The Effects of Smarter Choice Programmes in the Sustainable Travel Towns:
Summary Report

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Accompanying reports

This report is accompanied by the following volumes:

The Effects of Smarter Choice Programmes in the Sustainable Travel Towns: Research Report

The Effects of Smarter Choice Programmes in the Sustainable Travel Towns: Case Study Interviews

Sloman L, Cairns S, Newson C, Anable J, Pridmore A & Goodwin P (2010)

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Background

Darlington, Peterborough and Worcester are all medium-sized, relatively free-standing towns, located in the north and middle of England. Following a competition, they were designated 'Sustainable Travel Towns', implementing a programme of measures from 2004 to 2009, intended to reduce car use. Taken together they spent £15 million, of which £10 million was special Government funding provided by the Department for Transport.

Baseline surveys in each town in 2004 showed that traffic growth was a significant issue of public concern, with between 80% and 94% of respondents considering it to be a problem. The same surveys showed strong public support to give more sustainable transport modes (buses, walking and cycling) a priority in transport policy.

There were some differences in local conditions and problems, and each town made its own choice on how much to spend on each of a range of different measures. They all spent most on personal travel planning (from a third to nearly half of revenue spending), followed by travel awareness campaigns, promoting walking and cycling, and public transport marketing. Smaller amounts were spent on workplace and school travel plans. The programmes were implemented by teams of 6-10 staff in each town.

The main period for assessment of impacts was 2004 to 2008, taking care, as far as possible, to avoid confusion with the first impacts of recession at the end of 2008.

Data and Analysis

The main data sources for the towns were: detailed travel surveys in 2004 and 2008, with over 4,000 respondents to each survey in each town each time; smaller interim household surveys in some areas; some surveys in schools and workplaces; counts of bus passengers; automatic and manual counts of cyclists; manual counts of pedestrians; and automatic and manual vehicle counts. In addition, comparable data were used for other medium-sized towns nationally, namely household travel survey data from the National Travel Survey (NTS), and traffic counts from the National Road Traffic Estimates (NRTE).

Thus the travel survey results were compared with the patterns shown in the counts for the towns, and both were compared with NTS and NRTE data for other towns of comparable size. As in all such comparisons, results are subject to some caveats due to differences in survey methodology; geographical coverage; the subject under measurement (e.g. residents' car mileage in the household surveys, versus 'all car

traffic' in the count data, which includes travel by non-residents); and definitions and reliability of the different data sources. Considerable care was therefore required in interpretation.

Trip-making by each mode

Taking all three towns together, the total number of trips per head made by residents reduced slightly. Car trips per person reduced and trips by more sustainable modes increased. The figures showed a similar overall pattern, but marked differences in detail, from town to town.

These are summarised in Figure 1.

The analyses gave the following key results:

Car use: Car driver trips by residents fell by 9% per person, and car driver distance by 5%~7%, according to aggregated household survey results for the three towns. This compares with a fall of about 1% in medium-sized urban areas over the same period, based on NTS data.

Prior to the economic downturn, the volume of traffic observed on-street in all three towns reduced by approximately 2% across the whole urban areas, with reductions of 7-8% observed in the inner areas. Once the economic downturn began, there is evidence of further town-wide traffic reductions in the order of 0.5-1%, which were broadly in line with national trends. The difference between the household survey results and the traffic counts is mainly due to population increases (particularly in Peterborough), employment increases (particularly in Darlington), journeys in the towns by non-residents, differences in geographical coverage and definitions of the data, and, possibly, some induced traffic, though this was probably very small.

Bus use: Bus trips per person grew substantially, by 10%~22%, compared with a national fall of 0.5% in medium-sized towns. The bus growth primarily occurred in Peterborough and Worcester, with a less positive trend in Darlington (in part due to the nature of competition between two operators in that town).

Cycling: The number of cycle trips per head grew substantially in all three towns, by 26%~30%. Darlington (which was also a Cycling Demonstration Town) showed the greatest growth. Meanwhile, cycle trips declined in medium-sized towns elsewhere.

Walking: The number of walking trips per head grew substantially, by 10%~13%, compared to a national decline in similar towns.

Figure 1: Changes in numbers of trips by residents between 2004 and 2008

Change in trip numbers per 100 people per day between 2004 and 2008

■ Walk ■ Cycle ■ Bus ■ Car passenger ■ Car driver ■ All trips
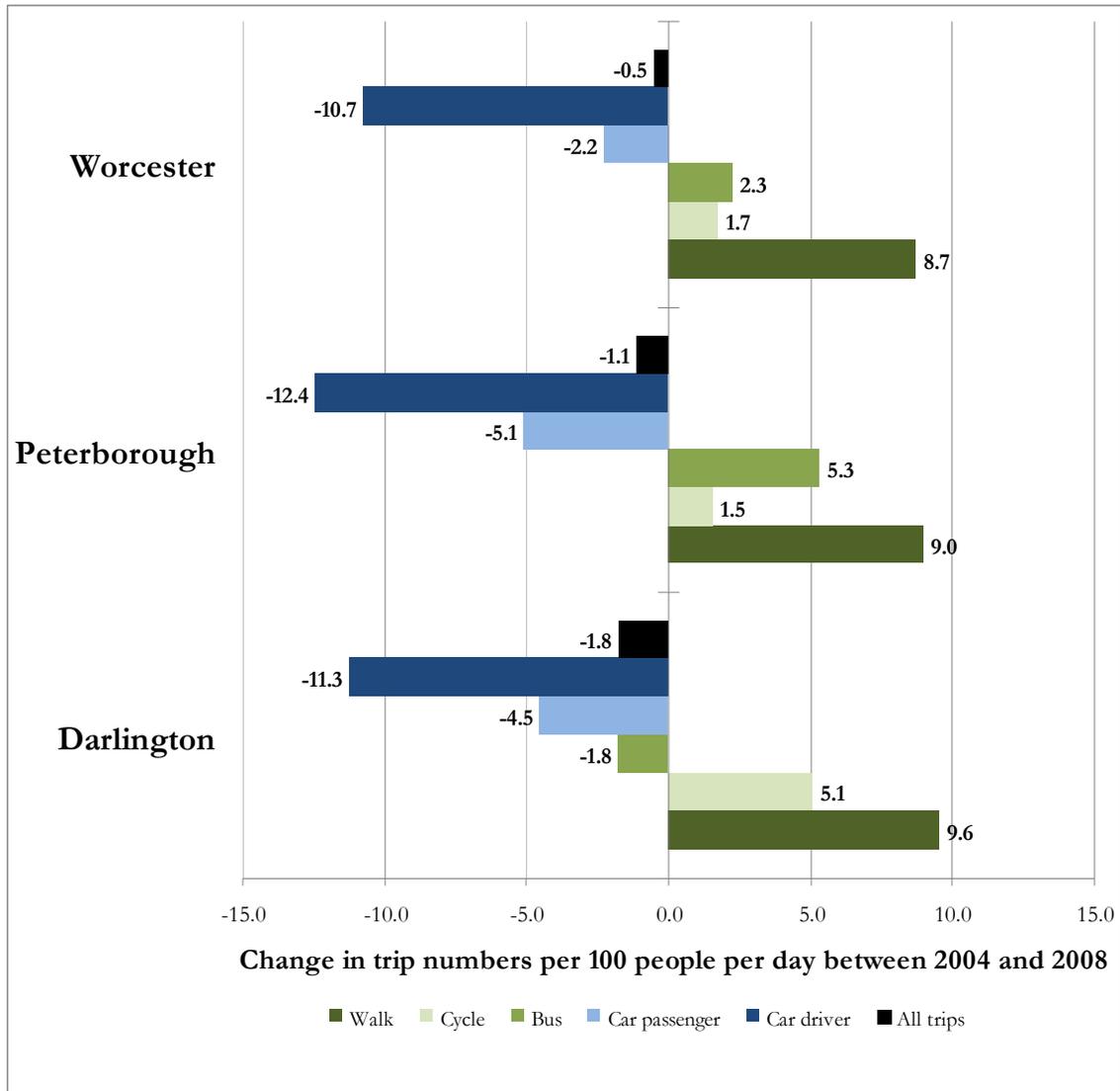
Notes: Data are for numbers of trips of <50km, weighted dataset. Base: between 11,954 and 12,909 trips by approximately 4,000 respondents in baseline and ex-post surveys in each town. Trips by other modes not shown for purposes of clarity. For an indication of scale of change, absolute number of trips <50km per 100 people per day in 2004 (aggregated dataset)=292, of which walk=72; cycle=9; car driver=124; car passenger=63; bus=20; train=1; other=3.

Patterns of Demand

More detailed analysis shows:

- While the reduction in the number of car trips per head was proportionately greatest for short trips, the biggest reduction in car distance travelled (hence traffic) was from medium-length and longer trips.

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- There were indications of complex behaviour change, involving transfers between modes, changes of destinations and changes in trip numbers, not all of which can be fully analysed with the available data.

- The biggest reduction in car driver distance came from changes to leisure trips, then shopping and work-related business. This pattern was consistent with the relatively low emphasis on work-trips in the interventions chosen.

- The biggest falls in car driver mode share appear to have been among groups either at a point of change in their lives (at college, looking for work, or recently retired) or on a reduced income. There was a smaller per head reduction in car trips by those in full-time work, though this still constituted 40% of the total reduction.

Assessment of Success

Overall, the Smarter Choice Programmes in the towns contributed positively to objectives of supporting economic growth, reducing carbon emissions, increasing health, promoting equality of opportunity, and improving quality of life.

The estimated outturn costs of the programme were £10 per person per year (roundly £11 at November 2009 prices), including both capital and revenue expenditure. We estimate that the cost per car kilometre removed was 3.6 pence (4 pence at November 2009 prices). On conservative assumptions, the implied benefit-cost ratio of the achieved outcome in the three towns, allowing only for congestion effects, is in the order of 4.5. Including environmental, consumer-benefit and health effects on the basis of recent Department for Transport modelling could broadly double the congestion-only figure. We judge that a full benefit-cost ratio for forward projection, comparable with other transport investments, including a longer term assessment of both costs and effects on demand, is more likely to increase the figure than reduce it.

The report makes recommendations to assist local authorities in planning and delivering a successful large-scale Smarter Choice Programme, covering issues such as staffing requirements, engagement of stakeholders, the need for complementary measures, and important elements of the overall programme. It recommends giving somewhat more attention to measures aimed at work travel, and to capturing changes in travel over time at an individual level.

It is concluded that the current evidence base is sufficient to justify a substantial expansion of implementation of Smarter Choice Programmes.

1.   Introduction

In 2004, the Department for Transport published *Smarter Choices: Changing the Way We Travel* (Cairns et al., 2004), which reviewed the evidence available at that time on the effect and scale of implementation of smarter choice measures, previously called 'soft measures'. The review suggested that these measures had the potential to deliver substantial changes in travel behaviour and reductions in traffic, if implemented in a supportive policy context and on a large scale over a period of ten years.

The Department then launched the Sustainable Travel Towns project to provide a 'real-world' test of whether it was indeed the case that intensive, town-wide Smarter Choice Programmes might have such an impact on travel behaviour and traffic. It ran from April 2004 to April 2009, with £10 million funding for the implementation of large-scale Smarter Choice Programmes in three towns: Darlington, Peterborough and Worcester. All three programmes aimed to encourage more use of non-car options – in particular, bus use, cycling and walking – and less single-occupancy car use.

In 2008, the Department for Transport commissioned a study of progress in the three Sustainable Travel Towns. This summary brings together the main findings from that study. It is accompanied by two companion volumes:

- *The Effects of Smarter Choice Programmes in the Sustainable Travel Towns:* R*esearch Report*
- *The Effects of Smarter Choice Programmes in the Sustainable Travel Towns: Case Study Interviews.*

Throughout this summary, we cross-refer to relevant sections of the Research Report, to assist readers wishing for a fuller explanation of particular findings. Cross-references use the abbreviation RR (research report) followed by the chapter or section number.

The research involved three main stages: a *contextual review,* which gathered information on how the implementation of smarter choice measures had developed nationally over the period since 2004; in-depth *structured interviews* with officers responsible for implementation of the Smarter Choice Programmes in the three Sustainable Travel Towns; and analysis of a wide range of *data sources,* to gain an understanding of the extent of behaviour change in the three towns. A full explanation of the research study methodology is given in RR1.1.

One of the primary data sources examined was a specifically commissioned household travel survey, carried out in Autumn 2004 and repeated in Autumn 2008[1]. This was a random sample survey (*not* a panel i.e. respondents at baseline were not specifically followed up in the ex-post surveys). Socialdata & Sustrans used a weighting system to adjust for potential biases

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[1] Sustrans & Socialdata (2005 a,b,c and 2009 a,b,c: see RR13 for full citations) report the methodology adopted for the household travel surveys. Households were mailed survey forms, which comprised a self-completion mail-back household questionnaire and one-day travel diaries for a nominated day of the week for all individual household members. Repeat reminder letters and phone calls were sent to households that did not respond. The survey sample included households completing travel diaries for all seven days of the week. Samples were stratified to ensure a sufficient sample size to provide reliable data at ward level. The sampled area covered all residential households in each of the three towns, and was drawn from a commercially available database of postal addresses and telephone numbers which incorporated the Royal Mail Postal Address File.

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in the survey returns[2], but their approach to weighting was questioned by Bonsall and Jopson (2007), and for this reason we obtained unweighted datsasets, kindly provided by Socialdata & Sustrans, and repeated many of the analyses using both weighted and unweighted datasets. Although (as would be expected) weighting does make a difference to the results, often of the order of a percentage point or so in the changes observed from 2004 to 2008, there did not appear to be any consistent pattern of change which would cause concern of bias (sometimes weighting moved the results in one direction, sometimes in the other), and the general picture produced was broadly similar.

In this summary, we begin by briefly describing the background to the adoption of Smarter Choice Programmes in the three towns, and the strategies that they chose.

We report the analysis under four main heads, namely:

- ***inputs*** to the Smarter Choice Programmes, in terms of funding and staffing;
- ***outputs****,* in terms of the type and scale of activity that resulted;
- ***outcomes*** or effects of the activity on travel patterns;
- ***impacts*** on social, economic and environmental objectives.

We consider the extent to which effects on travel patterns are likely to have been the result of the interventions in the towns, as opposed to wider (national) changes. We also develop some insights into the nature of the behaviour change that took place in the three towns during the course of the Sustainable Travel Town programme, in terms of trip lengths, trip purposes, demography and employment status. Finally, we examine some lessons for future implementation of Smarter Choice Programmes, both in terms of local management and delivery and in terms of national policy options and priorities.

The final period of data collection for the programme coincided with increased sensitivity about recessionary pressures, with some analyses suggesting that the start of the current recession should be put at about the third quarter of 2008, though the main impacts which would be expected to affect travel directly were somewhat later. We therefore paid particular attention to ensuring that the reported effects exclude any element of behaviour change as a result of the economic downturn, through comparison with changes to travel patterns that were evident from benchmark data sources and close attention to the timing of results from the different sources.

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[2] The weighting system used by Socialdata & Sustrans adjusted for household telephone ownership (since households without telephones did not receive telephone reminders and hence were less likely to respond); level of interest in personal travel planning (in areas where this was offered); and representativeness in terms of age, gender, numbers responding from each ward, and number of responses for each day of the week.

2.   Overview of the towns

The three towns are medium-sized, relatively free-standing, and located in the north and middle of England. At the start of the Sustainable Travel Towns programme, Darlington and Worcester had populations of roughly 100,000 people, while Peterborough was somewhat larger, with an urban population of about 137,000. Peterborough and, to a lesser extent, Worcester, saw some population growth during the course of the programme.

2.1   Darlington

Darlington's relatively compact urban area was modified by a trend of de-centralisation of employment, with the development of large 'edge of centre' employment sites (a retail distribution centre and a large business park) in the period leading up to and during the Sustainable Travel Town initiative (RR3.2.1). Part of the town's motivation for developing a large-scale Smarter Choices Programme was to ensure that additional employment did not compromise accessibility or worsen congestion (RR3.3.2). Between 2004 and 2008, employee jobs in the town grew by 10% (RR17.2.2).

As well as being a Sustainable Travel Town, Darlington was selected as one of six Cycling Demonstration Towns in 2005. This resulted in the injection of an additional £500,000 per year from 2005 onwards, largely for cycling infrastructure improvements. Darlington was the only town to have both Sustainable Travel Town and Cycling Demonstration Town status (RR3.2.1). Investment in active travel modes was seen as an important priority, in part because health inequalities between affluent and less well-off areas of the town were very marked, with a 13-year differential in life expectancy (RR3.3.2).

