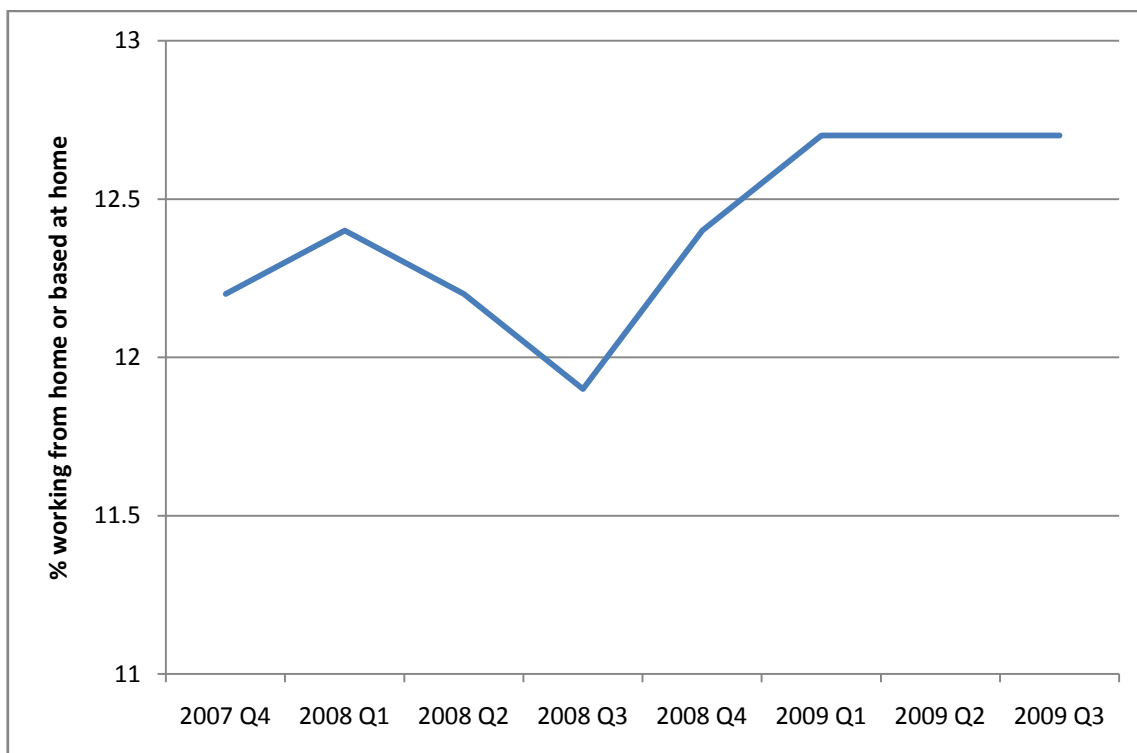


Figure 8.2: Percentage working from home or based at home

- 8.33 The only variable which seemed to present a steady change was the percentage of people working from home, or working based from home, going up from an average of 12.2 per cent pre-recession to 12.6 per cent post-recession (see Figure 8.2).

⁵⁴ All data downloaded from the UK data archive (www.esds.ac.uk). Data in each wave weighted using the variable PWTO7.

⁵⁵ As no data on commuting was available for 2008 Q1, the data for 2009 Q1 was also excluded so as to ensure seasonal effects do not distort results. The average proportions for the three remaining quarters pre- and post-recession were then calculated.

Housing Patterns

8.34 In principle, lower incomes and rising costs might lead to people saving money by moving to smaller accommodation or by moving into flatshares. However, we were unable to find any data to confirm this hypothesis. The most substantial data set available, the Labour Force Survey, did not reveal any change in household size, nor did the European Social Survey (see below).

Overseas travel and air travel

8.35 As noted above, the latest consumption data suggest a reduction in foreign travel. Figures from National Air Traffic Services Ltd (NATS) show a decline in international and domestic arrivals/departures in the UK.⁵⁶ For example, comparing September 2009 to September 2007, a 20 per cent drop is observed in the number of transatlantic arrivals and departures, a 10 per cent drop in the number of domestic flights, and an 11 per cent drop in all other flights.

8.36 Figure 8.3 shows the number of flights in each quarter indexed against the equivalent quarter in the year 2007. As can be seen, the decline below 2007 levels begins in the Summer of 2008, before the start of the recession, but is most acute in 2009. All flight types are affected, but transatlantic flights are perhaps the most affected.

8.37 As with consumption expenditure, a second data set is available to corroborate and extend these findings, namely the International Passenger Survey.⁵⁷ This survey randomly samples passengers going in and out of the UK by air, sea or the Channel Tunnel. As with the air traffic data, there was a marked decline in overseas travel. Overall, the number of trips made abroad in the first four quarters after the beginning of the recession (Q4 2008 to Q3 2009)⁵⁸ was 14 per cent below the number of trips made in the previous four

⁵⁶ Data available from the media centre at www.nats.co.uk

⁵⁷ Data sourced from ONS (2010) *MQ6 Transport Travel and Tourism: Overseas Travel and Tourism Quarter 3 2009* which provides quarterly data back to 2000. Earlier data sourced from ONS (2009) *Mq6: Transport Travel and Tourism: Overseas Travel and Tourism Quarter 4 2008*.

⁵⁸ Ibid, Table 2.

quarters (Q4 2007 to Q3 2008). The biggest fall was for trips to North America, down by 20 per cent from 4.7 million to 3.8 million. Q1 2009 saw the fewest trips abroad, with numbers lower than any quarter since Q1 2002. Again, trips to North America were most affected, with fewer trips than any quarter since Q1 1997.

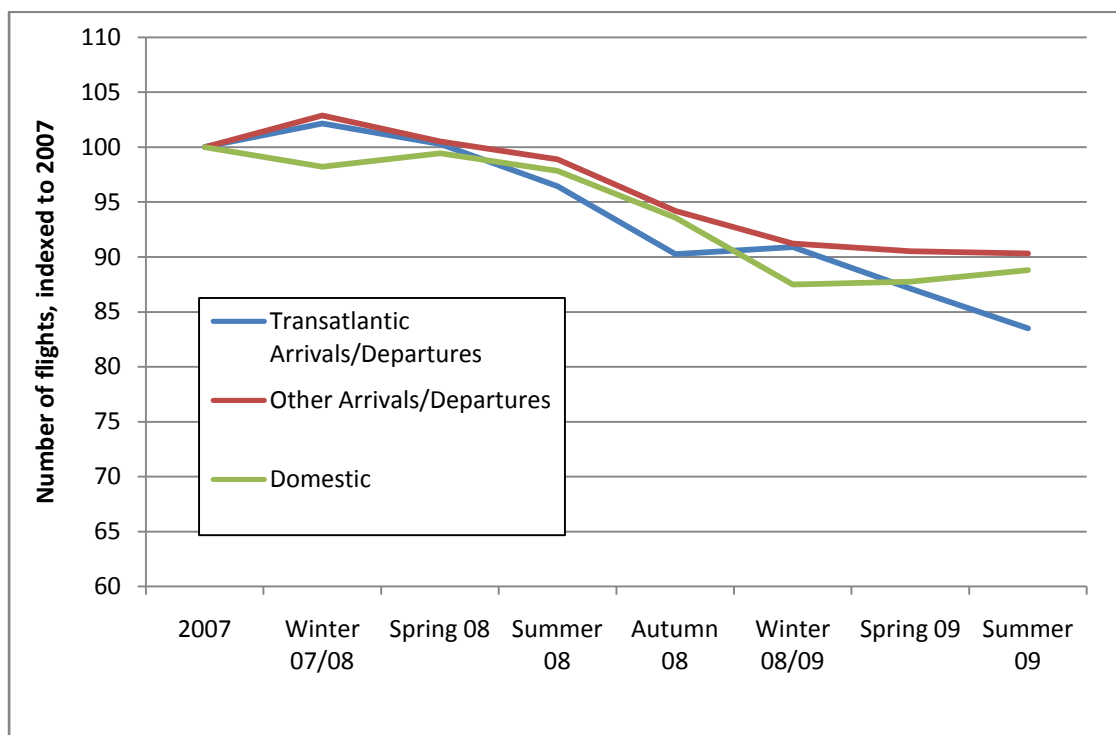


Figure 8.3: Total number of flights

- 8.38 Spending figures from the survey confirm this pattern, with a 21 per cent decline in expenditure abroad in the four quarters following the recession.⁵⁹ Indeed, the four quarters immediately pre-recession had already revealed a significant decrease in expenditure abroad. Comparing the period Q4 2008 – Q3 2009 to the identical period two years earlier (Q4 2006 – Q4 2007) reveals a 27 per cent decrease in expenditure.
- 8.39 The average lengths of trips increased slightly (10.1 nights to 10.3 nights), which can be viewed as an environmentally positive change given the argument that fewer long trips will produce less CO₂ emissions than several

⁵⁹ Ibid, Table 5.

short trips.⁶⁰ However, the magnitude of the change was very slight (a 2 per cent increase overall).

- 8.40 The decline in travel has affected different types of trip differentially. Business trips have seen the biggest decline, dropping by 17 per cent, whilst the number of holidays has decreased by 14 per cent and the number of trips to visit friends and relatives has declined the least – 9 per cent.⁶¹ Considering trips to Europe, travel by air has seen a greater decline (16 per cent) than travel by sea or tunnel (9 per cent).⁶²
- 8.41 In considering these results, it is worth re-iterating the finding from Consumer Trends that expenditure by UK residents abroad has been one of the hardest hit categories of expenditure since the recession. However, in contrast to these dramatic changes in behaviour, according to the Defra tracker survey, attitudes to flying have not changed significantly. This tends to reinforce the view that observed changes have been driven primarily by economic factors rather than shifts in environmental attitudes.

Local travel

- 8.42 The latest data from the Department of Transport's bulletin on road traffic (DfT, 2009) suggest that overall road traffic declined by 3.5 per cent between the first quarters of 2008 and 2009, and overall by 1.3 per cent from 2008 to 2009 (Figure 8.4). The biggest fall was seen in heavy goods traffic (down 8.5 per cent from 2008 to 2009), while private car traffic fell by 1.2 per cent.⁶³

⁶⁰ Based on Tables from 2 & 7 from ONS (2010) *op cit*.