2.2   Peterborough

Peterborough was designated as a 'New Town' in 1968, and has seen substantial residential development over the past forty years, concentrated in four 'townships'. By 2008, the last of these, Hampton, was being built to the south of the city (RR3.2.2). During the course of the Sustainable Travel Towns programme, Peterborough's urban population grew by more than 6% (RR13.7). Housing growth in Peterborough is expected to continue, as the city lies in one of the Government's Housing Growth Areas.

As a result of the New Town designation, there has been extensive investment in Peterborough's road network, including the development of 'parkway' dual carriageways (RR3.2.2). Congestion levels in the city are low, access by car is easy, and there is a sense of pride at the high levels of car accessibility (RR3.5.4). Interventions that would have the effect of restraining traffic or reducing traffic capacity (such as bus lanes or parking charges) were described as politically 'taboo' (RR3.3.3). While smart measures had initially been adopted as a means of minimising traffic growth and creating capacity for new housing, they were increasingly being seen as part of a strategy for tackling carbon emissions (RR3.3.3).

2.3 Worcester

Worcester was the only one of the three towns that was not a unitary authority. The Sustainable Travel Town project was led by the county council, but with close cooperation with the city council. The town was described by the local authority as very 'middle of the range' in terms of socio-economic characteristics (RR3.2.3). It had high levels of car use and car ownership, which resulted in congestion in the town centre. The traditional street layout made it problematic to reallocate road space towards more sustainable modes, and the 'voluntary' nature of smart measures led to them being seen as a politically acceptable way of tackling the town's congestion problems (RR3.3.2).

However, as the Smarter Choice Programme developed, officers also felt that it resulted in increased political support for measures that might previously have been considered too difficult, such as bus priority measures (RR3.3.3), and it was also considered to have led to greater cooperation between the county and city councils in the implementation of a city parking strategy (RR3.3.1), suggesting that the programme may have played a significant educational and awareness-raising role amongst decision-makers.

3. Public attitudes in the towns

The baseline household survey carried out in the three towns in 2004 included in-depth attitudinal research with over 400 interviewees in each town (RR3.4). These surveys suggested that the great majority of respondents (between 80% and 94%) considered recent traffic growth to be a problem. The proportions finding the consequences of car traffic 'no longer bearable', or 'not so bearable', were 51% in Darlington; 42% in Worcester; and 30% in Peterborough. In all three towns, a majority of respondents favoured making sustainable transport modes a priority in transport policy (between 85% and 94%), with greatest support for development of public transport services (judged to be effective by between 76% and 91%); and developing bicycle routes (judged to be effective by between 73% and 85%).

4. The strategies adopted in the towns

The strategies adopted in the towns were, in many respects, quite similar (RR3.5.1). Their key elements were:

- development of a strong brand identity;
- a large-scale personal travel planning programme;
- travel awareness campaigns;
- cycling and walking promotion;
- public transport information and marketing;
- school travel planning;
- workplace travel planning.

In addition, Worcester sought to establish a car club, but this was not successful, with the operator pulling out less than a year after it was established due to a commercial restructuring of its business (RR3.5.1).

5.   Inputs: funding and staffing levels

Over the course of the five years, on the basis of outturn and budget information supplied by the three local authorities, effective expenditure for the Smarter Choice Programme was estimated to be £4.4 million in Darlington; £6.8 million in Peterborough; and £4.4 million in Worcester (RR3.5.2). These figures include both revenue funding and capital expenditure on a variety of supporting measures such as bus and cycle infrastructure and safe routes to school[3].

Across the whole programme, capital schemes constituted somewhat over half of the effective expenditure. Estimates of the expenditure contributing to delivery of the six main smarter choice measures in the three towns[4] are presented for each smart measure in the relevant chapter of the research report (RR4.3.2; RR5.3.2; RR6.3.2; RR7.3.2; RR8.3.2; and RR9.3.2).

Once a full staff team had been recruited, the staffing levels in the towns were 6-10 full-time equivalent posts per annum. (RR4.3.1, RR5.3.1, RR6.3.1, RR7.3.1, RR8.3.1, RR9.3.1). There were clear differences between the towns in the total amount of staff time allocated to each smart measure. Notably, Peterborough invested more staff time than either of the other towns in public transport information and marketing, and Darlington invested more time in cycling and walking promotion.

The relative emphasis given to the different measures may be seen in the proportion of revenue expenditure allocated to each. Looking just at the revenue expenditure that can be

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[3] We asked the three towns to provide financial information to show how their investment had been allocated in each year. So far as possible, we attempted to standardise the headings to which costs were allocated. However, the towns themselves used a variety of headings for budgetary purposes, and translating these headings into the standardised ones suggested by us was not always straightforward. The resulting figures should therefore be regarded as 'best estimates'. Our estimates include investment in infrastructure and services funded from other budgets than the DfT Sustainable Travel Town grant where it might reasonably be supposed that these would be likely to be supportive of behaviour change. We have excluded revenue costs which would not have contributed directly to the behaviour change intended to arise from the programme, and which might reasonably be considered a core part of local authority operations (media work, monitoring and evaluation, study tour, accommodation, equipment, administration and traffic management). These amounted to approximately £1.6 million. For staff costs, we used estimates based on information about the staff time dedicated to the programme and average staff salaries; the resulting figures are slightly over £1.1 million less than the reported total expenditure on salaries, but in our view are a more reliable reflection of the effective staff costs of the programme. So, in total, there was £8.8 million of capital expenditure and £6.8 million of revenue expenditure directly relevant to behaviour change activities, with £2.8 million of additional revenue costs relating to core activities and unattributed salary costs.
[4] That is, workplace travel planning, school travel planning, personal travel planning, public transport information and marketing, promotion of walking and cycling, and travel awareness campaigns.

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identified as having been spent on a specific smart measure[5], the highest proportion in every town (33%-46%) was spent on personal travel planning. The next largest expenditure categories were travel awareness campaigns (14%-28%) and cycling and walking promotion (15%-23%), followed by public transport information and marketing (5%-11%). Revenue spending on workplace travel planning and school travel planning was much less, at 1%-9% and 2%-5% respectively.

The relative spending on each of the smart measures is illustrated in Figure 2[6]. As we will see in section 7, the inputs in terms of staff resources and expenditure broadly correlate with the outcomes that were achieved.

Figure 2: Proportion of revenue allocated to each individual smart measure

🟦 Workplace travel planning	🟪 Travel awareness campaigns
🟥 School travel planning	🟥 Cycling and walking promotion
🟨 Personal travel planning	🟦 Car club
🟦 Public transport information & marketing	
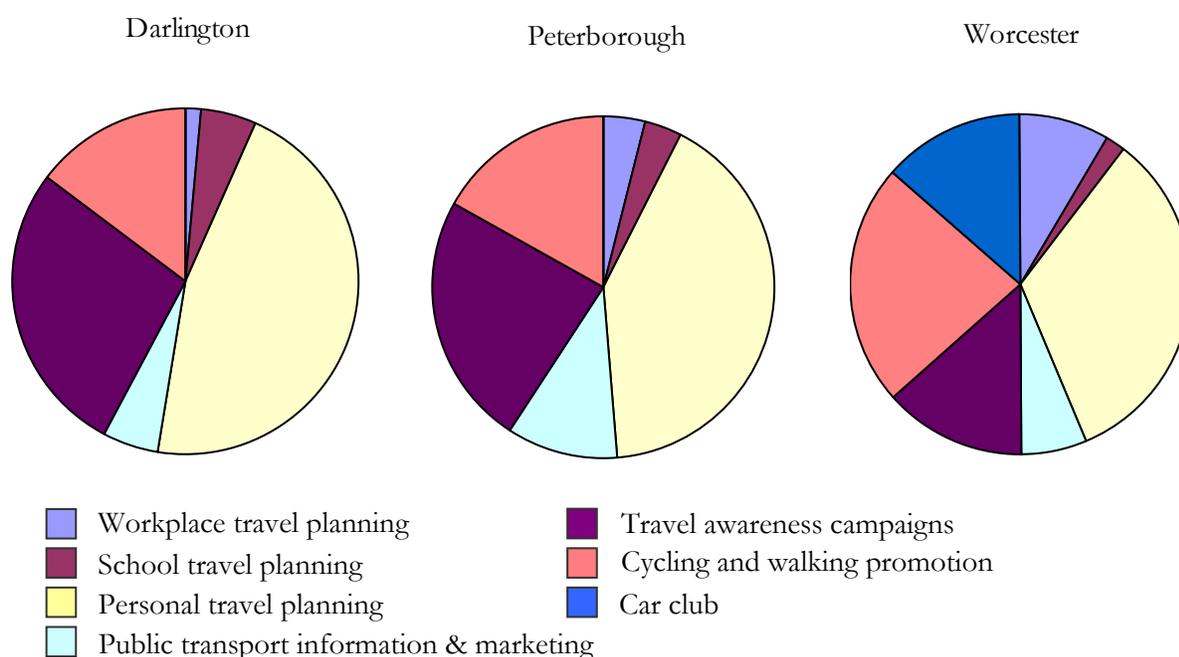
Note: proportions only take account of expenditure that could be directly allocated to a specific smart measure, and therefore exclude local authority staff costs and 'other' costs

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[5] In practice, this represents only between 40% and 60% of the estimated total revenue expenditure. Of the remainder, 30-40% was for local authority staff costs in managing and delivering the programme; and 10-20% was for a variety of other costs including monitoring, travel behaviour research, training, accommodation, general media work and traffic management support (RR3.5.2).

[6] These figures are not a complete reflection of the amount of 'effort' allocated to measures such as workplace travel planning, which required significant amounts of local authority staff time. Although it was not possible to break down the total figure for local authority staff costs into amounts for each individual measure, we were able to estimate the proportion of local authority staff costs allocated to workplace travel planning and personal travel planning. If these estimated staff costs are taken into account, revenue expenditure on workplace travel planning increases slightly to about 4-10% of costs, while revenue expenditure on personal travel planning falls to about 19-32% of costs.

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6.   Outputs: the type of activity and its scale

The principal outputs from the main strands of the Smarter Choice Programmes in the three towns were as follows:

6.1   Workplace travel planning

Workplace travel planning had begun to engage employers covering slightly over 30% of the workforce in all three towns by mid-2008, this being between 25 and 52 organisations per town (Figure 3)[7]. Between a third and half of organisations had become involved via the planning process. It was estimated that, by mid-2008, 11-12% of the workforce worked for an organisation with a 'fully-fledged' travel plan (RR4.2). This relatively low percentage reflected difficulties reported by the local authorities in fully engaging employers in workplace travel planning, bearing in mind the proportion of effort and budget available.

Figure 3: Proportion of the workforce engaged in travel planning in 2008
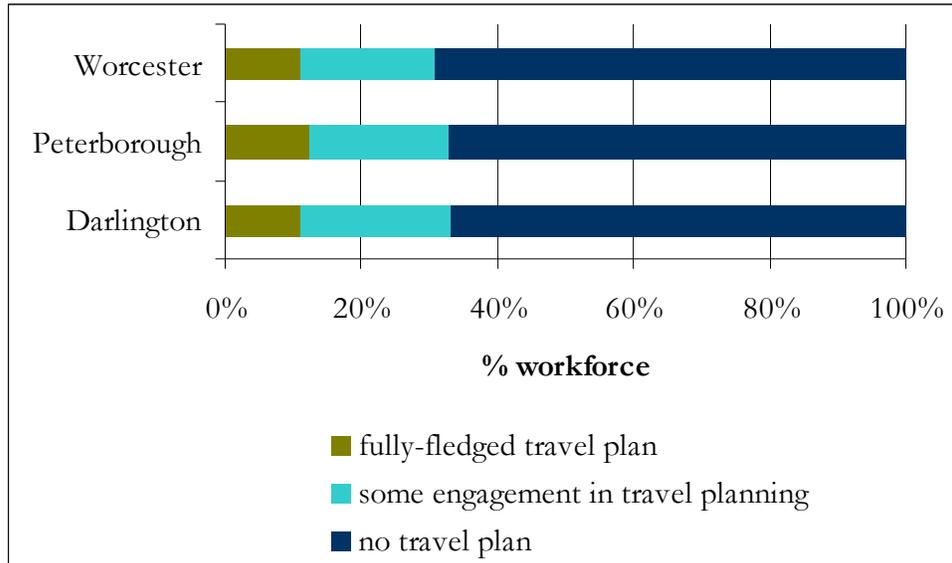
Notes: Figures are estimated from approximate size of workforce in each town and number of employees at all organisations engaged (either 'fully-fledged' or 'some engagement') in each town. These were: Darlington: 25 organisations employing 11,000 people; Peterborough: 52 organisations employing 32,000 people; Worcester: 32 organisations employing 15,000 people

The cost per employee in engaged organisations was between £9 and £14 over the five-year programme, or approximately £2 to £3 per year (RR4.3.3). Support available to employers varied between the towns, and included: assistance in undertaking surveys; advice on developing a travel plan; access to a travel plan network; employer green travel award

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[7] Figures for the proportion of the workforce covered by travel planning are based on information on approximate numbers of employees at each organisation with which the local authorities were working, reported in more detail in RR4.2.1. Engaged organisations ranged in size, although greater effort had generally been focussed on larger organisations. Both private and public sector organisations were targeted. For more detail on the scale and nature of the initiatives in the three towns, see RR4.

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scheme; grants for sustainable travel improvements; discounted bus ticket schemes; new bus services (a commuter bus and a shuttle bus to a park-and-ride site); cycle to work promotions; workplace cycle training; cycle loan schemes; a visiting cycle repair service; access to a city-wide car share scheme organised via Liftshare; travel advice sessions; and customised travel guides to key worksites (RR4.1).

The workplace travel interventions had mainly focussed on commuting, with only limited examples of efforts to tackle business travel (RR4.1.5).

6.2   School travel planning

School travel planning had started to engage schools covering 85-100% of primary/nursery pupils and almost 100% of secondary pupils by mid-2008, with the total number of schools engaged being between 34 and 53 per town (Figure 4). However 'engagement' was at various levels, and the proportion of pupils covered by a school travel plan that was judged by officers to be comprehensive (that is, with an active plan, many initiatives, and a safe walking and cycling environment) varied from 24% to 58% (RR5.2). The capital cost per pupil targeted ranged from £30 to £50 over the five-year programme, or £7 to £11 per pupil per year. Revenue costs per pupil targeted were £7 to £21 over the five-year programme, or approximately £1 to £4 per pupil per year (RR5.3.3). All the towns felt that the Government's capital grants for schools with travel plans had played a key part in the strategy for engaging schools.

Figure 4: Proportion of pupils covered by school travel plans in 2008
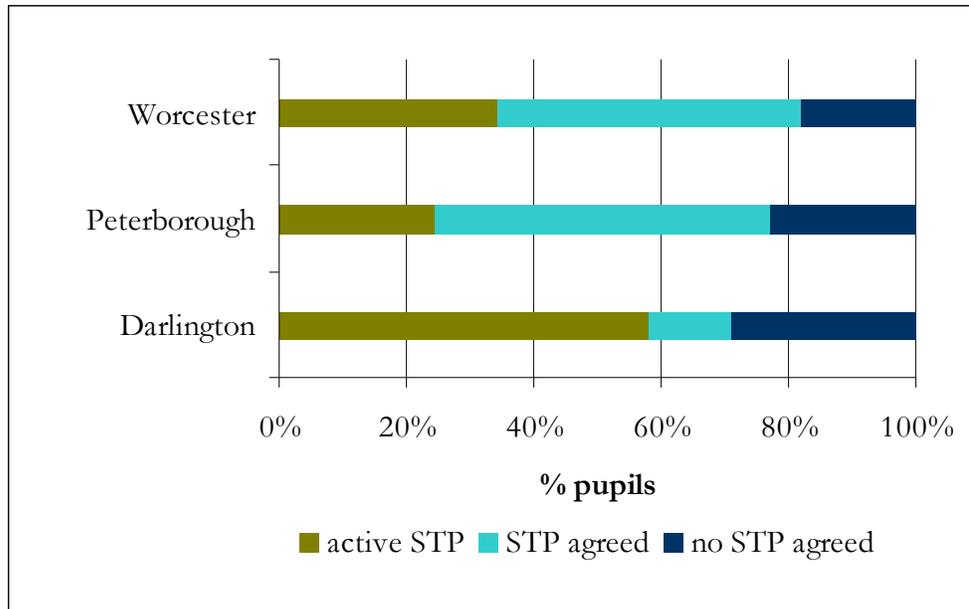
Notes: Base: Darlington 36 schools and 13,741 pupils; Peterborough 65 schools and 26,530 pupils; Worcester 33 schools and 15,780 pupils. Schools with 'no STP agreed' include both those with which there had been no engagement, and those that had been contacted and had started to develop school travel work, but had not yet finalised their school travel plan.

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The importance attached to investment in 'safer routes' highways infrastructure varied, with Darlington and to some extent Peterborough placing greater emphasis on this than Worcester. Support offered to schools varied between the towns, but included: assistance with pupil surveys and writing the school travel plan; a school travel plan award scheme; provision of cycle parking; cycle training; cycling promotion (*Bike It*); Dr Bike sessions; bikers' breakfasts; cycle loan schemes (for teachers and parent-and-child tandems); pedestrian training; assistance setting up walking buses; promotional activities such as *Medal Motion, Walk on Wednesdays, Walk to School Week, Wheelie Wednesdays* etc; lesson activities and participation in assemblies; and visiting theatre productions on school travel issues (RR5.1).

6.3   Personal travel planning

In terms of its budget, the personal travel planning programme was the largest element of the strategies in all three towns. It targeted 50% to 100% of households. Between 41% and 69% of households were successfully contacted, and between 22% and 45% of households consequently received a range of intervention materials to encourage more sustainable travel (Figure 5) (RR6.2).

Figure 5: Proportions of households targeted, contacted, and receiving intervention materials via personal travel planning
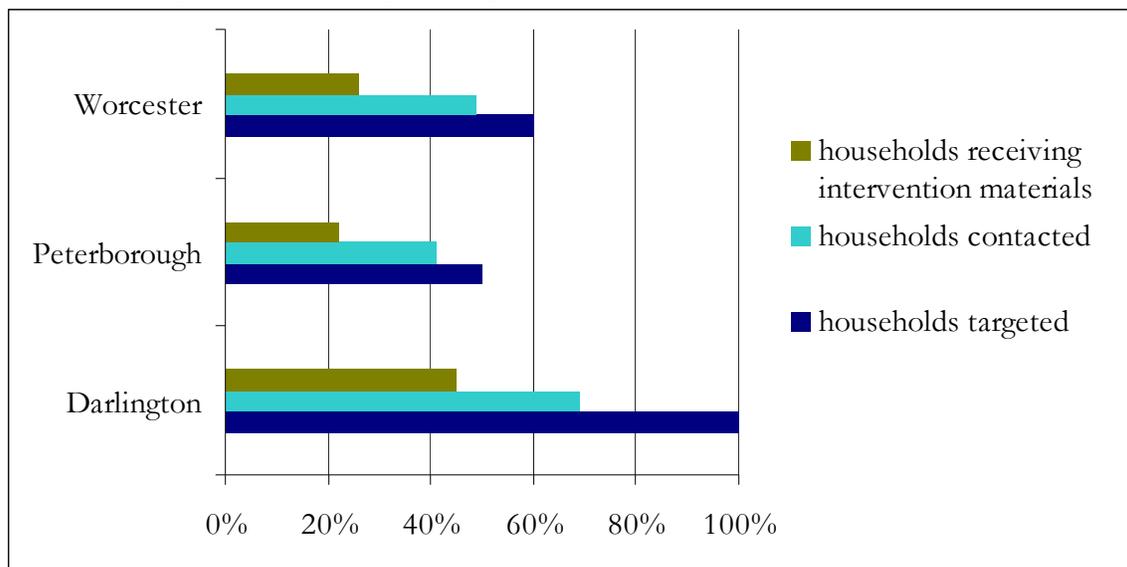
Notes: Base: Darlington 37,877 households (100% of households in town); Peterborough 30,006 households (50% of households in city); Worcester 23,504 households (60% of households in city).

The cost of the programme (including contractor costs, materials costs and staff costs but not monitoring) was about £16 per individual contacted, or roughly £3 per year (assuming UK average household size) (RR6.3.3).

A wide range of information resources and services were offered to households (RR6.1). These included: town-wide and neighbourhood walking, cycling and public transport maps or guides; walking information (e.g. leisure walks leaflets; information about walking groups

and events; leaflets on walking for health and setting up a walking bus); cycling information (e.g. cycle maps; guides to neighbourhood cycle routes; information about cycle loans, cycle training, taking a bike on the train, choosing a bike and cycle maintenance); cycling services and equipment (cycle training, cycle loan scheme, bike health check, LED cycle lights, cycle trip computer); public transport information (e.g. bus map; area guides to bus services; bus stop-specific timetables; personal journey plans; rail timetables; information about *Text and Go* service; information about railcards and concessionary fares); a free bus pass for a limited period; travel information for people with mobility problems (e.g. about Shopmobility and transport to healthcare); information about eco-driving and car-sharing; and loyalty scheme pledge cards and challenges.

6.4   Public transport information and marketing

Public transport information and marketing activities were town-wide, and hence potentially affected all residents of the three towns[8]. Revenue-type promotional and marketing activities cost between £2 and £3 per head of population over the five-year programme (RR7.3.3), or approximately 40-70 pence per head of population per year. Peterborough and Worcester also made substantial capital investment in public transport (park-and-ride services, bus stop improvements, bus priority measures, high quality vehicles, real-time passenger information and public transport information centre). This cost £26 to £29 per head of population over the five-year programme (RR7.3.3), or approximately £5 to £6 per person per year.

While all three towns undertook public transport information and marketing programmes, activity was most intensive in Peterborough and Worcester (RR7.1, RR7.2). Whilst initiatives varied between towns, information provision included upgrading the interchange and timetable information at bus stops; public transport guides which were distributed to households via the personal travel planning programme; development of information centres or hubs; and introduction of real-time passenger information. Marketing included improvements to the 'legibility' and branding of the bus network, to make it easier to understand (e.g. with colour-coded branding on vehicles, timetables, stops and publicity), and, in Worcester, several large marketing campaigns to support the introduction of new services. Ticketing integration was achieved through the introduction of multi-operator tickets; and a variety of fares discounts were introduced.

As well as information and marketing, improvements were made to the bus services themselves (RR7.1, RR7.2), sometimes led by the operators and sometimes part of initiatives led by the local authorities. In Peterborough and Worcester, there were significant improvements in service quality, including more frequent/regular services on main routes. Low-floor accessible vehicles were progressively introduced. Driver training in Peterborough and a bus charter in Worcester aimed to improve the passenger experience.

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[8] There is evidence from one of the towns, Peterborough, to suggest that awareness of some of the information materials was high. A brand awareness survey of 890 Citizen Panel members in Peterborough in 2007 found that awareness of various public transport information materials ranged from 16% to 71% of respondents. For information services (such as the *Travelchoice* information centre, real-time passenger information, and Text & Go information to mobile phones) awareness ranged from 10% to 44%.

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6.5   Cycling and walking promotion

Cycling and walking promotion was town-wide, and hence potentially influenced all residents of the three towns. Revenue spending on walking and cycling information materials, events, adult cycle training and staff costs was about £3 to £5 per head of population over the five-year programme (RR8.3.3), or approximately 60 pence to £1 per head per year. This was complemented by capital investment. Capital spending on cycling was substantially higher in Darlington (the Cycling Demonstration Town), at £14 per head of population over the five years, while it was £3 to £6 over this period in the other two towns, equivalent to £2.80, £1.20 and 60 pence per person per year. Capital spending on walking was between £1 and £5 per head of population over the five years in the two towns for which data were available (RR8.3.3), equivalent to between 20 pence and £1 per person per year.

Revenue-type interventions to encourage cycling and walking included production of cycling and walking information, including maps; a wide variety of cycling and walking events, including cycling festivals and guided rides and walks; cycle training (principally for children, but also offered to adults in Darlington and Worcester); and cycle loan schemes in Darlington and Worcester. All the towns expanded their cycle parking (with the greatest increase in Darlington). Peterborough experimented with branding of two walking and cycling routes, and Worcester developed branded cycle signs. Towards the end of the Sustainable Travel Town programme, Darlington embarked on a major branding and signing programme for seven radial cycle routes (RR8.1).

Darlington began with very little cycle route infrastructure, but developed a far more coherent cycle network during the course of the Sustainable Travel Town programme due to extra funding reflecting its status as a Cycling Demonstration Town. Darlington's town centre was also pedestrianised during the Sustainable Travel Town period. Peterborough already had an extensive network of off-road cycle routes, and saw relatively little change in cycling and walking provision during the course of the Sustainable Travel Town programme. Worcester initially had better provision for cycling than Darlington, although with a shortage of utility routes. In Worcester, the Sustainable Travel Town programme helped secure lottery funding towards a pedestrian/cycle bridge, which was due to be built towards the end of the Sustainable Travel Town period (RR8.1).

6.6   Travel awareness campaigns

The cost of travel awareness campaigns in the three towns was about £3 to £8 per head of population over the five-year programme, or about 50p to £1.60 per head per year (RR9.3.3).

All three towns developed a clear brand identity for their programmes. They used this on a comprehensive set of printed information materials (including bus maps, bus stop timetables, cycling maps, walking maps, neighbourhood guides etc), and also on their websites, on advertising materials, on buses, and in PR and press work. Information was distributed through many outlets, including community centres, libraries, shops, workplaces, schools, festivals and events, Tourist Information Centres and travel information centres, hotels and GP surgeries, as well as being offered directly to households via the personal travel planning programme. All three towns also put effort into creating a steady stream of

publicity and media coverage for their work, both by generating stories for the media and through a radio 'jingle' (Darlington), advertorial, posters and banners, stunts, events and displays (RR9.1, RR9.2).

Two towns developed an ongoing engagement with residents through a *Local Motion Club* (Darlington, over 10,000 members) and a *Good Going* pledge and loyalty card (Peterborough, over 5,000 members). These schemes enabled the smarter choices teams to keep in touch with residents, telling them about new sustainable travel initiatives, and providing incentives and special offers to encourage green travel behaviour.

Public awareness of the campaigns was higher in Darlington and Peterborough (with brand recognition of 67-75%) and somewhat lower in Worcester (37%) (RR9.2)[9].

7. Outcomes: the effects of the activity on travel patterns

7.1 Data sources

The primary source of evidence on changes in people's travel patterns in the three Sustainable Travel Towns was the household travel survey, carried out in Autumn 2004 and repeated in Autumn 2008 in all three towns, with over 4,000 respondents in each town for each survey (RR13). In relation to personal travel planning activities, smaller interim household surveys were also conducted at several stages during the course of the Sustainable Travel Town programme. Details of sample size, response rates and methodology are given in RR13.1, RRA13.1 and RRA13.8.

At the aggregate level the household survey had sample sizes of over 25,000 people and 75,000 trips, divided into the three towns and two time periods. These sample sizes are generous by the standards of much social research (voting intentions are usually based on surveys of about 1,000, for example). The sample of people represented 3-5% of the study area populations and was sufficient to provide 95% confidence intervals of around +/- 2% in each town for each date.

In practice, we have found that most differences from 2004 to 2008 that are actually big enough to be interesting or of any practical importance, have been detected with a reasonable level of statistical confidence when using the pooled data. Not all, however, can be disaggregated with confidence to each town separately, or to further dimensions of interest such as person type, mode and journey purpose. Therefore we have given much

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[9] The awareness levels in Darlington and Peterborough appear fairly typical of awareness levels resulting from similar publicity campaigns elsewhere. For example, the brand for the Nottingham *Big Wheel* public transport information and marketing campaign was recognised by 67% of city residents two years after it began (survey of 1,200 residents); brand awareness for *ACT ON CO_2*, launched in September 2008, peaked at 64% in March 2009 (with awareness of the *ACT ON CO_2* logo peaking at the same time at 54%, and recognition of the *ACT ON CO_2* car purchasing campaign rising from 22% to 66% as a result of TV being added to the media mix; evaluation of the *are you doing your bit?* campaign (launched 1998) found that, following the initial year, there was 86% recognition of the campaign adverts.

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attention to strengthening confidence in the results by use of independent data from other sources.

Analysis of the household surveys was therefore combined with detailed examination of a number of secondary sources:

- automatic vehicle counts and manual car and taxi counts in all three towns (RR17);
- bus passenger boarding data for all three towns (RR14);
- automatic and manual counts of cyclists in all three towns (RR15);
- manual counts of pedestrians crossing a town centre cordon in Darlington and several screenlines in Peterborough (RR16).

In most cases, these monitoring data were not collected by the towns for the express purpose of measuring changes arising from the Sustainable Travel Town programme, and hence suffered from limitations in relation to count location, timing and continuity. For example, much greater monitoring of pedestrian flows – particularly in the residential locations where walking was most likely to have increased – would have been valuable. Nevertheless, the monitoring data offered a rich temporal sequence, which provided both a check of the validity of the household travel survey results and an understanding of the timing of change. This latter, in particular, assisted us in drawing inferences as to possible explanations for the observed changes.

We also obtained from the local authorities all available monitoring data in respect of journeys to school and work:

- workplace travel surveys at employers engaged in travel planning, in each year for which they were conducted since 2005 (Peterborough only, since, with the exception of County Hall in Worcester, organisations in the other towns had not conducted more than one survey) (RR11);
- school travel surveys for each school, in each year that they were conducted since 2004 for all three towns (RR12).

Finally, we compared the results in the three towns with available data from the National Travel Survey and National Road Traffic Estimates, to take account of evidence of wider national trends. For National Travel Survey data, we obtained special tabulations for medium-sized urban areas with a population of 25-250,000 (the most relevant geographical unit in the National Travel Survey)[10]. For National Road Traffic Estimates, data for urban A-

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[10] Inevitably, there are some differences between the survey methods used in the towns, and in the national benchmark sources. As outlined in RR10, considerable care was therefore taken to analyse the benchmark data in order to generate a robust picture of trends. For example, in Tables 1 to 4, the trends in medium-sized urban areas from the National Travel Survey use data for individual years (e.g. 2008 compared to 2004). Alternative approaches considered in RR10 include using data for three-year bands to increase sample size. While this alters the precise numbers, it does not substantially alter the trends. Due to a design change in the National Travel Survey in 2007, there are concerns that short trips (particularly for walking) were under-reported in 2007 and 2008, and so we examine changes in walk and cycle trips in medium-sized urban areas for the period 2004 to 2006 as well as 2004 to 2008.

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roads and urban minor roads was examined (RR10). Benchmarking against national trends is particularly relevant for the traffic data, given the economic circumstances occurring towards the end of the Sustainable Travel Town programme.

For every data set used, we found issues relating to its specific characteristics and comparability, including the weighting of the travel surveys, geographical coverage of the counts[11], definitions, and dates. We have taken account of these issues in the analysis, and this is reflected, where appropriate, by quoting results in the form of ranges[12] and by examining data from multiple sources in order to assess the coherence of the 'story' that emerges.

7.2   Trends by mode of travel

Figure 6 provides an overview of the changes in trip-making patterns in the three towns, based on the household survey data. It should be noted that this shows changes in absolute trip numbers per person (*not* percentage changes). We discuss below the detailed evidence in relation to travel by car, bus, cycling and walking, including the relative changes in travel by each mode.

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[11] As far as possible, count data were for the main urban areas of the towns. However, the distribution of traffic and cycle count sites meant that coverage was not comprehensive (though care was taken to exclude counts that fell substantially outside the urban boundaries). For walk data, the areas monitored in both Peterborough and Darlington were relatively central. For bus data, for Darlington, it was only possible to get data for borough-wide bus boardings, rather than for the subset of routes that served the main urban area.
[12] Where we quote ranges for results from the household surveys, these reflect the difference between results using weighted data and results using unweighted data (for explanation of the reason for this, see Section 1). Ranges that are reported for counts of traffic, cycling, walking etc. reflect results from different sources (e.g. more than one screenline) or different analyses of the data.