⁶¹ Ibid, Table 18.

⁶² Ibid, Tables 19 & 20.

⁶³ DfT. (2009). *Road Traffic and Congestion in Great Britain: Quarter 4 2009*. Data from Table 1, downloaded from <http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadtraffic/traffic/qbtrafficgb/2009/q409>

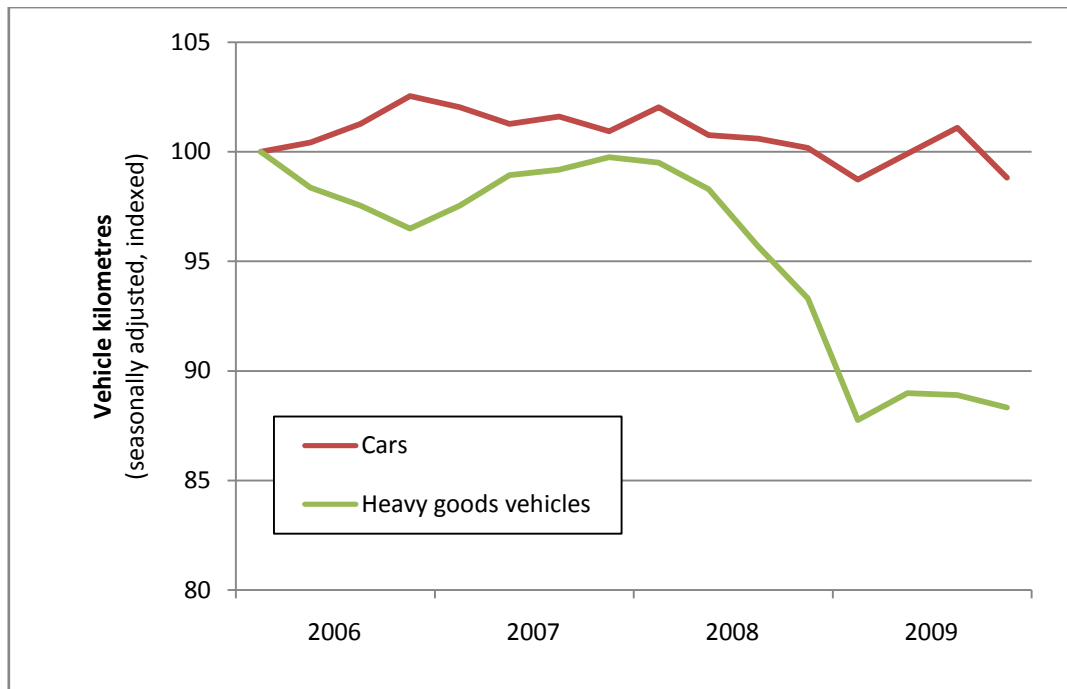


Figure 8.4: Total traffic (vehicle kilometres)

- 8.43 Between the baseline year ending March 2008 and the year ending December 2009, the standard measure of congestion on inter-urban roads (i.e. motorways and trunk A roads)⁶⁴ fell by 10 per cent. These findings are corroborated by the Defra tracker survey. For example, over a third of drivers (37 per cent) reported driving less than 5,000 miles per year in 2009, whereas the equivalent figure in February 2008, from an Energy Savings Trust survey, was 25 per cent.
- 8.44 Transport for London have collected data on cycling patterns.⁶⁵ They show that a four-week period in May/June 2009 had the highest levels of cycling in the capital of any period since records began in 2000. However, the increase in cycling seen after the recession is no different from the general increasing trend seen in the capital over the last 10 years.
- 8.45 Two questions from the Defra survey repeated in 2007 and 2009 relate to car use and public transport. The number of respondents who agreed with the statement “for the sake of the environment, car users should pay higher

⁶⁴ This is the average delay in minutes per 10 miles experienced on the slowest 10 per cent of journeys for each monitored route.

⁶⁵ Andy Emmonds of TFL, personal communication. 10/02/10.

taxes” decreased slightly (from 25 per cent to 24 per cent) – this small difference, however, was marginally significant.⁶⁶ Attitudes to bus use, on the other hand, did not see any statistically significant change.

Energy use

8.46 According to data from BERR, energy consumption (seasonally adjusted and temperature corrected) has declined substantially since September 2008 (Figure 8.5).⁶⁷ This pattern appears to apply both to overall energy consumption, and to domestic energy consumption.⁶⁸

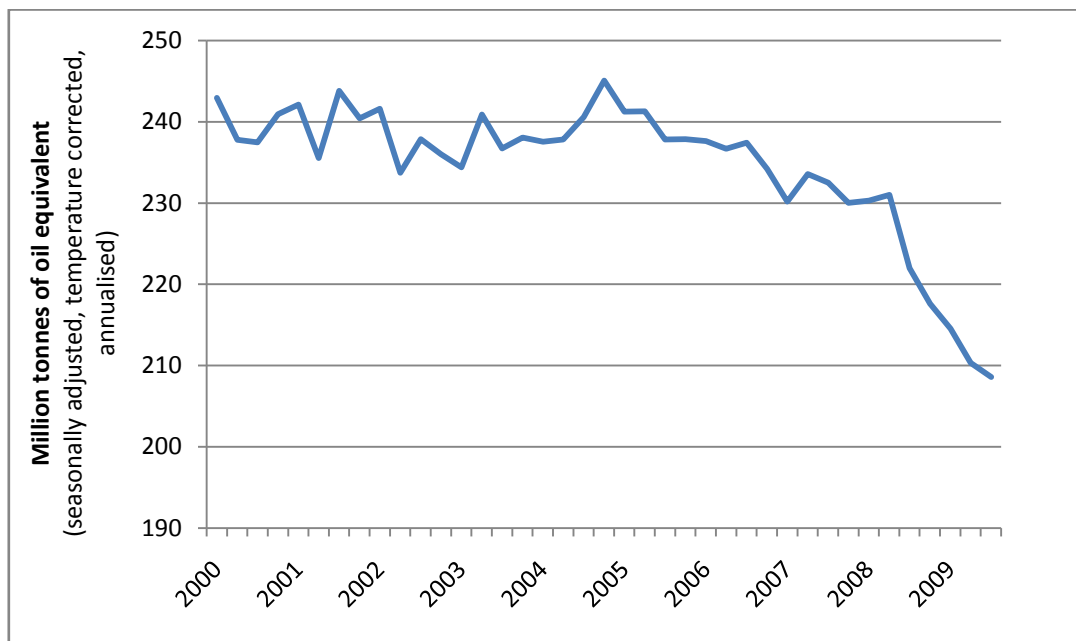


Figure 8.5: Inland energy consumption in UK

8.47 The Defra tracker surveys for 2009 and 2007 included several questions where respondents report on energy saving behaviour (Figure 8.6). The percentage of respondents who disagreed with the statement “*I don’t really*

⁶⁶ $t = 2.01, p < 0.05$

⁶⁷ Inland energy consumption data from table 1.2 of *Energy Trends* (<http://www.decc.gov.uk/en/content/cms/statistics/source/total/total.aspx>)

⁶⁸ See table 1.3 of *Energy Trends*.

give much thought to saving energy in my home” increased from 62 per cent in 2007 to 77 per cent in 2009. Similarly, the number of respondents who claimed to have cut down on gas and electricity use increased from 58 per cent to 76 per cent, and the percentage who claimed never to leave the heating on when they left the house increased from 41 per cent to 48 per cent. On the other hand, the number of people who claimed never to leave the lights on when they left the house decreased from 50 per cent to 46 per cent.

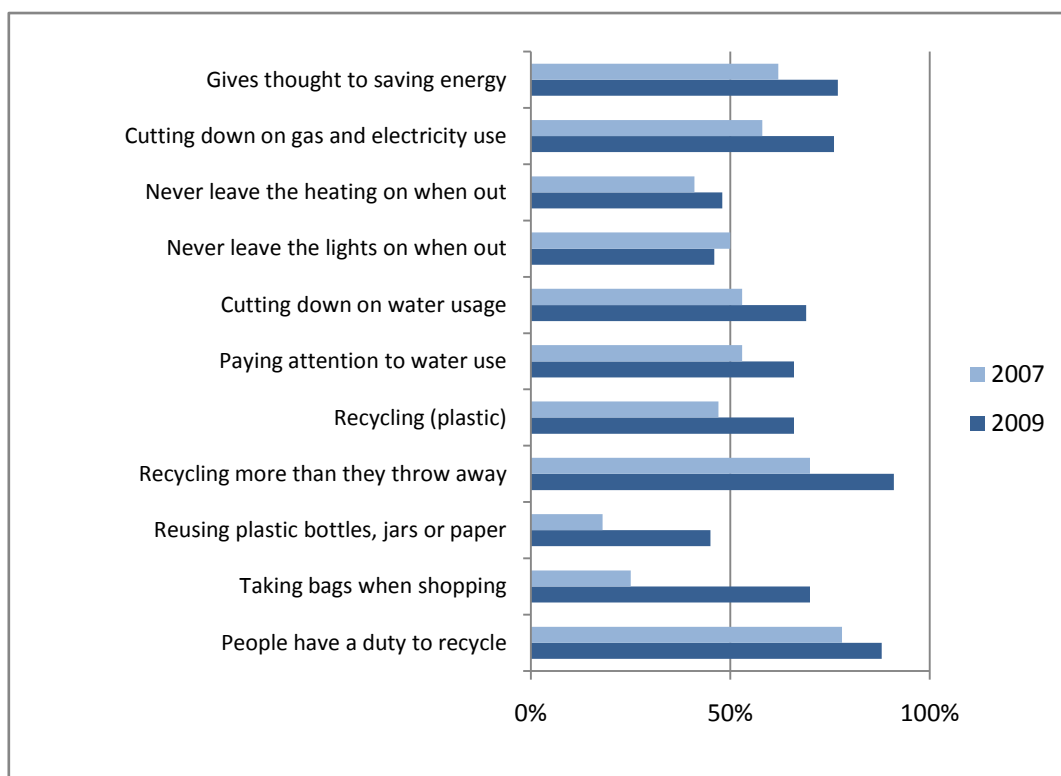


Figure 8.6: Energy-saving, waste and water use behaviour

8.48 The survey results also reveal that the average number of energy saving light bulbs per household increased from 4 in 2007 to 12 in 2009.

Water use and waste

8.49 As with energy use, respondents report more positive environmental behaviour and attitudes with regards to water. Sixty-nine per cent of respondents claim to be making an effort to cut down on water usage at home, compared to 53 per cent in 2007. Similarly, 66 per cent reported paying attention to water use at home, compared with 53 per cent in 2007,

8.50 There have also been steady increases in the use of doorstep recycling and composting services, as is shown in Table 8.1.

Table 8.1: Doorstep recycling amongst those whose council provides such services

% who normally recycle the following items	2007	2009
Papers, newspapers, magazines	87	90
Tins, cans, foil	63	80
Glass bottles, jars, glass	59	76
Cardboard	53	71
Plastic bottles, plastic packaging	47	66
Garden waste	55	51
Food waste	20	25
Clothes	13	22
Shoes	9	17

8.51 91 per cent of respondents claimed to be recycling more than they throw away, compared to 70 per cent in 2007. These gains are also seen with respect to reuse of items. Forty-five per cent of respondents claimed to reuse items such as plastic bottles, jars or paper always or very often, compared with 18 per cent in 2007. Meanwhile 70 per cent reported taking their own bags when shopping always or very often, compared with 25 per cent in 2007. Eighty-eight per cent of people now believe “people have a duty to recycle”, compared with 78 per cent in 2007.

Changes in prevailing attitudes

8.52 The third possible mechanism through which the macroeconomic climate might serve as a moment of change is by changing prevailing attitudes, values and discourse, which in turn influence behaviour (c.f. discussion of the Theory of Planned Behaviour in Chapter 2). This possibility was considered by exploring survey data which may have captured relevant attitudes. This includes the Defra tracker survey, which includes questions about general attitudes to the environment, and the European Social Survey, which includes questions about values and potentially interesting changes in trust and political engagement.

General environmental attitudes

8.53 The Defra tracker surveys include a range of questions on general attitudes to the environment. A subset of these are outlined in Figure 8.7.

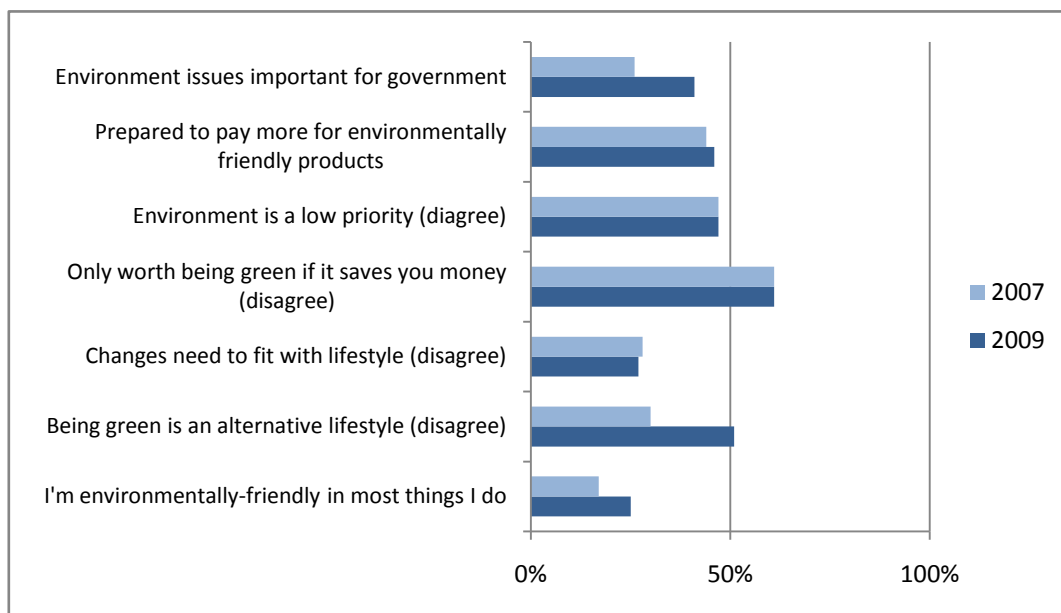


Figure 8.7: changes in environmentally-related attitudes

8.54 In some cases, substantial positive changes can be seen – such as the importance of environmental issues for government, perception of self as green, and the sense that being green is not just an alternative lifestyle. However, other attitudes have seen little change. In particular, people are no more willing to pay a higher price for green products, and there remains a sizeable proportion of people who see the appeal of being green only in so far as it saves money. One of the strongest barriers to pro-environmental behaviour – the sense that it must fit in with one’s pre-existing lifestyle – remains unchanged. Indeed, a slightly larger proportion (48 per cent versus 46 per cent) agreed with this statement in the 2009 survey.

Values

- 8.55 The European Social Survey is carried out every two years across a wide range of countries in Europe, including the UK.⁶⁹ The two most recent rounds were conducted at the end of 2006 at the end of 2008 (post-recession). Typically around 2,000 respondents are included per country, per round. Whilst some aspects of the survey change from round to round (included in rotating modules), the survey includes a set of core questions on behaviour, attitudes and values. Changes in values, which may lead to changes in behaviour, are determined using an adapted version of the Schwartz values scale (Schwartz, 2005).⁷⁰
- 8.56 For the UK, several significant shifts in values were found (Figure 8.8). The relative importance of self-direction (or autonomy) and benevolence (often defined as altruism to those around you, or in your group) increased.⁷¹ Conversely, the relative importance of universalism (often defined as altruism to people not within one's community, including care for the environment) and hedonism decreased.⁷² Indeed, the specific question on the importance of caring for the environment saw a significant decline in relative importance, the largest decline for any single question in the values scale.⁷³
- 8.57 These changes are in stark contrast with comparable countries in Europe. For a set of 12 countries in Northern and Western Europe (including the UK, Ireland, France, Belgium, the Netherlands, Germany, Austria, Switzerland, Denmark, Sweden, Norway and Finland), the importance of power and achievement (both typically materialistic values) declined significantly, whilst the importance of both benevolence *and* universalism increased.⁷⁴ Importantly, looking at individual questions, being rich was rated as

⁶⁹ www.europeansocialsurvey.org

⁷⁰ A set of ten basic values assessed in the European Social Survey using a 21-question scale. For each individual, value importance is calculated relative to the average importance they attribute to all values combined, this helps to compensate for individual response bias.

⁷¹ Self-direction: $t = 4.26$, $p < 0.001$, equal variances; benevolence: $t = 3.78$, $p < 0.001$, equal variances not assumed.

⁷² Universalism: $t = -2.39$, $p < 0.05$, equal variances; hedonism: $t = -2.84$, $p < 0.01$, equal variances.

⁷³ Environmental concern: $t = -4.00$, $p < 0.001$, equal variances.

⁷⁴ Power: $t = -5.93$; $p < 0.001$; achievement: $t = -2.90$; $p < 0.01$; benevolence: $t = 10.04$; $p < 0.001$; universalism: $t = 1.99$; $p < 0.05$. In all cases equal variances existed.

significantly *less* important post-recession, whilst there was no significant change in the importance of the environment.⁷⁵ The only value where change in the UK can be seen as more favourable than in the rest of North West Europe was hedonism – its decline in importance in the UK, was not matched with a decline in the other countries.

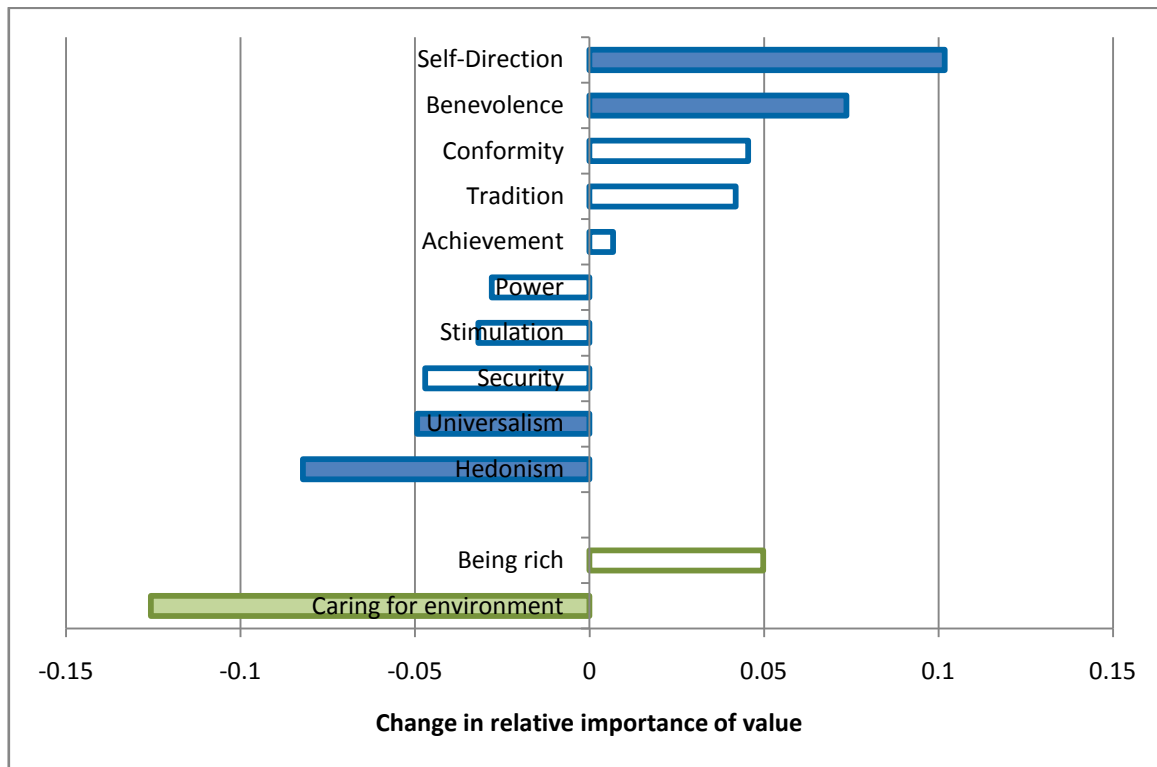


Figure 8.8: Change in values in the UK population between 2006 and 2008. Filled in bars indicate significant changes. Bars in green are for single questions, whereas those in blue are for values

Trust, political engagement and volunteering

8.58 Trust, political engagement and volunteering are elements of social capital that are important in developing pro-environmental behaviour. They also play a role in ensuring that citizens are willing to co-operate with government with respect to environmental legislation, and making a difference directly themselves. The European Social Survey allowed analysis of change in the following three aspects of social capital:

⁷⁵ Being rich: $t = -5.47$; $p < 0.001$, equal variances not assumed. Environment: $t = -1.67$; $p = 0.10$, equal variances.