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Figure 6: Changes in numbers of trips by residents between 2004 and 2008
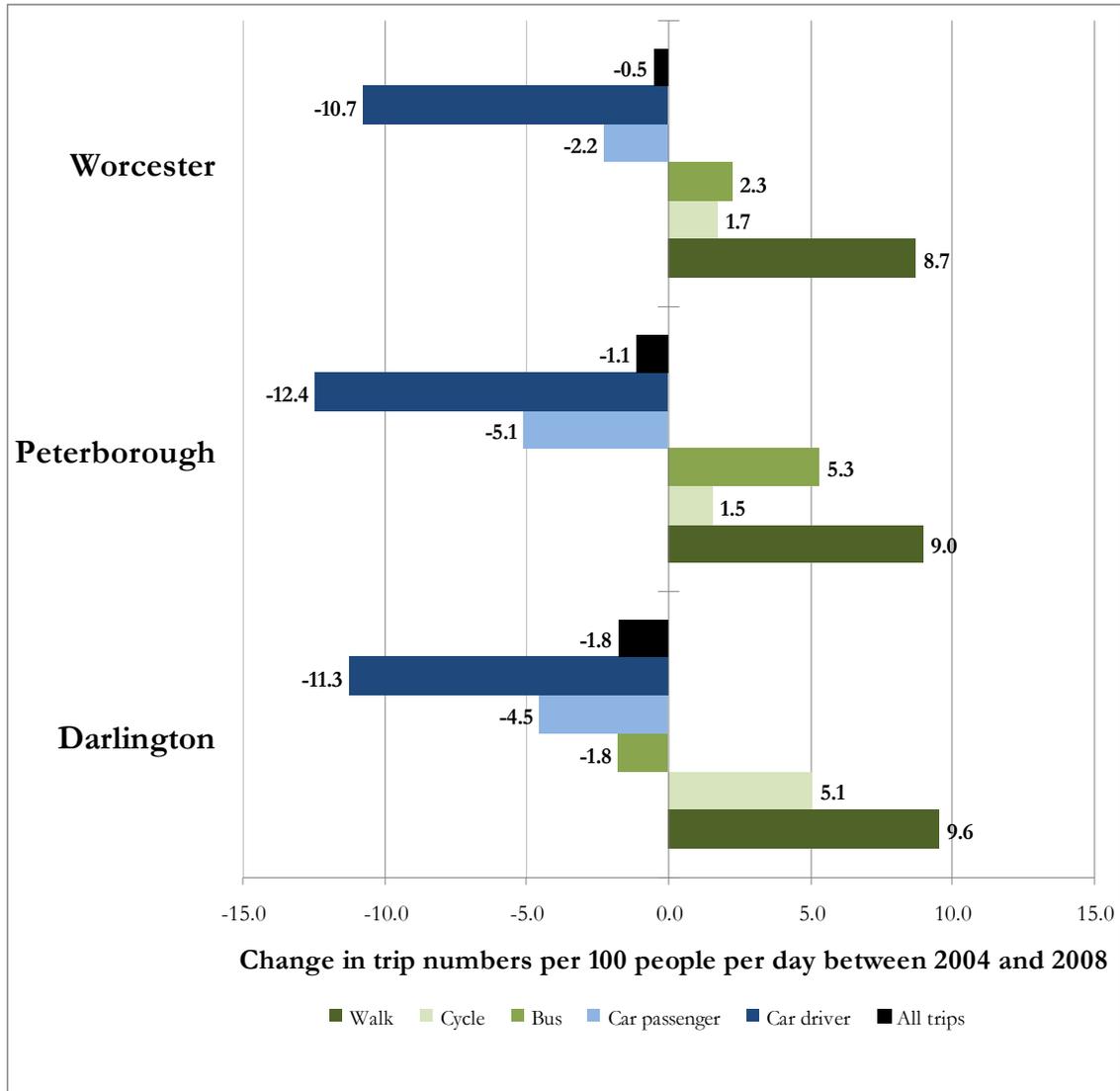
Notes: Data are numbers of trips of <50km, weighted dataset. Base: between 11,954 and 12,909 trips by approximately 4,000 respondents in baseline and ex-post surveys in each town. Trips by other modes not shown for purposes of clarity. For an indication of scale of change, absolute number of trips <50km per 100 people per day in 2004 (aggregated dataset)=292, of which walk=72; cycle=9; car driver=124; car passenger=63; bus=20; train=1; other=3.

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7.2.1 Car travel

Car driver trips per resident of the three towns taken together fell by 9% between 2004 and 2008, whilst car driver distance per resident fell by 5%~7% (household travel survey; trips of 50km or less; RR13.2)[13]. Car use per head also fell nationally in comparable (medium-sized) urban areas during this period, but by a much smaller amount: a change of -1.2% for car driver trips and -0.9% for car driver distance (National Travel Survey data; all trip lengths; RR10.2.2)[14]. Traffic count data showed variable results in different areas of the three towns, with overall reductions of the order of 2%, and more substantial reductions in inner areas, of the order of 7-8%, taking place prior to the economic downturn (RR17.2). It is expected that traffic counts would show smaller changes than the household surveys, due to the presence of non-local traffic (unaffected by the interventions in the towns); population growth in Peterborough and to a lesser extent Worcester; and employment growth in Darlington. Further reductions in the order of 0.5-1% in overall traffic levels in the towns were then observed from automatic count data in the last six months of the Sustainable Travel Towns period. This is in line with the reductions in traffic showing in the National Road Traffic Estimates (RR10.3.2).

We describe below the key results for each town, starting with results from the household surveys, and followed by information from automatic and manual traffic counts.

The count data suffer from various limitations: they include travel by non-residents and, in the case of the automatic counts, commercial traffic (neither of which were the target of the Smarter Choice Programmes); they have incomplete geographical coverage, sometimes with few or even only one counter in key locations; and, in some cases, they show volatile changes within which the interpretation of general trends is very sensitive to the methods used for combining the data. We have consequently erred on the side of caution in our analysis, examining several possible methods for combining data and reporting the results from all of these.

The key results reported below are generally statistically significant to the 90% confidence level or better. An overview of the results from different sources is shown on Table 1.

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[13] All household survey results quoted in this and succeeding sections are for changes between Autumn 2004 and Autumn 2008, for trips of <50km, which includes all trips made by residents within the towns and to surrounding areas, but not the rarer trips to more distant destinations. Figures are quoted for trips of <50km because longer journeys were not the target of the Sustainable Travel Town programme; the inclusion of longer journeys would make any results less comparable with the other data sources (which all measured traffic within the towns); and given the use of a one-day travel diary, the sample of longer distance trips was much smaller, and therefore subject to random statistical variation shown in large and inconsistent changes in these small numbers. Some additional analysis was done on these longer trips, included in the full report, which does not change the conclusions reported here. Where ranges are reported (e.g. X%~Y%), the two figures show the results using weighted or unweighted data. If no range is given, results using weighted and unweighted data were the same, except in a few instances where it is specified that the analysis used the weighted data only.

[14] That is, in an index with 2004=100, car driver trips per person per year were 98.8 in 2008, and car driver distance per person per year was 99.1 (National Travel Survey, medium-sized urban areas 25-250,000 people). Note that in this and succeeding sections, the household survey results from the towns are derived from travel diaries which are broadly comparable, but not identical, to the diaries and methodologies used for analysis of the National Travel Survey. Key differences are highlighted in the footnotes to Tables 1-4.

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Table 1: Evidence on car driver trips and traffic

	Household surveys ##		Traffic counts (manual and automatic)#			Possible explanations for trends
	Trips per person	Distance per person	Inner area+	Outer area+	Overall change	
National trend	-1.2%	-0.9%			-0.5% (car traffic) -0.7% (all vehicles)	
Sustainable Travel Towns	-9%	-5%~-7%				
Darlington	-7%~-10%	-6%~-7%	-6.7% to -5.3%	+1.6% to -0.2%	-2.4% to-3.2% (all vehicles)	Employment growth of 10% during the STT period (often in peripheral business parks) may have led to inward commuting by non-residents, masking reductions in residents' car travel
Peterborough	-8%~ -10%	-7%~ -10%	-7%	-1%	-2.4%	Population grew by >6% during STT period, so city-wide fall in car traffic of 2.4% equivalent to *per capita* reduction of ~8%
Worcester	-8%~ -10%	-3%	-8% (consistent fall from start of data in 2005/06)	Growth until 2006/07, then fall of -1.0% to -1.8%	Growth until 2006/07, then fall; -1.9% to -2.6%	Only one non-peripheral counter, meaning that the 'overall' change may be an underestimate of actual reductions.

See following page for notes to this table.

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Notes to Table 1:

Figures are percentage changes (*not* %-point).

Household surveys for 'national trend' are from special tabulations of National Travel Survey for medium urban areas (25,000-250,000 population), for trip stages and trip stage distances, comparing 2008 to 2004. Household surveys for the Sustainable Travel Towns: change figures are for ex-post survey in Autumn 2008, compared to baseline survey in Autumn 2004; base = all trips under 50km; range shows variation between weighted and unweighted data (where no range given, both weighted and unweighted data returned same result). Note that the 50km filter on trip distances was not applied to the NTS data. Unlike the situation in the three towns, we have no reason to assume that changes in trip numbers and distances recorded in NTS data would be skewed to changes in particular journey distance bands.

Traffic counts: where ranges are given in the count data, the larger reductions include the effects of the changing economic situation, whilst the smaller numbers do not (except for the values in inner Darlington, where the situation reverses). Darlington data are from automatic counts of all vehicles. The two figures given correspond to the change in May to October averages (2004 to 2008) and the change in annual totals (May-April, 2004/5 to 2008/9), with only the latter therefore including the period of economic decline. (April 2004 data were not available). Worcester data are from automatic counts of all vehicles. The two figures given correspond to the change in Q1-Q3 totals and the change in annual totals (specified as April-March), with comparisons from the time period specified to 2008/9, with only the latter therefore including the period of economic decline. Peterborough data are from manual counts of cars and taxis, since automatic counter data did not become available until March 2006 (though cross reference between the two sources was done for the relevant period). Note that manual counts are of a more limited nature than automatic counts. Values given here are for the change between 2004 and 2008, with the large majority of counts done between March and October, therefore excluding the main period of economic decline.

Count data for 'national trend' are from National Road Traffic Estimates for urban areas. Figures for car and taxi traffic are for Q2 and Q3, 2004 to 2008 (to match the main dates when manual counts of car traffic occurred in Peterborough). Figures for all vehicles are the change between 2004/05 and 2008/09 (and correspond to the greater reductions given in the ranges for Darlington and Worcester, except for the inner Darlington figure). (For more details, see RR17).

+ Definitions of 'inner' and 'outer' areas were determined by the available data – and, in particular, count site location. In Darlington, the 'outer' area was defined as sites around the periphery, together with the use of an 'other' area category (between inner and outer). In Peterborough, the term 'outer area' was used more generally, to mean the whole area outside the inner area. In Worcester, other than one central automatic counter, seven automatic counters were all located around the periphery, and these peripheral sites were used to generate the 'outer' area values. Further explanation is given in RR17.

Employment growth in Darlington (+9.6%) and Peterborough (+7.5%) during Sustainable Travel Town period was substantially greater than the national trend (GB total employee jobs increased by 2.3% between 2004 and 2008, based on Annual Business Inquiry data). There was a drop in employee jobs in Worcester over this period (-4.2%). Population growth in Peterborough was substantially greater than the national trend (GB population increased by 2.5% between 2004 and 2008).

Darlington The household survey data show a reduction in car driver trips per resident of 7%~10%, and car driver distance of 6%~7%. The automatic traffic counters suggested that, across the town as a whole, total traffic levels fell by 2.4%-3.2% between 2004 and 2008 (with the lower figure pre-dating the economic downturn). Prior to the economic downturn, in inner Darlington, there was a reduction of 6.7%, whilst counters around the perimeter of Darlington appeared to show a small increase of about 1.6%. (Traffic around the perimeter

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subsequently declined, possible due to economic reasons, whilst there was some growth in the inner area, probably due to traffic redistribution caused by roadworks.)

One possible explanation for the difference between the traffic counts and the household survey is that employment growth of 9.6% occurred during the Sustainable Travel Town period, concentrated in peripheral business parks, which would have generated some inward commuting by non-residents, partially masking reductions in car travel by residents (RR13.3.1; RR17.2).

Peterborough The household survey data show a reduction in car driver trips per resident of 8%~10%, and car driver distance of 7%~10%. Peterborough's population grew by more than 6% during the Sustainable Travel Town period, so the expected reduction in total car traffic by residents, after allowing for population growth, would be substantially less than this.

In terms of changes in observed traffic flows, in the inner area, car traffic fell by 7% between 2004 and 2008, reversing a trend of rising car traffic between 2002 and 2004. In the outer area, there was a reduction in car traffic between 2004 and 2006 followed by some increase, which, overall, resulted in a traffic reduction in the order of 1% prior to the economic downturn. The greater reduction in car use on trips into the inner area is consistent with these being better served by public transport (RR13.3.2; RR13.7; RR17.3). An estimate of the change in overall traffic levels in the town, based on the relative distribution of population, suggests that this would equate to a 2.4% reduction in traffic levels prior to the economic downturn.

Worcester The household travel surveys show a reduction in car driver trips of 8%~10%. However, compared to the other two towns, the car driver trips affected were particularly short, such that car driver distance per resident only fell by 3%[15]. This is reasonably consistent with the automatic traffic counter data (RR13.3.3; RR17.4), which show a 2.6% reduction between 2006/7 and 2008/9 (with a reduction of 1.9% when comparing Q1-3 of 2006 with Q1-3 of 2008). This followed an earlier period of traffic growth.

The one centrally located counter, which began operation in 2005, shows a consistent reduction between 2005/6 and 2008/9 of 8%. Meanwhile, the other seven counters, located around the periphery of the city, suggest that traffic grew between 2004/5 and 2006/7, and then fell by 1.8% between 2006/7 and 2008/9 (or -1.0% when comparing Q1-3 of 2006 with Q1-3 of 2008).

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[15] This appears largely to be a consequence of a substantial increase in car driver distance for commuting in the 10-50km distance band (see RR13.5), partially offsetting the general fall in car driver distance for other journey purposes and distance bands. We speculate that this may be a consequence of increased out-commuting by residents, as Worcester was the only one of the three towns where employee jobs fell between 2004 and 2008 (-4.2%).

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7.2.2 Bus travel

Bus use grew substantially in Peterborough and Worcester during the period of the Sustainable Travel Town work, whereas it declined in Darlington. According to the household travel survey data, between 2004 and 2008, bus trips per resident of the three towns taken together increased by 10%~22% (trips of 50km or less; RRA13.5), whereas, according to the National Travel Survey, there was a national decline of bus trips in medium-sized towns of 0.5% over the same period (RR10.2.2).

Table 2 summarises the changes in bus use in the towns.

Darlington Bus boardings decreased by 13% between 2004/05 and 2008/09, although the household surveys suggest that there may have been a smaller decline (change of -6%) or even an increase in bus trips (change of +11%), depending on whether the weighted or unweighted data are used. (This was one of the very few examples where the weighting made a substantive difference to the results.) The apparent mismatch may be because the bus boarding data is for the whole borough (including services outside the urban area, and trips by people living outside the town), whereas the household survey data is for residents of the town. Competition between two major bus operators in Darlington meant that it was more difficult for the local authority to effectively encourage bus use than in the other towns, and limited the data available for analysis.

There are indications that personal travel planning may have helped to slow the rate of decline in bus travel, but this and other marketing interventions were insufficient, in the absence of more substantial changes to the bus offering, to bring about a large-scale increase in bus travel (RR14.2.5, RR14.5).

Peterborough Bus passenger growth occurred throughout the Sustainable Travel Town period, and bus boardings there increased (+40%) between 2004/5 and 2008/9. Bus trips by residents of the city, as measured by the household survey, also increased (+36%~+43%). Detailed analysis suggests that a proportion of the growth in bus use is likely to have been the result of population growth and concessionary fares (25-30%)[16], while personal travel planning may have contributed about another 25% of the growth. The remaining 45-50% of the growth may then be attributed to a combination of service restructuring, which created the right conditions for growth, followed by intensive effort to provide better public transport information and integrated tickets, and supported by regular service enhancements (RR14.3.5, RR14.5).

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[16] In assessing the proportion of overall growth due to concessionary fares, we took into account the substantial growth in bus use by non-concessions (56% of the growth in bus travel on the main *Citi* services came from increased ticket sales to non-seniors) and the fact that the 'senior' market was growing prior to the changes to the concessionary fare scheme (between 2004/5 and 2005/6, before the introduction of free travel for over 60s, sales of senior tickets increased by 20.7%).

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Table 2: Evidence on bus travel

	Household surveys##		Bus boardings (patronage) data #		Possible explanations for trends
	Trips per person	Distance per person	Change in bus boardings	Timing of change	
National trend	-0.5%	+12%			
Sustainable Travel Towns	+10%~ +22%	+30%~ +41%			
Darlington	-6%~ +11%	+14%~ +29%	-13%	Bus boarding data suggest decline in bus use may have stabilised in 2006	During the period 2004-2007 lack of cooperation between bus operators made it more difficult to encourage bus use. Post-2007 one operator took over all commercial services, reorganising the whole of the urban bus network and introducing new higher quality buses in the summer of 2008, just two months prior to the 2008 household travel survey. Personal travel planning may have slowed the decline in bus travel, but this and other marketing initiatives were insufficient, in the absence of service enhancements, to increase bus use
Peterborough	+36%~ +43%	+54%~ +56%	+40%	Growth occurred throughout the period of the STT work	Indicative estimates suggest that 25-30% of growth may have been due to external factors (population growth and concessionary fares); 25% due to personal travel planning; and 45-50% due to service restructuring, regular service enhancements, information, and ticketing integration
Worcester	+17%~ +24%	+30%~ +46%	+27%	Growth mostly occurred before mid-2006, and patronage stabilised thereafter	Launch of new orbital bus service, marketing, fares initiatives, route improvements and first wave of personal travel planning appear to have generated early bus patronage growth. After mid-2006, personal travel planning may have played a role in maintaining bus use, but was not able to generate significant growth

Notes: Figures are percentage changes (*not* %-point). ## Household surveys for 'national trend' are from special tabulations of National Travel Survey for medium-sized urban areas (25,000-250,000 population), for trip stages and trip stage distances, comparing 2008 to 2004. Household surveys for the Sustainable Travel Towns: change figures are for ex-post survey in Autumn 2008, compared to baseline survey in Autumn 2004; base = all trips under 50km; range shows variation between weighted and unweighted data (where no range given, both weighted and unweighted data returned same result). Note that the 50km filter on trip distances was not applied to the NTS data. Unlike the situation in the three towns, we have no reason to assume that changes in trip numbers and distances recorded in NTS data would be skewed to changes in particular journey distance bands.
Bus boardings data are for the period 2004/5 to 2008/9. For Peterborough and Worcester, data are for ticket sales for the bus routes serving the main urban areas. For Darlington, where only limited data were available, data are for bus boardings within the borough, and are therefore for journeys both within and beyond the urban area.