- Political engagement, including following politics in the media, attitudes to politics, and actual political engagement⁷⁶
- Trust (between people)⁷⁷
- Trust (in institutions)⁷⁸

8.59 More detailed data on volunteering was available from the Quarterly Citizenship Survey.⁷⁹

8.60 Actual political engagement was found to have declined significantly, with individuals involved in fewer political activities.⁸⁰ On the other hand, interest in politics has increased significantly (though understanding has not changed).⁸¹ The following of politics in the media, however remains unchanged.

8.61 Surprisingly, trust in political institutions increased between 2006 and 2008, particularly trust in the police, the legal system and politicians.⁸² However, the controversy over MPs' expenses, which began in May 2009, is likely to have had a detrimental impact on trust for politicians. Trust amongst people, on the other hand, appears to have declined between 2006 and 2008.⁸³ The pattern in Europe is different, with significant increases seen in all dimensions of social capital, including trust amongst people, institutional trust, political

⁷⁶ Following politics in the media was assessed by three questions on TV, radio and newspapers. Attitudes to politics were based on three questions, including one on political interest and two measuring self-assessed comprehension of political issue. Political engagement was based on nine questions asking about political engagement in the last 12 months, from voting, to demonstrations and political activism.

⁷⁷ Based on three questions in the Survey asking people to choose which of two statements they agree with more. The sets of statements were: "most people can be trusted or you can't be too careful", "most people try to take advantage of you, or try to be fair", and "most of the time people looking out for themselves or helpful". In all cases, high numbers indicate more agreement with the more trusting statement.

⁷⁸ Based on the average of responses to seven questions on trust in the following institutions: national parliament, legal system, police, politicians, political parties, European Parliament, and the United Nations. In all cases higher numbers indicate more trust.

⁷⁹ www.communities.gov.uk/communities/racecohesionfaith/research/citizenshipsurvey/quarterlystatisticalreleases/

⁸⁰ $t = -2.99$, $p < 0.01$, equal variances not assumed.

⁸¹ For the specific question on political interest, $t = 3.47$, $p < 0.001$, equal variances not assumed.

⁸² For overall trust in institutions: $t = 2.24$, $p < 0.05$, equal variances not assumed. Significant increases also seen for trust in the police ($p < 0.01$), legal system ($p < 0.05$) and politicians ($p < 0.05$).

⁸³ $t = -1.95$, $p = 0.051$, equal variances not assumed.

engagement and attitudes to politics (the increase in the proportion of people following politics failed marginally to meet the significance threshold).⁸⁴

8.62 The picture for volunteering is more confusing. Whilst several articles in the media have reported a rise in volunteering since the start of the recession⁸⁵, data from the Quarterly Citizenship Survey reveal the opposite pattern, with figures dwindling since the start of the recession, particularly with regards to “informal volunteering” (see Figure 8.8). There was a spike in formal volunteering in the second quarter of 2009 (between April and June)

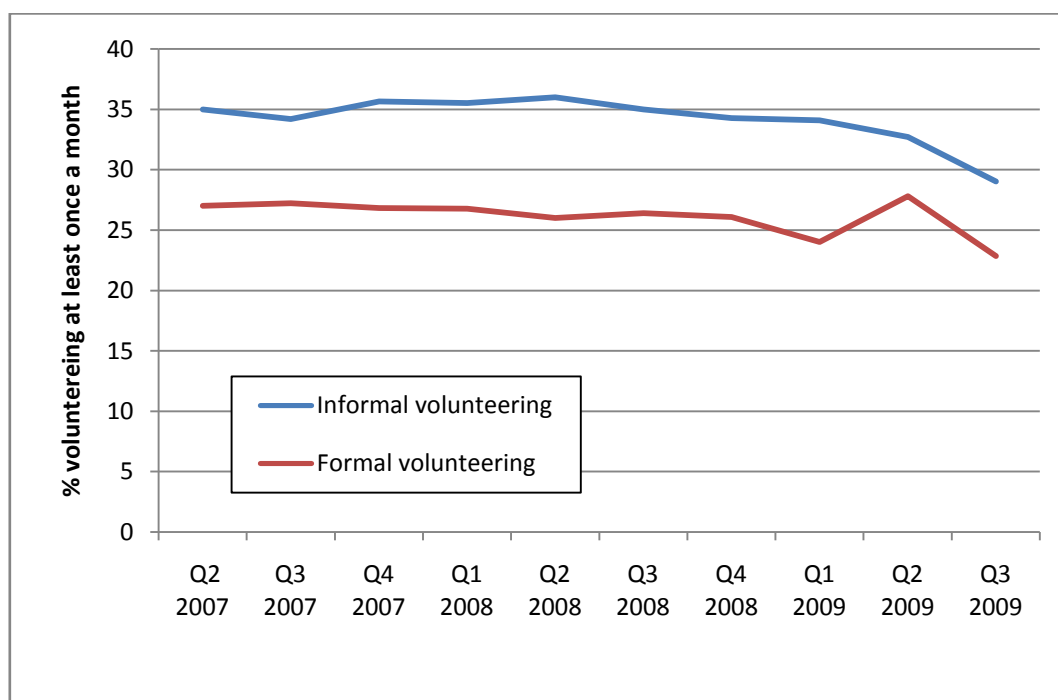


Figure 8.8: Percentage engaging in volunteering at least once a month over the last ten quarters

8.63 The difference between the data from the Citizenship Survey and reports from volunteering centres may be partly due to a shift to more formal types of volunteering. The suggestion is that the people who have started volunteering more are recent graduates and professionals recently made unemployed, who may gravitate towards larger better known volunteering organisations such as

⁸⁴ Trust amongst people: $t=3.03$, $p < 0.01$; institutional trust: $t = 11.02$, $p < 0.001$; political engagement: $t = 3.93$, $p < 0.001$; attitudes to politics: $t=8.03$, $p < 0.001$; following politics: $t=1.91$, $p < 0.06$. In all cases equal variances not assumed.

⁸⁵ <http://news.bbc.co.uk/1/hi/uk/8008428.stm>

CSV and BTCV, whereas smaller organisations may indeed be facing cuts due to the recession and are unable to support their volunteers. However, further research would be required to confirm this hypothesis.

Summary

- 8.64 To what extent has the recession been a “moment of change” in the sense considered in this report? In some areas, there seems to have been little change since the start of the recession. Many attitudes have remained unchanged. People do not seem to prioritise the environment any more than two years ago and there is no evidence for an increase in the numbers of people willing to make what are perceived as sacrifices to achieve pro-environmental behaviours (e.g. spending more, modifying existing lifestyle). Perhaps worryingly, prevailing values with regards to the environment seem to have become *less* positive.
- 8.65 However, there is evidence that many behaviours have shifted in an environmentally positive direction, in some cases quite considerably. On average, people are consuming fewer goods; cutting down on air travel and car use. Of course, these changes are almost certainly directly linked to deteriorating economic conditions and increases in the price of fuel and food. People may only be greener now because they can’t afford otherwise. As such, there is a risk that behaviours will revert when economic conditions improve (as was the case in several of the historical examples reviewed in the previous chapter).
- 8.66 Nevertheless, there are some indications to suggest that this outcome may not be inevitable and that the current recession may lead to some lasting change. Firstly, some pro-environmental behaviours have developed without any obvious economic incentive. For example, the number of people re-using bags for shopping has increased from 25 per cent to 70 per cent, although many shops still provide free plastic bags. Similarly, attitudes to and behaviours around recycling have improved.
- 8.67 Secondly, being green appears to no longer be seen as an “alternative” lifestyle, and more individuals see themselves as green. Fewer people reported that they would feel embarrassed if they were perceived as green.

Perceptions of social norms and personal identity are often taken to be a key element in behaviour change, so these trends may be encouraging from an environmental perspective even if they have not yet led to tangible changes in behaviour.

- 8.68 It is difficult, of course, to establish the extent to which these changes are attributable directly to macroeconomic conditions, or represent the continuation of existing trends towards the mainstreaming of environment considerations, which has been evident place since the start of the century. The most obvious links to the recession are in area where apparently “green” behaviours are strongly associated with saving money. The full test of the hypothesis that the recession is a moment of change, however, can only come once it is over and we can consider whether those pro-environmental behaviours most clearly linked to frugality persist in better times.

Summary: Exogenous shocks as moments of change

Which pro-environmental (or other) behaviours seem to change due to exogenous energy or economic shocks?

- There is fairly good evidence that people can and do make marked changes to their consumption habits and travel behaviours in response to energy price shocks and economic crises. This can be seen both from historical data and in recent data from the current financial crisis.
- Evidence from historical data suggests that these behaviour changes tend to return to “normal” once conditions (e.g. prices) return to their previous state. Some evidence suggests that the *expectation* of a return to normal is a factor in helping people make the changes willingly in the first place.
- However, the finding in California that a large proportion of the long-term consumption changes following the energy crisis were due to the purchase of energy efficient appliances implies that such shocks might catalyse the purchase of “greener goods”.
- Changes to consumption patterns generally reflect “cutting back” on retail discretionary spending (i.e. restaurants, hairdressers, foreign holidays) and major purchases discretionary spending (i.e. cars).
- In terms of travel behaviour, research points overwhelmingly to a preference for maintaining private vehicle use and adopting different routes, travel schedules and trip-chaining rather than shifting mode.
- Current evidence suggests that the 2008/9 crisis has had little effect on attitudes to the environment.

What are the factors that make behaviour change more or less likely at this moment?

- However, changes in consumption data are consistent with a situation in which many people are deciding to rein-in their spending on non-essentials, as is the finding that energy use rebounds strongly once prices are capped.
- No evidence was found to suggest that exogenous shocks provide an impetus for people *deliberately* to act more pro-environmentally in their daily lives.

9 Cuba's *Revolución Energética* – a case study in mass efficiency improvement

Introduction

Background

- 9.1 Cuba has lived through some of the most sudden and extreme macroeconomic shocks, disruptions to energy supply and natural disasters of any country. This chapter outlines some aspects of a particular event in Cuba's recent history, the so-called *Revolución Energética* (Energy Revolution) instigated in 2006. This was a large-scale, government-led response to an energy supply problem that had been growing steadily over the previous decades and which reached crisis point in the aftermath of successive hurricanes in 2004.

Approach to research

- 9.2 Rather than attempt to identify in detail individual behaviour responses, the focus of this case study was on the measures taken by the Cuban authorities as part of the *Revolución Energética* and their outcomes. To this end, the review searched for descriptive and quantitative information about the project. We also include an illustrative extract from an ethnographic case study recently conducted by a researcher at **nef** (the new economics foundation), Dr Kathy Riley, which explored the impact of the *Revolución Energética* from the perspective of householders in a neighbourhood in Havana.
- 9.3 **It is worth noting that reliable data on household energy consumption and behaviour in Cuba is hard to come by; government agencies collect this information (often in minute detail) to aid their own planning, but do not make it publicly available. Similarly, empirical research on attitudes to energy consumption is extremely limited. Some of the figures presented below are from media reports and non-peer reviewed articles; they should therefore be interpreted with caution.**

Background to Cuba's *Revolución Energética*

- 9.4 Since 1962, Cuba has been subject to one of the longest running and most comprehensive international economic embargoes imposed anywhere. During the 1970s and 80s, heavily subsidised by the Soviet Union, Cuba became dependent on cheap oil for its transport, farming and wider economy. Consequently, the collapse of the Soviet Union in 1990 devastated the Cuban economy – some 80 per cent of imports and exports were lost virtually overnight. Oil imports dropped by some 50 per cent and oil consumption by 20 per cent between 1989 and 1992, with very considerable impacts on both transport and energy generation (Arrastía Avila & Guevara-Stone, 2009).
- 9.5 Given Cuba's reliance on cheap energy, the effects of this could easily have been disastrous. Indeed, in the short term these shocks did give rise to severe energy and food shortages. Over time, however, both problems have been ameliorated to a large degree.

Food

- 9.6 Before the Soviet collapse, Cuba imported most of the goods required to meet the needs of its people. It exported sugar and tobacco to the Soviet Union at agreed premium prices and took oil in return, some of which was re-exported. This situation created a distorting incentive, leading to large amounts of Cuban land being given over to export crops grown in industrial mono-cultures, heavily dependent on oil-based inputs. Just before the collapse, in 1989, three times more land was dedicated to sugar than to other food.
- 9.7 Following the collapse, use of chemical pesticides and fertilisers dropped by 80 per cent, putting an end to the industrial, high-input approach to farming that had developed in the country. The knock-on effect on people's daily lives was dramatic. The availability of basic food staples like wheat and other grains fell by half and, overall, the average Cuban's calorie intake fell by over one third over the course of around five years.
- 9.8 Cuba's response to the food crisis has been well documented. Prior to the shock, Cuba was already investigating (albeit on a relatively small scale) forms of ecological farming that were far less dependent on fossil fuels than other approaches. When the shock came, therefore, a system of "regional

research institutes, training centres and extension services” was already in place to support farmers (Pfeiffer, 2006). Immediate crisis was averted by food programmes that targeted the most vulnerable people, the old, young, pregnant women and young mothers, and a rationing programme that guaranteed a minimum amount of food to everyone. The threat of serious food shortages was overcome within five years by a radical transition to self-sufficiency. At the heart of the transition after 1990 was a rapid shift to the use of bio-fertilisers and bio-pesticides, crop rotation and intercropping, plus the use of animal labour and manure (in other words, a largely organic system) and the success of small farms and urban farms and gardens.

- 9.9 Shortages and rising food prices made urban farming very profitable. Many backyards in Cuban cities became home to food crops and farm animals – grown and reared almost exclusively along organic lines. Half the food consumed in the capital, Havana, is grown in the city’s own gardens and, overall, urban gardens provide 60 percent of the salad vegetables eaten in Cuba.⁸⁶ By the turn of the last century, in Havana alone there were more than 26,000 food gardens (Novo & Murphy, 2001).⁸⁷

Energy

- 9.10 If Cuba’s response to the problem of food production following the Soviet collapse has become a well-known success story, solving the energy problem has proved harder. With no easy way to increase energy supply quickly, the government realised that efforts had to be made to reduce consumption. In the mid 1990s, it began a concerted drive to encourage the idea of energy efficiency.
- 9.11 In 1997 the *Programa de Ahorro de Energía por la Ministro de Educación* (PAEME: Energy Saving Program of the Ministry of Education) was

⁸⁶ For an in-depth exploration of the Cuban transition to a more sustainable and largely self-sufficient food system, see Wright, J. (2005). *Falta Petroleo! Perspectives on the Emergence of a More Ecological Farming and Food System in Post-Crisis Cuba*. Unpublished doctoral thesis, Wageningen Universiteit, The Netherlands.

⁸⁷ In an interesting historical comparison, the Cuban experience both echoes and – statistically, at least – surpasses what America achieved in its frequently-lauded push for “Victory Gardening” during World War II. Back then, led by Eleanor Roosevelt, between 30 and 40 per cent of vegetables for domestic consumption were produced by the victory gardening movement.

established to promote teaching about energy conservation in schools. Discussing the impact that PAEME has had since its inception, Arrastía Avila and Guevara-Stone (2009) describes:

Energy themes are pervasive in Cuban schools. Almost all school subjects address energy issues. For example, in geography class students investigate the different renewable sources of energy and describe their application in the immediate future. Biology classes study the environmental impacts of electricity generation. In social studies students explore Cuban newspapers and magazines to report on how Cuba is using renewable sources of energy to generate electricity (p. 32).

- 9.12 At the same time, according to Piñón (2004), Cuba began “an aggressive program of developing renewable energy projects” (p. 17). However, the net impact seems to have been relatively modest, with renewables remaining just a small proportion of Cuba’s total energy mix by 2005 (Perez *et al.*, 2005).
- 9.13 By the early part of this century, meanwhile, the bulk of Cuba’s energy infrastructure was still in a bad way. Most of Cuba’s energy was produced by eleven large, outdated and relatively inefficient thermoelectric power stations. Several of these were 25 years old and only functioning around half the time. There were frequent blackouts, especially during peak demand periods. The highly centralised distribution grid led to a high percentage of transmission losses and the overall supply problem was exacerbated by the fact that most Cuban households had extremely old and inefficient electrical appliances. Moreover, the residential electrical rates did not encourage conservation by offering only very shallow graduations in pricing that were heavily subsidised (Guevara-Stone, 2009).
- 9.14 When the 2004 hurricane season hit Cuba, the dilapidated state of the energy infrastructure was laid bare. Between mid-2004 and mid-2005 there were 122 days with at least some power outages (Ojeda Bello, 2006) and at one stage a million people were left without access to electricity for ten days (Guevara-Stone, 2009).

The Revolución Energética

- 9.15 The response from the Cuban government to the hurricanes and their resulting impact on the energy system was to dramatically increase existing efforts towards energy efficiency. This was done through the instigation of a co-ordinated series of initiatives, under the banner of the *Revolución Energética*.
- 9.16 Announcing the initiative, Fidel Castro (then the president) said:
- “We are not waiting for fuel to fall from the sky, because we have discovered, fortunately, something much more important: energy conservation, which is like finding a great oil deposit.”*
- 9.17 As is evident from the range of activities described in Table 9.1, the *Revolución Energética* was a large-scale and ambitious programme of works involving coordinated actions across a range of different areas. These works were funded by government directed from the top down. Notably, most of these activities were focused not on increasing gross energy supply but rather on improving efficiency.

Table 9.1: A description of the activities undertaken as part of the *Revolución Energética*, from the *Centro de Información para la Prensa* (Information Centre for the Press; www.cip.cu) with broad classification of activities. [nb. translation is **nef**'s, not from CIP.]

Level of intervention	Nature of intervention	Spanish	English
National/ regional	New infrastructure	Establecimiento de los grupos electrógenos diesel y de fuel – oil, sincronizados al Sistema Eléctrico Nacional (SEN). Se trata de equipos con bajo consumo energético, alta disponibilidad, facilidad para su instalación y niveles de potencia unitaria inferiores a las termoeléctricas.	Establishment of diesel and fuel oil power generators synchronised with the National Electric System. These are generators with low energy consumption, readily available, easy to install and can run at low power levels.
National/ regional	New infrastructure	Lograr mayor cantidad de electricidad en base a gas natural, que es definitivamente mucho más económico que generar con productos derivados del petróleo. Para esto se está acelerando la perforación de pozos exploratorios y de desarrollo en la zona productora. Las plantas de ciclo abierto y ciclo combinado, que se han instalado y que se tienen previstas, son sin duda una acertada decisión para tener energía más segura y a mucho menor costo.	Production of more electricity from natural gas, which is significantly cheaper than that produced from petrol derivatives. To achieve this, greater numbers of exploratory wells are being drilled and production zones developed. Open cycle and combined cycle turbine plants, which have been installed and are planned, are without doubt a good decision for ensuring secure energy at lower cost.
National/ regional	New infrastructure	Instalación de paneles solares en centros de educación y salud en zonas aisladas.	Installation of solar panels in educational and health centres in remote areas.
National/ regional	New infrastructure	Programa de utilización de la energía eólica que contempla el completamiento de la instalación de 100 estaciones de medición del viento y la puesta en explotación.	Programme of wind energy, which intends the completion of 100 wind measurement stations and subsequent exploitation.
National/ regional	Improving existing infrastructure	Rehabilitación de las Redes Eléctricas, que presentan un alto grado de deterioro producto de la imposibilidad, en periodos anteriores de ejecutar su mantenimiento sistemático y modernización.	Renovation of the electrical distribution network, which is in a high state of deterioration, due to previous inability to carry out necessary systematic maintenance and modernisation.
National/ regional	Improving existing infrastructure	Reordenamiento de los servicentros que hoy se extiende a todas las bases de combustibles del país, reduciendo el número de servicentros, buscando la mayor racionalidad y control.	Reorganisation of petrol stations, reducing their number and seeking better control and a more rational system.