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Worcester Bus patronage increased markedly in the period from 2004 until mid-2006, and thereafter stabilised. Bus boardings increased (+27%) between 2004/5 and 2008/9, as did bus trips by residents of the city, as measured by the household survey (+17%~+24%). Most of the growth in bus boardings pre-dated the changes to concessionary fare eligibility in 2006[17]. It appears that the main reasons for the increase in patronage between April 2004 and mid-2006 were a series of marketing and fares initiatives, coupled with the launch of a new orbital service and improvements to some routes, and the first wave of personal travel planning. After mid-2006, personal travel planning may have played a role in maintaining bus patronage, but did not generate further town-wide increases in bus travel (RR14.4.5, RR14.5).

7.2.3 Cycling

There were positive results for cycling in all three towns, with particularly substantial growth in Darlington. According to the household travel survey data, between 2004 and 2008, cycle trips per resident of the three towns taken together increased by 26~30%, whereas, according to the National Travel Survey, there was a national decline of cycle trips in medium-sized towns over an approximately similar period (RR10.2.2).

Table 3 summarises the changes in cycling in the three towns.

Darlington The household surveys show an approximate doubling of cycling levels amongst Darlington residents: cycle trips per person increased by 89%~113%, and distance cycled increased by 76%~112%. Town-wide automatic cycle counters show an increase in cycle activity in the order of 50-60% between 2004/5 and 2008/9, while town centre cordon data shows growth of 84-116%. Growth started from about 2006. Before that date, cycling in Darlington had been relatively stable. The growth in cycling in Darlington appears to have started after the town was designated a Cycling Demonstration Town (in October 2005). There was a substantial growth in cycle counts from Spring 2006, which may be attributed to non-infrastructure interventions (cycling events, information resources, cycle initiatives at schools, cycle parking), and a further rapid growth from Spring 2008 following completion of a number of cycle infrastructure improvements from mid-2007 (RR15.2.4, RR15.2.5).

Peterborough According to the household surveys, cycle trips per person in Peterborough increased by 10%~17%, and distance cycled increased by 23%~38%. This is less evident from the count data. Automatic and some manual count data show relatively stable cycling levels across the town as a whole from 2004, following an earlier (pre-2004) decline in cycling levels. Screenline manual count data indicate that cycling levels increased by 11% near the city centre. Part (but not all) of the reason for this may be the increase in population to the south of the city. Peterborough officers considered that cycle count sites were poorly located to detect any increase in cycling in the city, and this may be a reason for the disparity with the household survey data (RR15.3.4, RR15.3.5).

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[17] Between 2006/7 and 2008/9 (i.e. in the period after the extension of concessionary fares for the over-60s), bus use actually declined by 1.2%. The trend in this period appears to be partially comprised of a drop in non-concessions ticket sales, balanced by an increase in concessionary tickets, though the 'mirroring' of the trends indicates that this may be partly due to ticket swapping – i.e. people who had previously bought a non-concessionary ticket swapping to buying a concessionary ticket (presumably because of greater awareness of the opportunity, or because the saving was significantly greater).

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Table 3: Evidence on cycling

	Household surveys ##		Manual / automatic counts #		
	Trips per person	Distance per person	Change in counts	Timing of change	Possible explanations for trends
National trend	-9%*	-17%*			
Sustainable Travel Towns	+26% to +30%	+28% to +32%			
Darlington	+89% to +113%	+76% to +112%	+51% to +57% (town wide automatic counts) +84% to +116% (manual counts at town centre cordon)	Cycle flow stable from 2001 to 2005. Steady growth thereafter, but two main surges in Spring 2006 and Spring 2008	Darlington became a Cycling Demonstration Town in October 2005. Surge in Spring 2006 most likely due to intense promotional activity (e.g. events, information resources, increased cycle initiatives at schools, increased cycle parking) supported by first phase of personal travel planning. Surge in Spring 2008 follows increased delivery of cycle infrastructure.
Peterborough	+10% to +17%	+23% to +38%	Broadly stable cycle levels town-wide (following previous decline of 20-30%). +11% in the central part of the town**	Decline in cycling between 1998 and 2002-2004; levels broadly stable from then onwards	Sustainable Travel Town work probably helped to halt the previous decline in cycling. Increases in cycle flows in central area may partly be due to housing growth in the southern part of the city.
Worcester	+11% to +23%	-14% to +2%	+16% (town-wide automatic counts)	Cycle flow stable prior to STT work. Increase mainly between Summer 2004 and Summer 2005, subsequently sustained	Main phase of growth may be due to marketing, publicity and some infrastructure improvements; personal travel planning may have made some contribution in certain locations and at certain times.

See following page for notes to this table.

Notes to Table 3:

Figures are percentage changes (*not* %-point).

Household surveys for 'national trend' are from special tabulations of National Travel Survey for medium-sized urban areas (25,000 – 250,000 population), for trip stages and trip stage distances, comparing 2008 to 2004. Household surveys for the Sustainable Travel Towns: change figures are for ex-post survey in Autumn 2008, compared to baseline survey in Autumn 2004; base = all trips under 50km; range shows variation between weighted and unweighted data. Note that the 50km filter on trip distances was not applied to the NTS data. Unlike the situation in the three towns, we have no reason to assume that changes in trip numbers and distances recorded in NTS data would be skewed to changes in particular journey distance bands.

* This was the change between 2004 and *2006* (not 2008), as there are concerns that short trips were under-recorded in NTS data in 2007 and 2008. Reductions between 2004 and 2008 were greater for cycle trips (-34%) and cycle distance (-28%). The small sample sizes for cycle trips in the NTS make these data vulnerable to year-to-year fluctuation. Use of three year bands still suggests a fall in the number of cycle trips nationally (-6% between 2002-4 and 2004-6), whilst it is possible that distance cycled nationally was roughly constant over this period. For the period 2002-4 to 2006-8, both cycle trip numbers and distances decline, though this may be due to the under-recording in 2007 and 2008.

Count data for the Sustainable Travel Towns are drawn from both manual and automatic counts (for details see RR15).

** Pre-Sustainable Travel Town trend is from two different sets of manual counts. Growth in central part of town is from manual counts. Stable town-wide cycle levels are from automatic counter data.

Worcester Cycle trips per person increased by 11%~23%, although distance cycled did not increase, and may have fallen (with a change of -14%~+2%). This appears to be because the growth in shorter cycling trips (up to 3km) took place in parallel with small reductions in longer cycling trips (3-10km). It may be that the initiatives adopted in Worcester were more effective in stimulating short cycling journeys, rather than longer ones, because better information about local destinations resulted in shorter trips. Automatic count data show a town-wide increase in cycling of approximately 16% between 2004/5 and 2008/9 (principally in the early part of this period), following a period of stable cycle levels before the Sustainable Travel Town programme began (RR15.4.4, RR15.4.5), with particularly significant increases in summer cycling.

7.2.4 Walking

Walking trips by residents grew in all three towns during the period of the Sustainable Travel Town work. According to the household travel survey data, between 2004 and 2008, walk trips per resident of the three towns taken together increased by 10%~13%, whereas, according to the National Travel Survey, there was a national decline in walk trips in medium-sized towns of at least 9% over an approximately similar period (RR10.2.2).

Table 4 summarises the results with comments and interpretation.

Darlington Household surveys suggest that residents made an increased number of walking trips (+11%~+13%). Manual counts on routes into the town centre also show an increase in walking (+43% between 2004 and 2009[18]). This represents a change of trend, as the count data suggests that walking on routes into the town centre was declining before 2004. The apparently greater increase in walking on routes into the town centre, than in walking generally, would be plausible, suggesting a greater uplift in walking for journeys in parts of the town with a high 'walk potential' due to closely spaced destinations and less readily available car parking. Most of the growth in walking on routes into the town centre took place between 2004 and 2006, pre-dating the town centre pedestrianisation, and so the growth cannot be attributed to this. There is evidence that some of the growth in walking into the town centre may have been the result of personal travel planning, but this does not account for all the growth. General travel awareness campaigns may also have been a cause of early growth (in 2004-2005) and of continued growth in certain areas at other times (RR16.2.5, RR16.4).

Peterborough The household surveys indicate an increase in walking trips by residents (+15%~+20%). This is consistent with the results from three sets of manual count data which record walking trips in the inner urban area, and all of which show an increase of about +18% between 2004 or 2005 and 2008. Prior to 2004, manual count data suggest that walking levels were broadly stable. There is some evidence that certain phases of personal travel planning stimulated walking, but there are also increases in pedestrian counts at times and locations which do not seem to be related to personal travel planning, possibly indicating the effects of general travel awareness campaigns (RR16.3.4, RR16.3.5, RR16.4).

Worcester The household surveys suggest that walking trips by residents increased (+9%~+12%). No manual count data were available to corroborate this. However, interim household surveys, which compared changes in trips by residents in areas targeted by personal travel planning with those amongst residents in a control area, suggest that the change in walking trips amongst residents targeted by personal travel planning was of the order of +15%, while the change in control areas of the city was about +7%. As in Darlington and Peterborough, this suggests that the increases in walking in Worcester may have been due to a combination of personal travel planning and other activities (RR16.4).

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[18] The reported figure of +43% excludes data from one site that shows a large and unexplained drop in flows, which is likely to be due to changes in location. If this site is included, the increase in walking is 25%, though this is considered to be a less reliable estimate.

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Table 4: Evidence on walking

	Household surveys ##		Manual counts #		Possible explanations for trends
	Trips per person	Distance per person	Change in counts	Timing of change	
National trend	-9%*	-12%*			
Sustainable Travel Towns	+10%~ +13%	+18%~ +27%			
Darlington	+11%~ +13%	+15%~ +20%	+43% on routes into town centre	Walking counts were declining prior to STT work. Most growth in walking on routes into town centre took place between 2004 and 2006	Examination of timing and location of increases in walking count data suggest that part of the growth in walking into the town centre may be attributed to personal travel planning. General travel awareness campaigns may have been a cause of early growth (in 2004-5) and of continued growth in certain areas. The main increase in walking occurred before town centre pedestrianisation, and so the growth in walking into the town centre cannot be solely attributed to this.
Peterborough	+9%~ +14%	+14%~ +33%	+18% in the inner area	Walking levels were declining prior to STT work. Growth at different times in different locations, but throughout STT project	Part of the growth in walking may be attributed to personal travel planning, but this does not account for all of the growth. General travel awareness campaigns may have been cause of growth between 2004 and 2005 (prior to personal travel planning), and also of growth at times and places that cannot be related to personal travel planning.
Worcester	+9%~ +12%	+25%~ +29%	No manual counts		Comparison of changes in walking in personal travel planning target areas and control areas suggests personal travel planning contributed some, but not all, of the growth in walking. Other interventions may also have had an effect (e.g. physical improvements, travel awareness campaign, school travel work).

See following page for notes to this table.

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Notes to Table 4:

Figures are percentage changes (*not* %-point).

Household surveys for 'national trend' are from special tabulations of National Travel Survey for medium urban areas (25,000 – 250,000 population), for trip stages and trip stage distances, comparing 2008 to 2004. Household surveys for the Sustainable Travel Towns: change figures are for ex-post survey in Autumn 2008, compared to baseline survey in Autumn 2004; base = all trips under 50km; range shows variation between weighted and unweighted data. Note that the 50km filter on trip distances was not applied to the NTS data. Unlike the situation in the three towns, we have no reason to assume that changes in trip numbers and distances recorded in NTS data would be skewed to changes in particular journey distance bands.

* This was the change between 2004 and *2006* (not 2008), as there are concerns that short trips were under-recorded in NTS data in 2007 and 2008. Reductions between 2004 and 2008 were greater for walk trips (-17%) and similar for walk distance (-13%).

Manual counts are for the period 2004 to 2009 (Darlington) or 2004 to 2008 (Peterborough).

7.3 Trends by journey purpose

For travel to school and, to some extent, travel to work, we had access to information on changes in travel patterns, in the form of school and workplace travel surveys. These enabled us to understand the variation in behaviour change at the level of individual schools or organisations. We also undertook analyses of changes in car driver mileage by journey purpose, using the household travel survey. In this section, we examine the organisation-level evidence in relation to commuter travel and school travel. Findings on town-level changes in car driver mileage by journey purpose are given in section 8.

7.3.1 Commuter travel

In Peterborough (the only town with a substantial amount of workplace travel survey data), roughly two-thirds of organisations that had undertaken repeated workplace travel surveys had been successful in reducing car driver commuting (RR11.2.2). Amongst the two-thirds of organisations that were successful, the overall reduction in cars per 100 staff was 8.4%. Across all organisations with survey data, the overall reduction was 3.5% (RR11.2.3). By comparison, car driver mode share for trips to work in medium-sized towns was broadly stable over the corresponding period (RR10.2.2).

Only two of the towns, Peterborough and Worcester, had workplace travel monitoring data to enable an organisation-level evaluation of changes in commuter travel patterns. In the case of Worcester, this was for one organisation only, County Hall. There, car trips to work fell by 5% (from 83.3 to 79.0 cars per 100 staff) between 2004 and 2007 (RR11.3).

In Peterborough, mode share data from at least two annual travel surveys was available for 19 organisations[19]. These covered approximately 14,500 employees (that is, roughly 15% of the entire workforce, or 45% of employees at organisations that had become engaged in workplace travel planning). Of the 19 organisations, seven had achieved reductions in the number of cars per 100 employees of 10% to 20% between their first and most recent monitoring surveys[20]. Six organisations had achieved a smaller reduction of between 0% and 10%. At one organisation there was no change, and at five organisations, car use had increased (Figure 7) (RR11.2.2).

Figure 7: Change in commuting by car at organisations with monitoring data in Peterborough
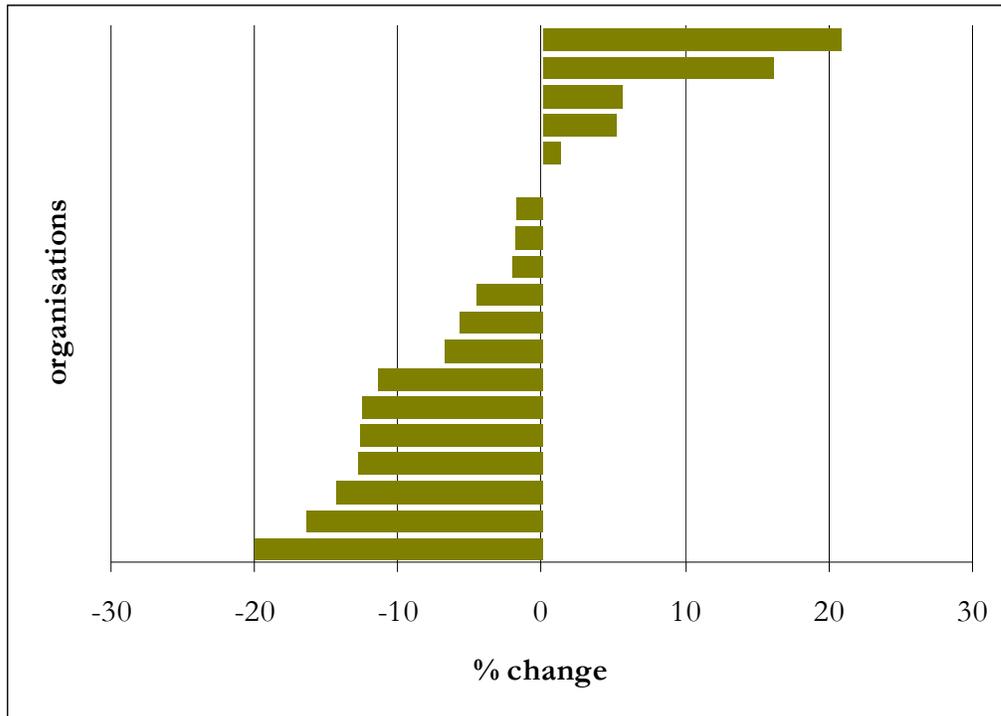
Notes: Chart shows percentage change (*not* %-point change) in the number of employees travelling to work as a car driver, for 19 organisations for which at least two monitoring surveys were available, between earliest and most recent surveys. Survey data recorded whether employee travel mode was 'drive alone' or 'car share'. We have assumed that half of all employees reporting that they 'car shared' were travelling as a car driver.