Level of intervention	Nature of intervention	Spanish	English
National/ regional	Improving existing infrastructure	Sustitución y renovación por la Unión Eléctrica de la técnica del transporte nacional y la paralización definitiva de los equipos ineficientes.	Replacement and renovation of the national transport system, by the Unión Eléctrica, and the removal of inefficient equipment.
National/ regional	Improving existing infrastructure	Sustitución de todas las bombas y motores de agua ineficientes, que garantizan el abasto poblacional, el consumo animal y el riego agrícola. Complemento indispensable de este programa será la eliminación de los salideros, tanto en las redes, como en los consumidores finales, con materiales y medios de mejor calidad.	Replacement of inefficient water pumps, which will guarantee supply for the population, livestock and agriculture. A vital compliment to this programme will be the elimination of leaks in the networks, and the point of final consumption, using better quality materials and methods.
National/ regional	Improving existing infrastructure	Intensificación de las medidas para el control preciso y el uso eficiente de todos los medios de transporte que existen en el país, tanto en el sector estatal como en el privado.	Intensification of methods for precise control and efficient use of all the country's transportation modes – in the state and private sector.
Individual/ household	Encouraging behaviour change	Concientización ciudadana que llega a todas las clases sociales. En el ámbito escolar, a manera de ejemplo, existe un plan educativo profundo para no mantener artefactos encendidos sin necesidad en la hora pico.	Awareness-raising to reach all social groups. For example, in schools there is a plan for in-depth education about turning off appliances that are not required, during peak energy-consumption periods.
Individual/ household	Encouraging behaviour change	Aplicación de una nueva tarifa eléctrica que ha estimulado una nueva y necesaria conciencia de ahorro energético en la familia cubana.	Introduction of a new electrical pricing system that has stimulated a new and necessary awareness of energy-saving amongst Cuban families.
Individual/ household	Upgrading appliances	Entrega de modernos módulos de cocción en sustitución de combustibles tradicionales de alto costo y nocivos para la salud como el queroseno.	Introduction of modern cooking equipment to substitute traditional combustibles that are expensive and harmful to health, such as kerosene.
Individual/ household	Upgrading appliances	Sustitución de electrodomésticos ineficientes, recogidos y convertidos en chatarra: refrigeradores, ventiladores, hornillas y calentadores de agua, bombillas (focos) ahorradoras y muchos otros que disminuyen tremendamente el consumo por domicilio, comercio e industria.	Replacement of inefficient household electrical goods with lower energy use alternatives (fridges, fans, mini-ovens, water heaters, light bulbs, etc) that tremendously reduce consumption in the house, in business and in industry.
Individual/ household	Upgrading appliances	Instalación de nuevos breakers en las viviendas.	Installation of new electrical breakers in households.

- 9.18 Part of the project was a concerted move toward a more decentralised generation system. Some 1,800 diesel and fuel-oil micro-electrical plants were built across 110 municipalities and now provide over 3,000 MW of power. In addition, there was also a significant programme of work to overhaul the electrical distribution network. This involved upgrading over 120,000 electricity pylons posts, installing several thousand kilometres of new cable and around half a million new electricity meters. The impact of these infrastructure changes was to decrease the oil intensity of electricity (the amount of oil required to produce one kWh) production by 3 per cent⁸⁸, leading to estimated savings in oil consumption of around 872,000 tonnes (data from the Centre for Energy Information and Development in Cuba; reported in Guevara-Stone, 2008)
- 9.19 Alongside these infrastructure changes, the *Revolución Energética* also involved initiatives at the individual level. Firstly, the existing energy efficiency education campaigns run by PAEME and its sister organisation the *Programa de Ahorro de Electricidad en Cuba* (Electricity Saving Program of Cuba) were significantly ramped-up in scope so as to widen awareness of the *Revolución Energética* (Figure 9.1).



Figure 9.1: An example of the public campaign advertising the *Revolución Energética*. The sign reads “A revolution of energy. Saving more, we will have more”.

⁸⁸ The amount of oil required to produce a kWh of electricity fell from 280 grams in 2005 to 271 grams in 2007.

9.20 This was combined with monetary incentives. A new residential electricity tariff was introduced for households with steeply rising unit costs (see Figure 9.2). Prior to the *Revolución Energética*, households using less than 100 KWh/month were charged 0.09 pesos per kWh, with each additional kWh up to a total of 300 KWh/month charged at 0.2 pesos, and each kWh above this level charged at 0.3 pesos.⁸⁹ These prices were highly subsidised and provided very little incentive for households to rein-in their energy use. In 2006, however, the tariff structure was overhauled. Whilst the lowest band was kept at 0.09 pesos, above this the rate increased considerably for each addition 50 KWh/month, up to a maximum of 1.3 pesos above 300 KWh/month.⁹⁰

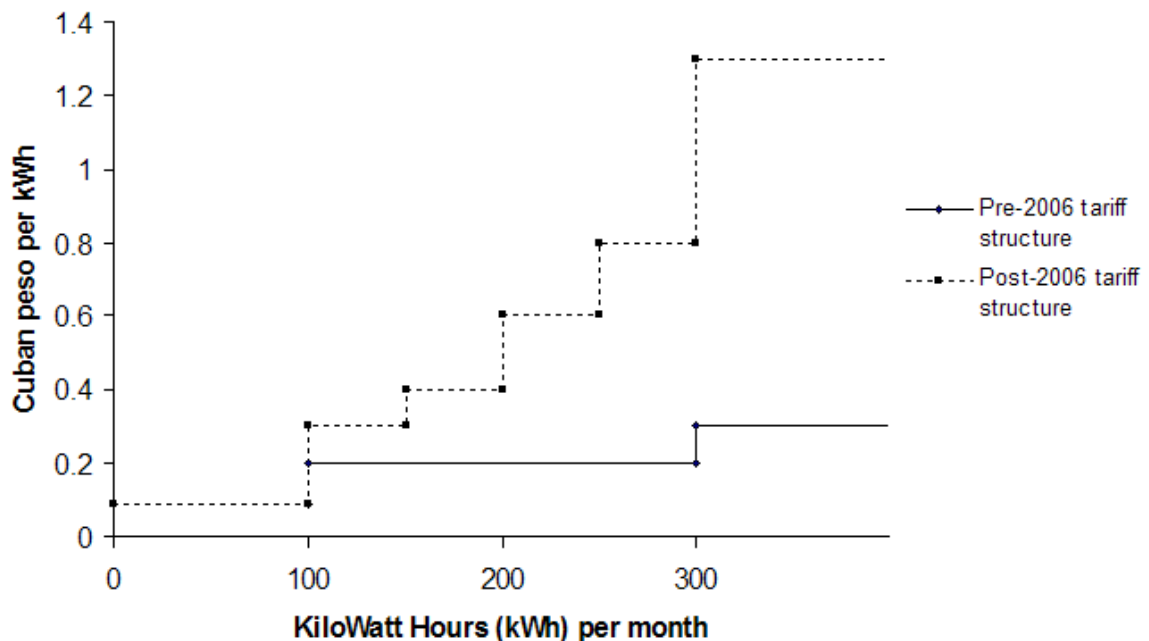


Figure 9.2: Pre- and post-2006 household electricity pricing tariffs in Cuba

9.21 The problem of old and inefficient household appliances was handled in a strikingly direct fashion. The most extreme example is that of household light bulbs. Energy saving light bulbs were distributed free of charge to all

⁸⁹ These figures were given in a report conducted by the International Solar Energy Society: <http://www.ises.org/sepconew/Pages/Menu/menuefficiency.html#FL>

⁹⁰ The formal government setting out the pricing structure is reproduced at <http://www.ecaminos.cu/leer.php/4204>.

households in the country. However, rather than this simply being an incentive for people to accept the new light bulbs by choice, changing all old incandescent light bulbs was made mandatory. The switch was achieved through door-to-door delivery managed by local governmental infrastructures, with old light bulbs handed over in return for new ones (this followed a previous accounting exercise in which the number of light bulbs in each household was individually assessed and recorded). The result was an astonishing nine million incandescent light-bulbs exchanged for energy efficient bulbs within six months – close to 100 per cent of the light bulbs in the whole country. Box 9.1 is short excerpt from an ethnographic case study (Riley, 2008) which gives a flavour of how the light bulb initiative was managed and experienced on the ground.

Box 9.1: Revolutionary light-bulbs

The following description is drawn from ethnographic research conducted by Dr Kathy Riley in one Havana neighbourhood during this period.

The time of the changing of the light-bulbs was a busy time for the People's Council. Everyone was "in the light-bulbs" – involved in the campaign to change the light-bulbs. The delegates complained of tiredness, aching feet and spoke of it as a time of sacrifice, but explained that what they were doing would benefit the country and them as citizens.

The light-bulbs were replaced house to house. Dani, the house owner of Kathy's dwelling described the process. The social workers came with the light-bulbs and David (the husband) had to change them over and give the boxes back, as an accounting method. Dani was very displeased about the whole thing as she did not like the slightly dimmer light of the new bulbs and thought they looked ugly in her lampshades.

In fact, the process of changing the light-bulbs started long before this home visit, as before the social workers came round with the bulbs they had previously had to establish how many bulbs were needed for each Council. This issue was discussed at some length in the local Municipal Assembly meeting a representative from the Electricity company had been invited to speak on light-bulbs, which he did for about half an hour. There followed eight further passionate speeches on the subject of light-bulbs. This was by far the longest discussion on a single theme during the Assembly meeting. The following discussion went like this:

President of Municipal Assembly: "A light-bulb can be a political issue!" [semi-joking, a little frustrated].

Electricity company official: "You are being asked a favour by the State" [general noise and individual conversations].

President: "Please listen in silence...you're not going to be able to explain this to the population if you don't understand [...] The Head of the Revolution has spoken on this theme [complete silence now]. So everyone knows. This is a matter for directors of the country, it is not going to be resolved here. You can make your comments and give your opinion."

Official: "You can give an idea of the number of light-bulbs needed."

President: "The theme here is not to combat illegality ... it is to change the light-bulbs [...] deal with these other issues later. JUST CHANGE THE LIGHTBULBS!"

By the end of the session the President was clearly deeply frustrated. In his long closing speech he berated the delegates for turning up late, and then went on to note: "we cannot think of the light-bulbs, but of what it means for Cuba to change the light-bulbs", closing with "we are delegates and more than anything we are Revolutionaries".

- 9.22 A somewhat different scheme was in operation for larger household appliances. Most families in Cuba had old Russian-made fridges and televisions that were extremely inefficient. Other appliances, such as inefficient home-built fans were also common. Moreover, an estimated 75 per cent of families cooked with Kerosene-fuelled stoves. The Cuban government took a mass shipment of fridges, electric hobs, rice cookers, televisions, fans and other appliances from China. For those people classified as *casos sociales* (literally, “social cases” – people in need)⁹¹, the new appliances were given away free. For others, they were made available at cost price; this was still expensive relative to average wages, so the government also provided an interest-free loan scheme with favourable repayment terms. Unlike the light bulbs, switching to these new appliances was not mandatory. However, most people were keen to change since the new products were much more reliable than those that were replaced (Riley, 2008). Within two years, around two million fridges, one million fans, 200,000 air conditioners and 250,000 water pumps were replaced, and close to 3.5 million rice cookers and pressure cookers were purchased or given away (Guevara-Stone, 2008).
- 9.23 Lack of availability of robust data means that the overall impacts of the *Revolución Energética* are difficult to assess. However, according to data from Cubaenergia (the Centre for Energy Information and Development in Cuba; reported in Arrastía Avila and Guevara-Stone, 2009), significant positive changes were made in terms of Cuba’s overall fuel consumption and, consequently, carbon emissions (Table 9.2).

Table 9.2: Reductions in fuel use and consequent CO₂ emissions avoided, 2005-2007

Fuels	Savings (tons of oil equivalent)	Emissions avoided (tons of CO ₂)
Crude oil	961,419	3,749,534
LPG	124,183	335,294
Kerosene	28,076	899,443
Total		4,984,271

⁹¹ There is no single state definition of *casos sociales* – rather, classification is determined on a case-by-case basis by local officials. However, it would typically include those on low incomes, with children, with physical or mental health conditions and the elderly.

How was it done? Central planning and local organisation

- 9.24 Compared with virtually all other nations of a comparable level of development, the level of top-down management of the Cuban economy is striking. However, in the policy areas where this central planning is most successful it is strongly linked to an architecture of engaged local administrations that are capable of rapid mobilisation. For example, the control of dengue fever is an important national health priority in Cuba, requiring collective action and behaviour change at the local level. According to a recent epidemiological study in Santiago de Cuba, community participation was key in addressing the problem. Multiple small task forces were created at the neighbourhood level that included all stakeholders, including householders as medical professionals working directly to prevent the spread of dengue fever. This inclusive approach, typical of many government interventions in Cuba, leads to “effective government-community partnerships that resolve problems of mutual concern” (Toledo, 2006).
- 9.25 The process of switching to more energy efficient appliances that was a key element of the *Revolución Energética* provides another illustration of this top-down plus local-level change approach. Whilst persuasive techniques to encourage spontaneous bottom-up change (e.g. information campaigns and pricing changes) were part of the overall strategy, the switch to energy efficient appliances was a top-down decision made by the government, applying to everyone without exception and implemented through official channels. On a practical level, the light bulb change was made extremely easy for householders, who had to do nothing other than report how many they required. The switch to more energy efficient appliances was not mandatory, but the scheme was arranged in such a way that it was an easy and popular choice for most people. In both cases, Cuba’s so-called *trabajadores sociales* (literally, social workers), a group of some 14,000 volunteers who act on behalf of the government, played a key role in ensuring that the new equipment found its way to the right people.

Part 4

Conclusions

10 Summary and directions for future work

Introduction

- 10.1 This final chapter consists of two parts. Firstly, we briefly review the process of the research project and make some general observations about the review as a whole, the state of the evidence and its relation to the theoretical framework developed in Chapter 2. Secondly, we consider the implications of our review for future work, both in terms of research and potential policy interventions.

General observations

- 10.2 The central aim of the project was to learn more about the moments of change hypothesis by exploring relevant theoretical research and empirical evidence. Viewed as a whole, what has been learnt from this exercise?
- 10.3 From a theoretical perspective, there are good reasons to believe that significant life events provide a promising opportunity for breaking existing habits. Conceptually, at least, the hypothesis fits well with some of the existing models of behaviour maintenance and change that are commonly used in health contexts and increasingly applied to pro-environmental behaviour.
- 10.4 In terms of tangible evidence that behaviour is altered at moments of change, the range of sources consulted has been wide-ranging, including: academic literature, grey literature, government publications and statistics, campaigning and advocacy material, statutory and voluntary support services and interviews with individuals involved – in various ways – in encouraging pro-environmental behaviour and supporting people during life events. Overall, the picture emerging from this review is rather mixed. There is some promising empirical evidence in the academic literature, but this is relatively scarce and also very largely confined to transport behaviour. Anecdotally, almost all of the limited number of people we spoke to – academics, practitioners and campaigners alike – found the moments of change hypothesis plausible *prima facie*. However, on the whole they were not aware

of, or had not themselves collected, data that could demonstrate changes in habitual behaviour actually occurring at moments of change.

Implications for future research and development

- 10.5 More evidence is required to verify the moments of change hypothesis. Overall, we found few studies that have set out explicitly to test it (albeit that those which have done so have generally given rise to promising results). It is difficult to assess the hypothesis on the basis of standard data sets, since these do not typically track individuals over time, let alone measure their previously existing habits, behaviours and attitudes. Moreover, as the theoretical review in Chapter 2 shows, there are a number of different factors that might feasibly affect the likelihood of positive behaviour modification occurring at a moment of change. Without capturing these factors so that they can be controlled-for in subsequent analyses, it would be impossible to ascertain exactly why behaviour changes occurred, even were they to be implied by aggregate trends (e.g. in consumption).
- 10.6 In drawing this conclusion, it is important to be clear that the relative lack of solid evidence in favour of the hypothesis does not imply that the hypothesis itself is flawed. Simply, it is difficult to make a judgement about this one way or the other because very little of the kind of data that would be required to do so was actually found. Such data would need to be based on longitudinal panels (i.e. with the same people over a period of time), to start from before the moment of change occurred and continue for some time afterwards and involve detailed attitudinal and behavioural measures. With only a handful of exceptions, the evidence we found in favour of the idea that moments of life change are associated with changes in environmentally-relevant behaviour was either anecdotal (e.g. reports from practitioners, such as students union representatives), circumstantial and not focused at the individual level (e.g. *post hoc* interpretation of consumption data) or cross-sectional (e.g. “one-shot” surveys).
- 10.7 This highlights the fact that moments of change is very much a theory-driven hypothesis, arising from conceptual models of how habitual behaviours are formed and changed rather than from any strong basis in behavioural observation. As is evident from the review in Chapter 2, there is ample extant

theory that can plausibly be brought to bear on the question of what influences behaviour at moments of significant life change. Numerous specific hypotheses could be drawn from these theoretical considerations. The problem is that the current state of evidence does not permit these to be tested.

- 10.8 Below, we outline some *priority concerns* for future research into the moments of change hypothesis. These are not recommendations for specific programmes of research, but are important issues that future research should attempt to address if it is to build effectively on our existing knowledge.
- 10.9 To explore the moments of change hypothesis in more depth and properly assess its suitability as the foundation for future policy development, we suggest that research needs to address two distinct, but related issues. Firstly, there is the question of *when* people tend to change their environmentally-relevant behaviours. In other words, amongst those people who have already taken some steps toward greening their behaviour, can commonalities be observed in the timing? What were the triggers and were these associated with any particular life events or features of the wider socio-economic climate?
- 10.10 Rather than starting from the moments of change hypothesis and thus having to guess which particular moments might give rise to observable behaviour changes, a more fruitful strategy may be to conduct exploratory work with people who have *already* made particular changes and attempt to ascertain what prompted them to do so, especially in relation to the timing of behaviour changes. For instance, in collaboration with energy providers, researchers could target people who have recently switched/signed-up to a green tariff to see if there are particular motivations or life circumstances that seem to be shared between them..
- 10.11 Of course, just because behaviours do not ordinarily seem to change at particular life junctures, this does not in itself negate the moments of change hypothesis; it may be that the opportunity for change is still there, but that an external intervention of some kind is required to realise it. This is the second issue that future research needs to consider – would an intervention actually make any difference? This is virtually impossible to answer on the basis of

current evidence, simply because there are so few examples of existing interventions that have tried targeting real-life moments of change.