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[19] The organisations included a broad range of types and sizes. While the main focus was on larger organisations, some smaller ones were also engaged, and organisation size ranged from under 50 staff to several thousand staff. There were both public and private sector organisations, and location ranged from city centre to peripheral business park. The largest absolute reductions in the number of cars being driven to work were at the city council (1640 city centre-based staff); a business park (with about 2500 employees); a regional college (over 700 staff); and two medium-sized private sector organisations (with 550 and 275 staff, respectively).
[20] Surveys were at various dates, with earliest surveys between 2005 and 2007, and most recent surveys between 2007 and 2009.

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Across all 19 organisations, there was a 3.5% reduction in cars per 100 staff (weighted by employee numbers, and equivalent to a reduction from 75.7 to 73.0 cars per 100 staff). For the 'successful' organisations (i.e. those that had achieved a reduction in car use), there was an overall 8.4% reduction in cars per 100 staff (equivalent to a reduction from 78.5 to 71.9 cars per 100 staff) (RR11.2.3). Active travel (i.e. walking and cycling) increased at 12 of the 19 organisations (RR11.2.4). Meanwhile, car mode share for the journey to work amongst Peterborough residents, as measured by the household survey, fell from 64% to 61% between 2004 and 2008 (RR13.5).

Efforts to reduce car commuting in Peterborough were – roughly speaking – successful in about two-thirds of the organisations which became sufficiently engaged to carry out workplace surveys, covering 8% of the entire workforce. While the household travel survey seems to indicate a general trend away from car commuting across the Peterborough population (not attributable solely to workplace travel planning, but possibly attributable to the Smarter Choice Programme as a whole), *some* organisations engaged in workplace travel planning achieved substantially larger reductions in car use than the Peterborough-wide average, and it seems plausible that these were the result of workplace travel planning.

The overall reduction in car use in Peterborough (and at Worcester County Hall) was lower than that shown by other studies of workplace travel planning (e.g. Cairns et al., 2004, which found a mean reduction in car commuting of 17.8% across 26 organisations with workplace travel plans in seven case study local authorities) (RR11.5). We hypothesise that, in the case of Peterborough, this may have been because the city's particularly low levels of congestion (and, indirectly, the desire of the local authority to maintain high levels of car 'accessibility') meant that there was little 'push' to commuters to try alternatives to driving, and that this made the work to reduce car commuting in Peterborough especially challenging (RR11.5).

7.3.2 Travel to school

In all the towns, most schools (between seven and eight out of 10) demonstrated a decline in the number of pupils travelling to school by car (RR12.2.5; RR12.3.5; RR12.4.5). The overall reduction in car use for the journey to school was between 9% and 17% in the three towns[21]. Active travel to school increased in all the towns. By comparison, car passenger mode share for trips to school in medium-sized towns also fell between 2004 and 2008, but by a smaller amount of 7% (1.6%-points) (RR10.2.2).

All three towns had annual monitoring data on school travel over several years for a majority of their schools, although with some data gaps.

In **Darlington**, monitoring data were available for 31 out of 36 schools in the urban area, covering 95% of pupils. During the period of the Sustainable Travel Town work, roughly speaking, 70% of schools experienced a fall in car use, and 30% experienced an increase. Overall levels of car use for the journey to school fell by 9-10% (from 27.2 to 24.8 cars per

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[21] Figures quoted here are derived from school travel survey data, various dates, by use of two calculation methods in each town. The quoted range is between the mean of the results from the two calculation methods in Darlington (9.3%) and the mean of the results from the two calculation methods in Worcester (16.7%).

100 pupils)[22]. Meanwhile, cycling (a particular focus of school travel work in Darlington because of its Cycling Demonstration Town status) increased from around 1% to over 6% of trips to school. Almost all schools achieved an increase in cycling. In some schools, this was partially or wholly due to a transfer from walking, though in other schools, walking increased too. Overall, there was a net increase in active modes of travel (i.e. walking and cycling) of 2-8% (or 1-5%-points, with the range depending on the baseline survey dates and method of calculation) (RR12.2.5)

In **Peterborough**, monitoring data were available for 62 out of 67 schools in the urban area, covering 96% of pupils. During the period of the Sustainable Travel Town work, the proportion of schools experiencing a fall in car use was similar to that in Darlington: that is, roundly 70%, as compared to 30% which experienced an increase. Overall levels of car use for the journey to school fell by 11-15% (from 35.3 to 31.3 cars per 100 pupils), and active modes of travel rose by 8-12% (or 4-7%-points). This was largely due to an increase in walking. The small number of schools which were felt by officers not to have become engaged in the travel planning process nevertheless appeared to have seen reductions in car use, and increases in walking, that were comparable to the average for all schools. It is possible that this was an effect of the other travel behaviour interventions in Peterborough (RR12.3.5).

In **Worcester**, monitoring data were available for 32 out of 36 schools, covering 82% of pupils. Roughly speaking, 80% of schools experienced a fall in car use, and 20% an increase, during the Sustainable Travel Town period. Overall levels of car use for the journey to school fell by 12-21% (from 30.3 to 23.8 cars per 100 pupils), and active modes of travel rose by 7-14% (or 4-7%-points), due to increases in both walking and cycling (RR12.4.5).

The reductions in car use for school travel in the three towns lie in the same range as the area-wide reduction in car use suggested in the original smarter choices report (Cairns et al., 2004), of 8-15%. The proportions of schools achieving reductions of different magnitudes (0-20%; >20%) are also similar (RR12.6.1). Figure 8 shows the range in changes in car use across all 125 schools in the three towns.

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[22] In all three towns, school travel surveys distinguished between pupils travelling by car as the sole passenger, and those travelling by car with other pupils. We have reported the number of cars per 100 pupils (based on the assumption that a 'car share' is equivalent to 0.5 cars) rather than car passenger mode share, because the former gives the more relevant measure in relation to wider impacts (traffic levels, congestion and emissions).

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Figure 8: Change in car use at all schools with monitoring data in the three towns
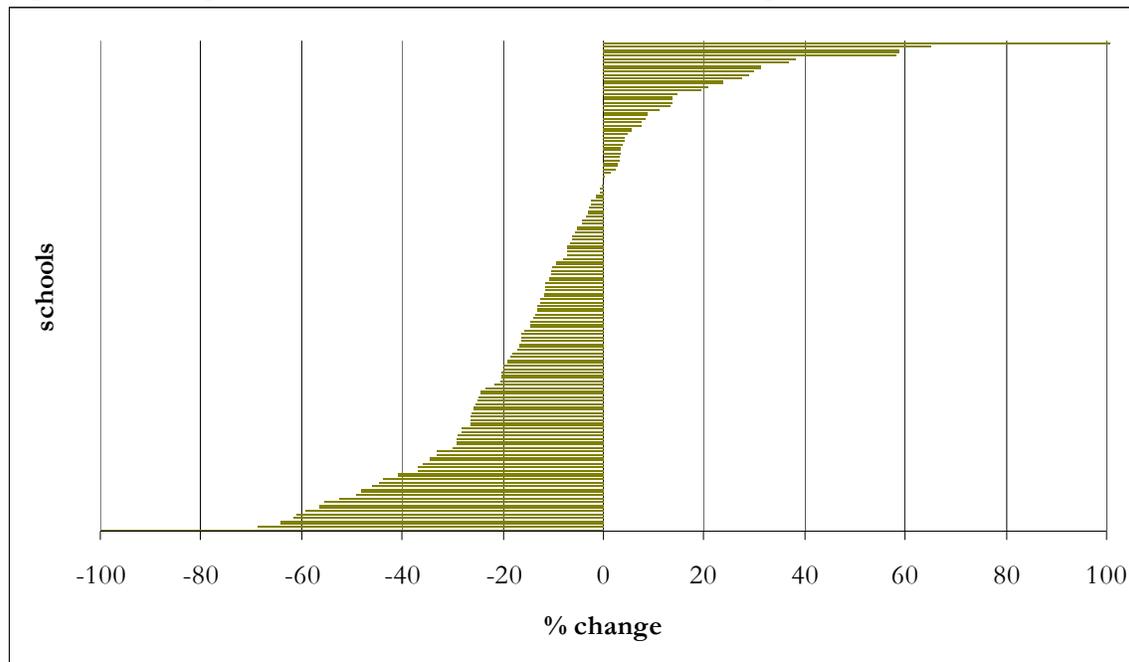
Notes: Chart shows percentage change (*not* %-point change) in the number of cars used for the journey to school, for all schools for which at least two monitoring surveys were available, between earliest and most recent surveys. 'Earliest' and 'most recent' surveys were at different dates in different schools. Base = approximately 10,000 pupils in 'earliest' and 'most recent' surveys in Darlington; 21-24,000 pupils in each survey in Peterborough; and approximately 11,000 pupils in each survey in Worcester. Survey data recorded whether pupil travelled by 'car alone' or as a 'car-share' with other pupils. We have assumed that a 'car-share' is equivalent to 0.5 cars. Note that schools with a large percentage increase in car use generally started from low baseline levels of car use, and so a large percentage increase represents a small %-point increase. For example, of the seven schools where car use increased by more than 30%, six had baseline levels of car use of under 10 cars per 100 pupils.

8.   Characteristics of the behaviour change in the three towns

We are able to draw the following conclusions about the nature of the behaviour change that occurred in the towns[23]:

- The growth in bus use, cycling and walking cannot be explained by trip generation. In fact, at the aggregate level, the total number of trips per capita by all modes, as recorded in the surveys, fell by 1.1% (RR13.2).

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[23] The conclusions in this section are based on differences between the patterns observed in the baseline household travel surveys and those with a comparable but different sample of people in the ex-post survey. This gives us some insight into *what* happened, but does not explain motivations or underlying reasons for travel behaviour change. A fuller understanding of this would require panel data and qualitative follow-up with individuals who had changed their behaviour.

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- The changes in travel behaviour have also been more complex than a simple mode shift from car to other modes for the same journeys. There were no longitudinal panel data to enable monitoring of shifts in specific journeys, and identification of precise locations of origins and destinations has not proceeded, though deeper analysis may be possible on that topic. Here, inferences have been drawn from the changing patterns of journeys of different lengths, modes and in total, bearing in mind that, while a shift in trip length definitely implies a shift in location, a stable trip length does not necessarily imply a fixed location. From the evidence that has been analysed, we infer that the travel behaviour change in the towns involved a combination of **mode shift** (with unchanged destination); **switch of destination and mode** (e.g. replacing a medium-length car trip with a shorter journey by foot, bike or bus); and **trip evaporation** (not making a trip at all). At the aggregate level, roughly 7% of the reduction in car use (including car driver and car passenger trips) was from a net reduction in trips[24]. In the absence of panel survey data, these observations must be considered indicative. Nevertheless, they are consistent with what we might expect from our knowledge of the interventions in the towns – including the emphasis placed on information about neighbourhood facilities (e.g. for shopping and leisure) through the personal travel planning programme, which might have been expected to encourage a certain amount of destination switching as people started using more local facilities instead of more distant ones (RR13.2; RR13.4).

- The percentage reduction in the number of car driver trips was greater, the shorter the trip. The household surveys showed a reduction of roundly 20% in car driver trips of less than a kilometre; 15% for trips of 1-3km; 10% for trips of 3-5km; and 5% for trips of 5-10km (these representing the distances of the majority of trips that stayed within the towns). There was also a reduction of around 3% in car driver trips for longer journeys of 10-50km, this being the distance corresponding with trips between the town and surrounding region. There was little or no reduction in car driver trips over 50km. This overall pattern is consistent with what might be expected from the focus of the policy initiatives in the towns, which was on regular and generally shorter trips (e.g. to work, school, shop etc) and with a greater emphasis on mode shift to foot, cycle and bus than to train (RR13.2).

- Although the largest behaviour changes were seen in short car driver trips, the largest reductions in distance travelled as a car driver came from medium and longer distance trips. Of the reduction in distance travelled for trips of <50km, about 45% of the reduction in car driver kilometres came from trips of 10-50km; about 40% from trips of

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[24] Using the aggregated dataset for the three towns, trips <50km, weighted, the number of trips per 100 people per day by 'car' (as a car driver or car passenger*)* fell by 15.4 between 2004 and 2008, while the number of trips by 'all other modes' increased by 14.3. The net change was 1.1 fewer trips per 100 people per day. This small reduction in the total number of trips made (from 292.1 to 291.0 trips per 100 people) accounts for 7% (i.e. roughly a fourteenth; *not* 7 %-point) of the total fall in car driver/car passenger trips.

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3-10km; and about 15% from trips of less than 3km[25]. The resulting contrast between the relative size of change as measured by trip numbers or distance travelled is shown in Figure 8. (RR13.2).

Figure 8: Change in car driver trips, according to distance

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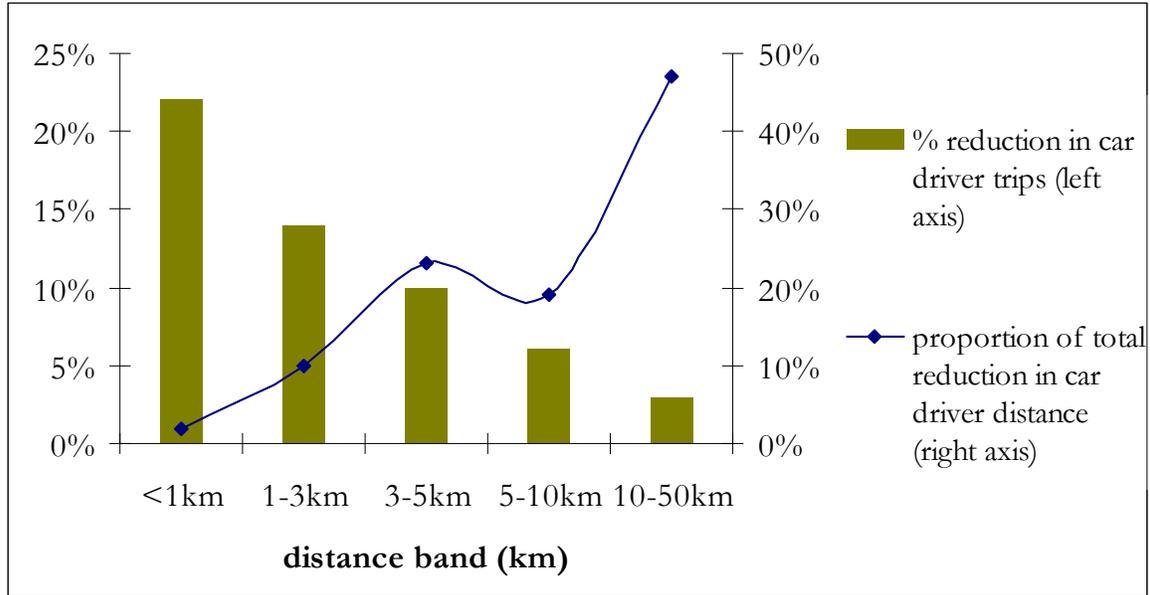
[25] Given the proportionately larger effect on distance of the 3% reduction in journeys in the 10-50km class, the question might be raised of whether this 3% is itself significantly different from zero, or from some other number, e.g. 2% or 4%, and if not, by how much the overall distance saved is changed by assuming another number instead of the 3% found, whether bigger or smaller. The answer in terms of the methodology of analysis used is that it would make no difference at all. This is because the starting point is the *overall* change in distance travelled, for the whole data set combined. This is the most reliable figure, and with the highest level of statistical confidence. Thus if one wanted to reduce or increase the change for one distance band, as a sensitivity test, one would have to increase or reduce the change for other distance bands accordingly. There would then be a different interpretation of which sort of journeys were most affected, but not of the total impact. (A small change in the 10-50km distance band would require a much larger offsetting change in the shorter journeys, say). Thus, asking whether the change in car driver kilometres in any one distance band is significantly different from zero, or from some other number, is interesting from the point of view of explaining the overall impact, but does not change the estimation of the size of the overall impact: each distance band has an error band but they are not independent of each other. Thus given the total effect, it is possible that there could have been a bigger contribution from the short journeys and a correspondingly smaller contribution from the longer journeys, or – equally likely – vice versa. It would not be correct to dismiss the smaller effects and then recalculate the total from the remaining bigger ones, since this would underestimate the overall result. This may be seen by considering the effect of dividing the whole set of results into very narrow distance bands of say one-tenth or one hundredth of a kilometre each. In that case, few, and at the limit none, would have had sample sizes sufficient for statistical confidence separately, but the overall result is unaffected. The observed effect in the 10-50km band is what the data show, and remains the best estimate.