- 10.12 Providing answers to this question is a matter of conducting practical, action-oriented research based around real-world interventions. On this point, it is interesting to note the existence of a new German research study, the Life Events Project (www.lifeevents.de). The project is led by Martina Schäfer at the Berlin Institute of Technology and is being funded by the German Federal Ministry for Education and Research (BMBF) as part of its socio-ecological research initiative (SÖF). The research team includes Sebastian Bamberg, whose work on travel mode choice and residential relocation is cited above. The Life Events project methodology is based strongly around the Transtheoretical Model (see Chapter 2) and will trial a number of interventions with people who are either moving house or who have just had a child.⁹² Unfortunately for the current project, results from the Life Events project were not available during this project. However, from our understanding of the project, it seems to provide an excellent example of how a rigorous and relatively controlled research design can be used in real-world settings to test theoretical predictions. .
- 10.13 Of course, the ultimate objective of research into pro-environmental behaviour is to make a tangible contribution to averting real, imminent crises: climate change and irrevocable resource depletion. On the basis of our review and also of these wider considerations, we would argue that in addition to being well-grounded in theory successful interventions need to display a number of further characteristics.
- 10.14 Firstly, they must be practical to deliver. Just as a course of personalised sessions with a smoking cessation advisor leads to better results than mere information provision, so sessions of individual coaching by trained “environmental counsellors” would probably be an effective way to bring about changes in pro-environmental behaviour. But this would be a massively expensive and time-consuming endeavour. Therefore, careful consideration needs to be given to finding existing opportunities that could be modified so as to deliver a pro-environmental intervention. It would be useful to map out

⁹² A very clear summary of the research design can be found at http://www.lifeevents.de/media/pdf/publik/Poster_ERSC08.pdf

the different ways in which people come into contact with providers of services and other credible sources and organisations through the life course, and especially during periods of life change.

- 10.15 Secondly, successful interventions need a receptive audience. For instance, having a first child brings about a huge disruption in people's previous behavioural patterns. However, the sheer scale and intensity of these disruptions is such that people may be resistant to interventions that do not seem to be relevant to their immediate problems (i.e. to helping them cope with the baby). Losing one's job might lead to significant behaviour changes but it is also a time of stress and misery. Again, people may not be receptive to messages about green behaviour at such times. This may boil-down to an issue of framing the message carefully and paying attention to the precise point at which it is delivered. For instance, people can be motivated to reduce their energy consumption for "green" reasons or for reasons of cost (as we infer is the case at times of wider economic hardship), but these motivations are likely to be more or less salient at different times. Carefully matching the "message" to the "moment" seems to be an important consideration for interventions that are targeted at particular events in people's lives.
- 10.16 Thirdly, interventions must come from a credible source. For instance, anecdotal evidence suggests that new students are prepared to accept energy-saving tips from their union, who are seen as being "on their side", but not from their university authorities who are suspected of trying to save money surreptitiously. Similarly, people whose consumption opportunities are being curtailed by a major economic downturn may resent advice that seems to come from those who they perceive to be responsible (e.g. the government). Thus, we suspect that it will be important to consider how the person or institution making the intervention is viewed by the recipient.
- 10.17 What form might moments of change interventions take? In their discussion of changing habitual behaviour, Verplanken and Wood (2006) make a helpful distinction between *upstream* and *downstream* interventions. Downstream interventions "focus on changing or extinguishing the problematic behaviour [sic] of people who already exhibit a significant risk factor" (Maio *et al*, 2007, p. 105) and are principally concerned with motivating individuals to make changes of their own volition. Information campaigns are the archetypal example of a downstream intervention, although interventions based around,

for example, motivational interviewing would also fall into this category. Upstream interventions, by contrast, “focus on changing the *environment* in which the problematic behaviour [sic] occurs and on promoting alternatives” (p. 105). This might imply, for instance, paying attention to default choices in new homes (for instance, having default green energy tariffs) or providing services in such a way that it is very easy to adopt better behaviour (e.g. by providing comprehensive recycling services that make it easy and intuitive to sort rubbish at the point of discarding).

- 10.18 The popularity of “nudging” (Thaler & Sunstein, 2008) in recent policy discourse suggests a current interest in upstream interventions, and perhaps a concomitant reluctance to engage in the kind of direct exhortation implied by downstream approaches. Moreover, as outlined in Chapter 1, the moments of change hypothesis is explicitly based on the observation that habitual behaviours tend to persist where the performance context is stable. However, this need not imply that the best kind of intervention at a moment of change is necessarily of the upstream kind. There is value in exploring whether upstream, downstream or some combination of approaches are most effective at moments of life change, and indeed whether there is any relationship between the nature of the life change itself and the kind of approach
- 10.19 Ultimately, if interventions based on the moments of change hypothesis are piloted and shown to be successful in producing sustained behaviour change, it will be necessary to consider their effectiveness relative to other possible approaches against which they might “compete” and/or work with (given that funding resources for any interventions will be limited). This is inherently difficult, since the costs of interventions are measured in pounds and the benefits accrue in other kinds of units – carbon, tonnes of waste saved and so on. At this stage, it is next to impossible to estimate what the tangible impact would be of a large-scale rollout of interventions targeted at groups undergoing particular life changes. However, the need to address this issue at some stage should be considered in the design of future action-research projects.
- 10.20 Much the same is true for assessing the efficacy of interventions designed to take advantage of exogenous shocks at the regional, national or international level – but with the added complication that (for obvious reasons) it is very hard to envisage piloting such interventions in a controlled way. It is for this

reason that the comparison with Cuba is worthwhile. Whilst any number of critiques can fairly be levelled at the Cuban system, the *Revolución Energética* provides a rare example of a determined top-down effort to change behaviours in response to an exogenous shock. It is surely the case that the far-reaching, government-led interventions observed in Cuba during the *Revolución Energética* would be neither possible nor desirable in the UK. However, there may still be a useful lesson to be learned in terms of the extent of “joining-up” between different policy areas and, in particular, creation of a coherent overall narrative with strong government leadership. According to Riley (2008) who conducted fieldwork in Cuba during 2006, one of the most striking aspects of the *Revolución Energética* was how all-pervasive it was. Through the combination of widespread media reporting, social marketing, education programmes and then the actual house-to-house upgrading initiatives there was simply no way to avoid hearing about the programme. In turn, this led to a palpable feeling of acting together. In a sense, the *Revolución Energética* could be seen as an extreme example of the kind of government leadership that is argued for in the Sustainable Consumption Roundtable’s report *I Will if You Will* (SDC, 2006).

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Appendix 1 –Stakeholder consultation

Although the research for this project was primarily desk based, some stakeholders were consulted during the research for Chapters 3 and 4. Below, details are given of the nature of these consultations, including indicative topic guides.

Chapter 3: Leaving home for the first time

Fifteen UK university student unions (SU) were approached. These were selected on the basis of an internet trawl – unions that appeared to highlight green issues reasonably prominently on their websites were chosen. These were: Aston, Birmingham, Bristol, Cardiff, Cambridge, Coventry, Gloucester, Kings' College London, Loughborough, London School of Economics, Manchester, Plymouth, Sheffield, Sussex and Warwick.

E-mails were sent to each of the selected students unions. Where a named environmental officer (or similar) was given, the e-mail was addressed directly to them; otherwise, it was sent to the main contact address. Subsequently, telephone interviews were arranged with SU representatives at eight universities.

Although a formal interview structure was not followed, the main topics addressed in the interview were:

- Typical issues raised by new students regarding housing, shopping and transport, as well as the kinds of advice and guidance that the SU provides
- Personal experiences of trying to help students – especially first years – take up greener behaviours
- University-sponsored green behaviour initiatives and general “buy-in” from university authorities
- Any evidence they or their university had collected that efforts at behaviour change were successful

Separate interviews were also conducted with two other people:

- The universities officer at People and Planet
- The founder and co-ordinator of the Student Switch-off campaign

The focus of these interviews was on understanding the strategies that the respective organisations use to encourage new students to adopt greener behaviours. The interviewees were also asked about evidence that they had collected to illustrate the efficacy of their interventions.

Chapter 4: Transition to parenthood

Interviews were sought with healthcare practitioners who had contact with new parents (midwives and health visitors), volunteers running groups with the National Childbirth Trust (NCT), and people who had had involvement in initiatives aiming to encourage the use of reusable nappies. In addition, conversations were held with a number of mothers who attended a parent and baby group session, which a **nef** researcher visited.

Interviewees were approached via organisations and through **nef**'s networks. There was no attempt to undertake systematic sampling, therefore those spoken to comprise an opportunity sample which should not be regarded as representing the full range of existing views. They were asked for their personal experiences as practitioners, volunteers or parents, and did not speak on behalf of an organisation.

Those interviewed were:

- A sustainability officer from a local authority, with experience of projects encouraging parents to use re-usable nappies
- A recent outreach worker for the Real Nappy campaign
- An NCT parent tea group co-ordinator
- An NCT parents and babies group co-ordinator
- A community midwife
- A children's centre midwife
- Five mothers attending a parent and babies group session

The types of questions asked of those in contact with new parents were:

- How do you make contact with parents? Do parents tend to approach you/you approach them? Why do they get involved in the organisation?
- Are there general patterns of changes in the behaviour of new parents with regard to: shopping habits, food, transport choices, energy and water use in the home, waste, etc?
- Are there different characteristics of parents which affect the way in which their behaviour changes?
- Any differences in planned/unplanned pregnancies?
- Is becoming a new parent a time when people's attitudes tend to change? If so, when, how, why, in what direction, etc?
- Is becoming a new parent a time when people tend to adopt pro-environmental behaviours? If so, which ones, how and why? Is it a good time to steer them towards these behaviours?
- How do parents react to information, interventions, etc which tries to steer their behaviour? When is the best time to intervene – which points during pregnancy, after birth etc?
- Do different parents have characteristics which make them react differently?
- Are first-time parents different from others?
- What is the best time to intervene? Are there different reactions from interventions at different points?

Particular questions for those who had been involved in encouraging nappy use included:

- What degree of pre-existing interest do they have in a) real nappies, b) other environmental issues (and do the two go together)?
- Do voucher schemes, etc affect real nappy use?
- What different reactions do parents have to initial information? Do their reactions change over time?
- Do parents who decide to use real nappies show more of an interest in other environmental issues? Do you do anything to encourage this?

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