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- The journey purposes that showed the largest *percentage* reduction in distance travelled as a car driver, across the aggregated household survey data, and looking at trips of under 50km, were education (-25%); work-related business (-23%); shopping (-14%) and leisure (-12%). However, education trips accounted for only a small proportion of total distance travelled. Hence, the largest contribution to the reduction in *total car driver distance* for trips of <50 km came from leisure trips (which contributed 45% of the total savings in car driver distance), shopping trips (30%) and work-related business (21%) (RR13.5).

- Looking at demographic characteristics, car driver mode share fell amongst both men and women (men: -7%, or -4%-points; women: -6%, or -2%-points). There was a reduction in car driver mode share amongst most age groups, which was typically around 6-12%. In all three towns, and in the aggregated dataset, it appears that the cohort of 41-45 year olds were less likely to reduce their car use. In two of the towns, and in the aggregated dataset, there were indications that 61-65 year olds were also less likely to reduce their car use (RR13.6).

- Some groups appear to have been more receptive than others to interventions to encourage less car use. Car driver mode share fell most amongst college students (-38%) and people looking for work (-30%), although these figures should be treated with some caution because the number of respondents in these two groups was fairly small. There were moderate reductions in car driver trips amongst retired people (-15%) and people on 'home duties' (-12%). Finally, car driver trips fell least amongst people in full-time work (-5%) or part-time/casual work (-2%).

- It is notable that the biggest behaviour change appears to have been amongst groups who were either at a point of change in their lives (e.g. at college, or looking for work, or age 66-70 and perhaps recently retired) or on a reduced income, or both. It is intuitively plausible, and consistent with previous research, that people who are in either of these situations are more likely to be receptive to changing their travel habits, if offered appropriate help and information (RR13.6)[26].

- In general, it seems that car driver trips fell least (in percentage terms) amongst those groups who used their cars more intensively: 41-45 year olds (with a car driver mode share of 62% in the 2004 combined dataset) and people in full-time work (with a car driver mode share of 68% in the 2004 combined dataset). However, even quite small percentage reductions in car driver trips in these groups may have a significant impact – a small reduction in a large number of car trips may have a similar or bigger effect than a large reduction in a small number of car trips. Thus, looking at the breakdown of car trips by employment status, it appears that, roughly speaking, nearly 40% of the reduction in car driver trips came from people in full-time work, and a similar proportion from retired people, with 10% coming from people on 'home duties' and the remainder coming from people who were looking for work, at college, or in part-time/casual work (RR13.6).

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[26]The reduction in car driver trips amongst 66-70 year olds is separate from the reduction in car use that might be expected amongst individuals as they age. Rather, the data suggest that the cohort of individuals aged 66-70 in 2008 drove their cars 14% less often than the cohort of individuals aged 66-70 in 2004.

A recurrent result that emerges from the observations above is that there are certain types of car trip, or people, which account for a large proportion of total car driver mileage at baseline, and a large proportion of the total change in car driver mileage, *even though the percentage reduction in mileage for the trip or person type is small.* Thus, car driver distance for trips of 10-50km was reduced by only 3%, but this contributed roughly 45% of the total reduction in car driver distance; and car driver mode share for full-time workers fell by 5%, but this contributed an estimated 40% of the reduction in car driver trips.

This is a notable finding suggesting that the contribution to traffic reduction is greater for these trips even when the focus of the measures chosen was more on shorter trips, and on journeys other than work. There are policy implications, which are discussed below.

9. Impacts in relation to social, economic and environmental objectives

Officers in the three authorities judged that the Smarter Choice Programmes in the towns made a positive contribution to social, economic and environmental objectives, and this seems borne out by our results. It was not possible to measure the long-term impacts of the programmes directly: that is, we were not able to measure a reduction in congestion and consequent economic benefit; or an increase in physical fitness and hence reduced incidence of ill health. However, we may infer that the outcomes in the three towns (that is, reduced car use and increased walking, cycling and bus use) would be likely, if sustained over the long term, to have a variety of positive impacts of this nature.

The potential social, economic and environmental impacts of the programmes in the three towns were examined in relation to the Department for Transport's high level goals[27].

9.1 Supporting economic growth

Car driver mileage by residents of the Sustainable Travel Towns fell by about 5%~7% (on trips <50km) during the course of the programme. This is likely to have helped reduce congestion and improve journey reliability. This is particularly likely to have been the case in the inner areas, where traffic count data shows reductions of the order of 7-8%.

Interventions targeted at school and workplace travel are likely to have been especially beneficial because of their effect on peak hour trips. Car use for the journey to school fell by between 9% and 17% in the three towns (as measured by school travel surveys), and car

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[27] *Delivering a Sustainable Transport System* (DfT, 2009) set out five high level goals for transport, which were: support national economic competitiveness and growth, by delivering reliable and efficient transport networks; reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change; contribute to better safety, security and health and longer life expectancy by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health; promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society; and improve quality of life for transport users and non-transport users, and promote a healthy natural environment.

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driver distance for commuting fell amongst residents of two of the towns (as measured by the household survey, trips<50km).

Large-scale Smarter Choice Programmes were partly seen by officers as a way of enabling employment growth, or housing growth, without creating unacceptable levels of congestion, and this seems to have been achieved, particularly in Darlington (where there was substantial growth in employment), and Peterborough (where both population and employment increased) (RR19.2).

9.2   Reducing carbon emissions

Estimations based on the household surveys suggest that the Sustainable Travel Towns programme resulted in annual per capita carbon savings of roundly 50kg of carbon dioxide in 2008, compared to 2004[28]. Grossing this up to town-wide level and accounting for increases in population, there was a combined saving of 17,510 tonnes of carbon dioxide per annum in 2008, across all three towns. The per capita figure only reflects reductions in car driver distance on journeys of less than 50km, but it is equivalent to a reduction in annual per capita emissions from car driving of approximately 4.6% for journeys of all lengths (RR18 and RR19.3).

9.3   Road casualties

The challenge for any town setting out to promote walking and cycling is to increase the level of active travel, whilst also securing ongoing reductions in road casualties. In the three towns, there were some notable successes in reducing absolute numbers of casualties, as in Worcester where substantial increases in walking were accompanied by reductions in all pedestrian casualties, including fatal and serious injuries; in Darlington, where a huge increase in cycling took place alongside a reduction in fatal and serious cycling injuries; and in Peterborough, where there was a reduction in overall cycle casualties that was not dissimilar to the national reduction, despite the town's growth in cycling in some areas. From such results, it is clear that increases in active modes need not inevitably be accompanied by increases in casualties. Moreover, in all three towns, the risk per kilometre walked or cycled reduced, in some cases very substantially. In most cases, though not all, the implied reductions in risk per kilometre were comparable to or greater than the implied reductions per kilometre occurring nationally. However, two of the towns did see increases in absolute numbers for some types of casualty, which were not reflected nationally. This implies that authorities setting out to encourage walking and cycling should support their promotional efforts with a strong programme of measures to improve the safety of active travel, such as 20mph zones, safe cycling infrastructure and other highways safety measures (RR19.4.1).

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[28] Our estimates used per capita changes in car driver kilometres for trips<50km from the weighted dataset, and emission factors published by Defra/DECC based on an average-sized car, to derive annual per capita carbon savings across all three towns, and for each town individually.

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9.4   Air quality

None of the towns had a traffic-related Air Quality Management Area, and hence none had an air quality dispersion model that might have enabled an assessment to be made of the effect of lower traffic levels on air quality. Nevertheless, there are likely to have been particular places (for example, in the inner areas of the towns) where roadside levels of traffic pollution would have reduced, with localised benefits. The overall impact on air pollution in the three towns would depend upon background levels, and the overall significance of local traffic to ambient air quality (RR19.4.2).

9.5   Increasing health

All three towns achieved increases in active travel, which are likely to have resulted in benefits to health. Between 2004 and 2008, the proportion of respondents to the household travel survey who did not walk or cycle (i.e. reported that they 'almost never' walked *or* cycled) fell by 11% (or 2%-points, from 23.4% to 20.9% of people, looking at the weighted data). The proportion that reported that they walked or cycled 'almost daily' increased by 6% (or 3%-points, from 46.6% to 49.4% of people) (RR19.4.3).

9.6   Promoting equality of opportunity

The towns identified several respects in which their programmes had promoted equality of opportunity, including reducing health inequality; widening employment opportunities by making it easier to reach workplaces without a car; improving pupil attendance at school; offering tailored travel information to people with mobility difficulties; working with disadvantaged communities to improve bus services and public transport information; offering specific services to people at risk of social exclusion; offering inexpensive travel options to people who could not afford to run a car; and sustaining and improving bus markets (RR19.5).

9.7   Improving quality of life

While it was difficult to quantify the extent to which the Smarter Choice Programmes had improved quality of life, there were a number of instances where officers in the towns suggested that there were likely to have been improvements. These included: making it easier to access a range of destinations; reducing disturbance caused by traffic; minimising the impact of travel on the natural environment, heritage and landscape; improving the experience of end-to-end journeys (with data suggesting increased satisfaction with public transport in two out of the three towns); reducing amenity problems caused by parking overspill around employers; improving work-life balance; and increasing social capital by encouraging community engagement. Quantitative and qualitative surveys in all the towns repeatedly demonstrated high satisfaction levels with the interventions: for example, customer satisfaction surveys in Worcester found that 70% of residents receiving personal travel planning information had found it 'helpful and useful'; and brand awareness surveys in Peterborough found individual information materials and services were rated as 'helpful' or 'very helpful' by between 54% and 96% of respondents (RR19.6).

10. Lessons for the management of large-scale Smarter Choice Programmes

The experience of the Sustainable Travel Towns in implementing their initiatives suggests a number of learning points for the management of effective Smarter Choice Programmes (RR21), which are outlined below.

10.1 Programme development and strategy

Delivery of effective Smarter Choice Programmes is **staff-intensive**. The teams delivering the programmes in the three towns were between six and 10 full-time equivalent staff, and all the towns acknowledged that these were not upper limits and they could readily have made use of greater capacity.

It took time to recruit an effective team and bring new recruits 'up to speed' (with recruitment of a full team typically taking between six months and a year). This pointed to the importance of **planning for a long-term programme** (i.e. at least the length of the programmes in the three towns), rather than expecting to achieve results within a couple of years. (Parallel work in London is emphasizing the importance of a planning phase prior to programme launch.)

It was valuable to **engage other partners** in the Smarter Choice Programme, potentially via the Local Strategic Partnership. Partners who played a particularly important role in the Smarter Choice Programmes in the three towns included the primary care trust, cycling organisations, and the public transport operators, but many other agencies also assisted with delivery of specific initiatives and information dissemination. This process can also help in persuading stakeholders about the value of this type of activity.

It was essential to **engage with elected members** at an early stage, and on an ongoing basis, so that they understood the value of the Smarter Choice Programme and were prepared to back it.

In all three towns, there was, to varying extent, a reluctance to implement **complementary measures to 'lock in' the traffic reduction** delivered by the Smarter Choice Programmes (e.g. bus lanes, parking charges, reallocation of road space). This ran the risk of dissipating the impact of the Smarter Choice Programme, by failing to provide ongoing incentives for residents to continue to use their cars less, or to discourage increases in traffic generated by more travel by people living outside the towns. However, there were some indications that a Smarter Choice Programme could help to create the political climate in which complementary measures (such as bus lanes and parking charges) would be supported.

10.2   Programme delivery

It was important to **invest in a strong brand** for the Smarter Choice Programme, with a clear local identity and a positive tone. A proactive press/PR strategy ensured extensive positive media coverage, and this was influential in gaining political support for the programme.

It was worth investing substantial effort in ensuring that **information and publicity materials were widely distributed**, using many outlets. These included websites, door drops, information counters, newsagents, community centres, employers, hotels, health centres, local radio, local newspapers, bus backs, bus shelters, billboards and town centre banners.

The towns used **innovative campaigns to celebrate sustainable travel** and capture the imagination. These helped to build a culture that was supportive of sustainable travel, by demonstrating that residents were prepared to take up these choices. Customer satisfaction surveys, local case studies and quotations from residents who participated in initiatives were all useful in demonstrating local support for the programme.

There were **clear synergies from a broad programme** in which a variety of smart measures were implemented under a common branding. Examples included residents who had heard sustainable travel messages through school travel work at their children's schools, and who were consequently receptive to engaging with the personal travel planning process; and the use of resources and products developed for one strand of the programme in another strand. There was evidence that changes in behaviour (e.g. increased bus use, or less car use for the trip to school) were due to combined impacts from more than one initiative.

The experience of the towns suggests that **programmes can be successfully targeted to encourage specific modes.** Comparing the towns' three programmes, there were some clear differences in focus, in terms of the staff resources or funding dedicated to particular modes of travel. Peterborough allocated substantially greater staff resource to public transport information and marketing than the other two towns (alongside substantial capital investment), while Darlington, which also became a Cycling Demonstration Town, allocated a comparatively high level of staff resources to cycling and walking, and invested substantially more per capita in cycling infrastructure. In both cases, this additional effort and resource paid off, in that it was reflected in the success of the relevant mode, with Peterborough achieving the most dramatic increases in bus travel, and Darlington enjoying the largest growth in cycling.

In terms of the weight given to specific types of smart initiative, the similarity of the programmes in the three towns makes it impossible to estimate quantitatively what might be the optimum balance of resources between different smart measures. All three towns made personal travel planning a cornerstone of their programmes, and saw this as working well with other initiatives. However, evidence from household surveys suggests that proportionately **greater investment in a systematic approach to reduce car use for travel to work,** especially for longer commuter trips (over 10km) has the potential to achieve substantial savings in traffic and carbon, which have not yet been realised in the

Sustainable Travel Towns. Our rationale for saying this is that car driver mileage for commuting accounts for a high proportion of overall mileage (43% for trips of <50km in 2004), and clearly therefore represents a significant potential 'prize' – that is, even small percentage savings would deliver large absolute car mileage reductions. The interventions in the towns were successful at reducing car driver kilometres for work in the shorter journey distance bands (<10km), where reductions in car driver mileage for commuting accounted for over a third (36%) of overall mileage savings. They were notably less successful in the longer distance band (10-50km), where car driver mileage for commuting increased in Worcester (although it fell in Darlington and Peterborough). This suggests that further work to design effective interventions targeted at longer commuter trips is needed. In section 11.2, we discuss what policy levers might be required.

Interventions targeted at specific modes are most effective when accompanied by improvements in quality. This was evidenced by the failure of personal travel planning and other promotional work to reverse the decline in bus use in Darlington in the absence of service improvements; the fact that growth in bus patronage in Worcester was not sustained beyond the period in which the main service improvements took place; and the fact that growth in bus patronage in Peterborough *was* sustained throughout the Sustainable Travel Town period, during which the initial bus service reorganisation was followed by a series of service enhancements. The evaluation also identified specific examples, in Peterborough and Worcester, where personal travel planning was particularly successful in encouraging bus use following the introduction of new services. There is similar evidence in relation to cycling. Darlington, the town where investment in improving cycle facilities was greatest, achieved by far the largest increases in levels of cycling. A **large-scale Smarter Choice Programme must therefore address both service quality (in marketing terms, the 'offer'), *and* information, marketing and promotion**, and is likely to require a combination of capital investment and revenue support. From a road safety perspective too, the experience of the towns underlines the importance of **supporting efforts to promote walking and cycling with a strong programme of improvements in the quality and safety of the walking and cycling environment.**

10.3   Programme evaluation and monitoring

The data collected as part of the Sustainable Travel Town programme provided insights into the effectiveness of the programme and pointers for development of even stronger programmes in future. In future programmes, deepened understanding might be obtained from **household surveys using a panel approach** and **use of data linkage to DVLA car mileage records.**

Other data sources (manual and automatic traffic and cycle counts; manual pedestrian counts; bus boardings) provide valuable corroboration of household surveys, and the evaluation and monitoring process for future programmes should include **development of a monitoring plan at the outset and ongoing checks of monitoring processes** to ensure that these data sources are available, that count sites are in optimal locations and that data collection is progressing as planned.

As part of the initial monitoring plan, future programmes should consider how data will be collected to measure the outcomes from individual smart measures. **Monitoring of workplace travel interventions,** in particular, requires a more systematic approach, probably including external commissioning of annual surveys, to overcome the failure of individual employers to carry out internal staff surveys.

Future programmes should also develop an **'initiatives diary'** or log, as a means of recording inputs (staff levels and expenditure), outputs (when and where activities were implemented, and at what scale), complementary outputs (i.e. by other agencies), significant changes in services or infrastructure, and potentially confounding events. This would enable a fine-grained analysis of the relative contributions of different measures, which, in turn, would assist in the design of effective programmes.

11.   The potential of large-scale Smarter Choice Programmes

11.1   Effectiveness and value for money

The large-scale Smarter Choice Programmes in the three Sustainable Travel Towns were successful in achieving travel behaviour change, and in particular, reducing the car driver trips and mileage travelled by residents, whilst encouraging substantial increases in the use of other modes. The focus of the programmes was almost entirely on within-town trips (and without similar exercises being carried out in neighbouring towns), and thus it is unsurprising that there was a greater effect on the numbers of shorter car driver trips than on longer ones. Although the Smarter Choice Programmes in the three towns were, in many respects, similar, there were some differences, and these give interesting results. In particular, where there was a focus on encouraging a particular mode of travel (as measured by staff resources, or funding allocated, or both), and where promotional measures were accompanied by improvements in the quality of the 'offer' (e.g. better bus services, or new cycle infrastructure), this yielded comparatively greater success. This was evident in Darlington in relation to cycling, and in Peterborough in relation to bus travel. This highlights the importance of considering Smarter Choice Programmes in a holistic way, encompassing service improvements as well as marketing.

A full estimation of value for money was outside the scope of this project. However, an approximate value for the congestion benefit can be calculated by updating the estimate made by Cairns et al. (2004), relating the expenditure per vehicle kilometre removed from the road network to the Department for Transport (DfT) estimate of the marginal congestion cost per vehicle kilometre. The 2004 study gave a mean expenditure of 1.5p per car km removed at 2003 prices, equivalent to about 1.8p at November 2009 price levels, with a congestion cost saving of 15p per vehicle kilometre (18p updating for inflation but not for changes in traffic congestion)[29]. This gave a congestion benefit-cost ratio of 10.

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[29] The congestion cost saving of 15p per vehicle kilometre was based on the best figures available at the time of the 2004 study, which were those agreed between the Strategic Rail Authority and the Department for Transport for use when assessing the benefit of shifting 'sensitive' lorry miles from road to rail. Congestion costs published by SRA in terms of pence per lorry mile were converted from lorry miles to car miles using standard PCU factors (see Cairns et al. 2004, p359).

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The Sustainable Travel Towns programme expenditure was in the order of 3.6p per vehicle kilometre removed, or 4p at November 2009 prices[30]. The figure is higher than the 2004 figure because of the inclusion of a significant element of capital expenditure, which is not annualised, and the different balance of cheaper and more expensive measures (RR21.2). Simply upgrading for inflation, the average congestion benefit would therefore be about 18p per 4p of expenditure, giving a congestion-only benefit cost ratio of 4.5.

A full calculation would need to take into account the higher than average cost of congestion in urban areas, partly offset by a lower value for the greater impacts on off-peak travel which occurred in the three towns. It would also be necessary to up-rate the cost of congestion, as a result of traffic growth since the congestion calculations was made in the early 2000s, and to include any increase in the value of time (for both personal and commercial traffic) above the rate of inflation. Further adjustment would then be necessary to allow for changes in the DfT appraisal approach and parameters associated with the Department's high level goals, including health effects, carbon values, treatment of taxation, local environmental impact, consumer welfare and quality of life. The DfT has recently carried out work[31] assessing the non-congestion costs and benefits of sustainable transport initiatives, to take account of such effects. Preliminary calculations suggest that application of this approach would give an overall benefit-cost ratio for the Sustainable Travel Towns initiative, which could be broadly double the congestion-only BCR of 4.5.

This is not an 'upper limit' for the value for money of Smarter Choice Programmes, and it should in principle be possible to achieve further increases in the BCR through intensive application at a regional scale and greater focus on measures designed to influence medium-length journeys. We also hypothesise that as the scale and intensity of implementation of Smarter Choice Programmes grows, it is likely that the behaviour change 'decay rate' will reduce, due to changing social and behavioural norms.
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[30] For details of the derivation of this figure, see RR21.2 and the annex to RR21. However, the method of calculation can be summarised as follows. We know that the effect in 2004 is zero by definition. From the household surveys, we can calculate how many car driver kilometres (equivalent to vehicle kilometres) have been removed by 2008, across the whole population in all three towns. In order to calculate the full reduction in vehicle kilometres, we also need to interpolate between 2004 and 2008 to get the intervening years, and to allow for a residual continuing effect after the end of the intervention. Both calculations need an assumption about whether effects are permanent, only last for one year, or something in between. We initially used the same assumption as in the 2004 report, namely that there is quite a rapid decay of effect of 40% per year. This then gives a total estimate of vehicle kilometres saved, which is compared with the total expenditure, and gives the result of 3.6p per vehicle kilometre. This answer is influenced by the assumption on decay rate, with a likely range from about 2p to about 4p. The 40% figure, we judge, is probably higher than is likely to be the case, especially in the context of widespread implementation supported by other policies, when there is little reason to suppose that choices quickly revert to a norm based mainly on extrapolation of policies that are more favourable to car use. Therefore we consider this cost is on the high side, and the resulting ratio of benefits to cost is conservative. A tentative shift to a decay rate of 33% would give a cost per car kilometre of 3.3p (2006 prices). In calculating these figures, we take the household survey results at face value, and do not adjust for any change in vehicle kilometres as a result of wider national factors. We estimate that if such adjustment were made, the cost per vehicle kilometre removed would be 4.2p (2006 prices) with a 40% decay rate; or 3.8p (2006 prices) with a 33% decay rate.

[31] http://www.dft.gov.uk/webtag/documents/expert/unit3.14.php#05 April 2009

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With a value of benefits to cost in the order of 4.5 for congestion benefits only, on the narrowest assumptions, and the net effect of other considerations being upwards, we are therefore confident that the Sustainable Travel Towns programme has produced very good value for money for the public spending on the measures.

11.2   Achievement of potential

The estimated outturn costs of the programme were £10 per person per year (roundly £11 at November 2009 prices). In the four-year appraisal period, this produced a reduction of 5%~7% in car driver distance travelled by residents for those journeys under 50km which were in-scope. As noted above, this represented very good value for money. The next question is whether or not this represented the maximum potential for change.

It is instructive to compare the results in the three towns with the estimate of full potential made in the smarter choices study (Cairns et al., 2004), of a 14% reduction in urban traffic, or 18% reduction in urban car traffic, to be produced by a 10-year programme with an annual cost of roundly £17 per head in 2003 prices (£20 at November 2009 prices)[32].

The three Sustainable Travel Towns achieved less than this, but the rate of expenditure and the duration were also less. Thus they achieved about 30-40% of the previously estimated full potential reduction in car driver kilometres, in about 40% of the time period which the 2004 study estimated would be required, with a rate of expenditure per head slightly over half as great, and without the supporting effect of simultaneous programmes in neighbouring towns. Therefore, allowing for the differences in scale, circumstances, duration and budget, our judgement is that the exercise has produced results that are broadly proportionate to the 2004 estimate of full potential. At the same time, the measures implemented have by no means exhausted the full potential.

Whilst acknowledging the achievements in the three towns, it is also worthwhile to consider how Smarter Choice Programmes might be developed in future to achieve greater effects. Examination of aggregated baseline household survey data suggests that 37% of car driver distance in the three towns was on journeys of 10-50km, and 40% on journeys of over 50km. These medium-length and longer trips must have had origins, or destinations, or both, which were outside the Sustainable Travel Towns. Commuting was by far the dominant trip purpose, accounting for nearly half (46%) of car driver distance in these medium and longer trip distance categories (RR21.3). Medium-length and longer commuter trips thus offer a large potential 'prize' in terms of car mileage savings, given suitable smarter choice interventions designed to influence them. Interventions targeting these trips might be expected to include a greater attention to workplace travel plans as discussed above; a coordinated regional approach; a stronger emphasis on car-sharing, rail travel, express buses, teleconferencing and tele-work; and use of regulatory or financial policy levers to incentivise business engagement in travel planning.

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[32] The reduction in car driver mileage, 17.6% for urban areas in a high intensity scenario, is not given in the original smarter choices report, which reported potential changes in 'all traffic' (i.e. car + goods vehicles/bus). It has been extracted from the original spreadsheet model for this report. Similarly the figure of £17 per head is not stated in this form in the 2004 report, but is implied in the calculations of costs, expenditure and effects.

11.3   Induced traffic and 'locking in'

Any measures that reduce traffic congestion have the potential to enable traffic to move faster, and therefore can induce more traffic, which will reduce the benefits. In principle, this would apply as much to smarter choices as to, say, increasing road capacity. A characteristic of the way in which the policies were developed in the towns was that rather little action was taken to reduce or reallocate road capacity to match the reductions in car driver mileage by residents and, for that reason, it seems likely that a proportion of the benefit could have been eroded by induced traffic. Therefore seeking evidence on this point is of interest.

The problem of assessment is that, at the scale considered here, the amount of induced traffic that would be expected from the measures is very small. This may be seen by examination of the DfT's 2008 National Road Transport Forecasts, which involve a series of modelled relationships between traffic growth, congestion delay and modelled traffic speed.

Between 2003 and 2010, the estimate for 'other urban areas' (i.e. excluding London and the large cities) was for a 4% increase in traffic volume, giving a 2% increase in congestion delay, and by inference approximately a 0.3% drop in traffic speed. This suggests that the observed decrease in traffic of approximately 2% in the three towns should logically have led to a fall in congestion delay of say 1%, and an increase in speed of about 0.2%, which is equivalent to around 0.2 seconds per kilometre travelled at 30kph. The induced traffic from such a change using average elasticities would only have been of the order of 0.2% or less.[33]. Such changes can certainly be large enough to calculate appreciable costs and benefits in a fine-grained model, but are not observable in survey or traffic count evidence: this is a common result in attempts to verify ex-post benefits from other transport interventions such as expanding road capacity.

In practice the apparent discrepancies between the household survey data and the changes in traffic observed on-street were primarily not due to induced traffic, but due to other factors, as follows:

(a)   To some extent, reductions in car driver mileage by existing residents provided the capacity to absorb population growth (in Peterborough) and employment growth (in Darlington) without increasing congestion, and so in a sense we may say that the towns consumed the benefits of the smarter choices interventions by enabling growth without causing a deterioration in quality of life or road network efficiency.

(b)   The three towns were not 'closed systems' – in other words, traffic in the towns was caused by trips by non-residents as well as residents. Since most traffic count sites were on major roads, where through traffic (or trips by non-residents) may have represented as much as half, or more, of total traffic volume, then, in crudest terms, we might expect that a 5%~7% reduction in mileage as a car driver by residents would result in an observable reduction in car traffic of only 2.5-3.5%.

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[33] This is a second-order effect since the 2% observed fall in traffic would include both reduced and induced traffic together. This does not affect the order of magnitude.

(c)   Residents appear to have preferentially reduced their car use for trips into the inner/central area, as opposed to trips to outer town locations, possibly because trips into the inner area were better-served by buses, and parking was more likely to be constrained or charged-for. This is consistent with the observation from the household surveys that behaviour change appears to have been larger for shopping and personal business trips than for some other journey purposes, since destinations for these trips might perhaps be expected to be concentrated in inner/central areas, or to be more transferable to these locations.

However, although these appear to be the dominant factors explaining the discrepancies observed, it is still probable that induced traffic occurred – particularly, perhaps, with extra car use by people living outside the towns, or by freight, service vehicles and business travel.

It has been our strong hypothesis that in the absence of locking in, or a supportive impact from other policies, there is the danger that induced travel will undermine (some of) the benefits of Smarter Choice Programmes. The results give no reason to revise this assessment, but do not add further clear evidence to assess it – or, indeed, to examine the important issue of whether the behaviour changes recorded would have been considerably greater had greater locking-in occurred.

11.4   Long term sustainability

The issue of timescale is important. Our original report envisaged a 10-year programme of activity. It seems clear that some initiatives – such as workplace travel planning – may take a relatively long time to deliver results, and that smarter choices work generally requires significant start-up time in terms of getting staff in place, with an appropriate strategy and training. Hence, assessing the effects of conducting this type of programme over a longer period could clearly be important. A related issue is the longevity of behavioural change.

As already highlighted, experience in the towns has been different, partly depending on the way that initial activities have been reinforced over time. Hence, monitoring progress in the three towns in the future may be important to understand how any reductions in traffic and carbon emissions, and improvements in health, can be sustained and enhanced over a longer period.

11.5   Quality of the evidence and analysis

In a separate recent review of the methodology used for evaluation of the effects of smarter choice interventions, a number of critical comments have been made about the quality of the evidence. In November 2009, the DfT published two reports[34] [35] on this question, which came to a general view that many of the specific studies examined were unclear, not well

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[34] Independent Social Research (2009). *Impacts of Better Use Interventions: Review of the Evaluation Evidence Base.* DfT, London. Available online at:
http://www.dft.gov.uk/pgr/evaluation/evaluationguidance/existingnetworks/betteruse.pdf
[35] AECOM (2009). *Evaluation of Better Use Interventions: Evaluation Framework Report.* DfT, London Available online at:
http://www.dft.gov.uk/pgr/evaluation/evaluationguidance/existingnetworks/frameworkreport.pdf

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specified, or failed to take into account issues of policy interest. The reports did not systematically re-examine the actual content of the evidence, being more concerned with coverage and methodology, and therefore did not come to any different view from Cairns et al. (2004) about the quantitative scale of the effects, nor even conclude that there was an inherent likelihood for the estimated effects to be biased in one direction or the other. They did make substantial recommendations about how the quality of the evidence could be improved.

We have paid considerable attention to some features of concern to the authors, including the transparency and processes of collecting and weighting survey data, and the sensitivity of results to weighting: in most cases we found that the results were robust whether weighted or unweighted data were used, though there were a few exceptions and, in these cases, we have noted them specifically. We also paid considerable attention to issues to which those reports gave less attention, especially the features of traffic count data and how to synthesise the results of disparate data sources. The results inevitably have caveats, and we have sought to spell these out in the interests of transparency and accuracy. The underlying problem is that there is policy and research interest in a level of detail of impacts that would make the research effort more costly than the expenditure on the measures themselves, which would be difficult to defend.

The biggest shortfall in data, in our view, remains the absence of longitudinal panel data which could identify details of behavioural change that are simply unobservable in cross-section surveys, though we do acknowledge that this criticism applies equally, or more so, to very much bigger programmes of travel research relating, for example, to most programmes of road building, pricing, public transport investment, subsidy, and regulation. For example, the Highways Agency programme of ex-post monitoring of their schemes does not include longitudinal data on road users to identify who has changed their travel patterns.

With these caveats, we judge that the current research offers as robust an evaluation of the available evidence as is realistically possible. As always, the data sets contain information that would reward further examination.

12. Conclusions

We conclude that the Sustainable Travel Towns programme was successful in reducing travel by car, and increasing the use of other modes, and that the programme offered very high value for money. The trends in the towns were different from those in other medium-sized urban areas, with respect to car, bus, walking and cycling trips per person and also with respect to changes in traffic.

Over the last year, the development of various important policy initiatives has had to proceed in advance of the results reported here, but with specific recognition of their importance. In particular, we note advice given by the Commission for Integrated Transport and the Committee on Climate Change, and an Impact Assessment carried out by the Department for Transport, in which more or less conservative assumptions were made about the potential contribution to carbon reduction that could be made by Smarter Choice

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Programmes, all noting that the results of the Sustainable Travel Towns initiative would be important to give more confidence in these assumptions.

Not all outstanding questions can be resolved by the Sustainable Travel Towns programme on its own, especially those which depend on testing the effect of simultaneous application of measures not in a single town, but in a cluster of towns and the surrounding areas in a region. Similarly, the Sustainable Travel Towns initiative does not add any new information on rural potential to that already available in the 2004 report[36].

On the other hand, considerable new information has been added regarding the relative effect on journeys of different lengths, which has been one of the issues of discussion. The results clearly indicate that, for Smarter Choice Programmes as presently being implemented, the proportionate effects on numbers of car trips are likely to be greater for shorter journeys, but that, even so, the biggest contributions to reduced traffic volume and carbon emissions are likely to be from changes to medium and longer distance journeys. They leave open the question of how the *principles* of the Smarter Choice Programmes in the three towns might be applied to medium and longer distance journeys, and this is now an important topic for examination and experimentation.

We judge that the experience in the three Sustainable Travel Towns (and elsewhere) is now sufficient to justify widespread development and delivery of town-based Smarter Choice Programmes. There would also be great merit in piloting of new initiatives, to apply the principles of travel behaviour change to medium and long-distance journeys and to travel in rural areas, and to focus more intensively on travel for work.

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[36] In broad terms, the analysis reported in Cairns et al. (2004) suggested that the potential for smarter choice measures to reduce traffic in non-urban areas was about half to two-thirds of the potential in urban areas (Cairns et al. 2004, p355).

Sloman L, Cairns S, Newson C, Anable J, Pridmore A & Goodwin P (2010)