

BARRIERS TO MODAL SHIFT

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Contents

	<u>Page No</u>
1. Introduction	1
2. Literature Review	3
Barriers to mode shift	
Components of car dependence	
Costs and benefits of travel	
Hard factors	
Soft factors	
Complementary factors	
The complexity of travel choices	
Summary of barriers to mode shift	
Bridges to mode shift	
Implications for transport modelling	
3. Analysis of Travel Choices	22
Review of existing analysis of travel choices	
Mapping of travel choices	
Comparison of modal split with accessibility ratios	
4. Approach to Survey Work	31
Selection of corridor for case study	
Approach to survey work	
Corridor characteristics	
Telephone survey and group discussions	
Postal questionnaire	
5. Telephone Survey and Group Discussions	34
Telephone survey and repertory grid construction	
Repertory grid analysis	
Sampling for the focus groups	
Focus groups	
6. Postal Survey	44
General characteristics of respondents	
Travel patterns	
Perceptions of respondents	
Improving public transport	
Future changes	
Workplace travel planning	
Lifestyle choices and travel	
Additional comments by respondents	

7. Planning and Delivery Changes	56
Delivery challenges	
Personal safety	
Information and ticketing	
Control	
Workplace travel planning	
Valuing impacts in transport modelling	
Modelling of soft and complementary factors	
8. Conclusions	61
Barriers to modal shift	
Hard factors	
Soft factors	
Complementary factors	
Bridges to modal shift	
Improvements to alternatives	
Making car travel less attractive	
Management and administration	
Technology, information and marketing	
Transport planning and transport administration	
9. Acknowledgements	65
10. References	66
Appendix A – Review of Existing Surveys and Analysis	
Appendix B – Repertory Grids and Forms	
Appendix C – Focus Group Findings	
Appendix D – Postal Questionnaire	
Appendix E – Postal Survey Analysis	

List of Figures and Tables

Figures

- Figure 1 – Summary of research approach
- Figure 2 – Barriers for school travel
- Figure 3 – Process of travel behaviour change
- Figure 4 – A possible analytical framework
- Figure 5 – Select zones from SITM modal split analysis
- Figure 6 – Mode share for car commuting by destination
- Figure 7 – Mode share for car travel for non commuting trips
- Figure 8 – 2001 am peak accessibility to jobs ratio
- Figure 9 – 2011 am peak accessibility to jobs ratio
- Figure 10 – 2001 am peak accessibility to population ratio
- Figure 11 – 2011 am peak accessibility to population ratio
- Figure 12 – Comparison of mode choice and accessibility for work trips
- Figure 13 - Comparison of mode choice and accessibility for non-work trips
- Figure 14 – Estimated modal split in corridor
- Figure 15 – Validation of constructs
- Figure 16 – Importance of constructs
- Figure 17 – Modal split by trip purpose
- Figure 18 – Support for future changes
- Figure 19 – Factors affecting residential location choice
- Figure 20 – Support for financing transport with road charges
- Figure 21 – An analytical structure for appraisal

Tables

- Table 1 – Barriers to mode shift
- Table 2 – Factors to encourage mode shift
- Table 3 – Comparison of social and demographic characteristics
- Table 4 – Summary of corridor characteristics

- Table 5 – Bipolar constructs used in the repertory grids
- Table 6 - % of not relevant responses
- Table 7 - % likely to use PT if high priorities implemented
- Table 8 – Ranking of rail improvement options by respondents likely to shift mode
- Table 9 – Ranking of bus improvement options by respondents likely to shift mode
- Table 10 – Opportunities and barriers to implementing improvements

Executive Summary

The main aim of this project was to identify and examine the actual barriers that are preventing car travellers from shifting mode to rail, bus, walk or cycle, or not undertaking a journey at all. It included a literature review, modelling of travel choices, and a survey programme.

Current car travel choices are based on real and perceived benefits in terms of time, cost, comfort, reliability and image. To develop plans to encourage efficient mode choice in Scotland many factors need to be addressed. This research aims to define the main parameters that account for the gap between what is socially desirable for mode choice and what people desire.

For many journeys car travel offers better accessibility than public transport and, despite increased spending on public transport, the gap between car and public transport accessibility is set to grow further. For society to develop more socially acceptable, economically beneficial and environmentally sustainable approaches to travel, a broader approach is needed to understanding and managing travel behaviour.

Barriers to modal shift can be considered under three main categories: “hard” factors, “soft” factors and complementary factors. For many trips, the main barriers to modal shift will be hard factors such as the cost, time and reliability of travelling by public transport. Soft factors include information, comfort, security, and a wide range of personal and social needs and attitudes. Complementary or lifestyle factors include non transport costs and taxes, limited travel time budgets, and the need to carry goods.

There are fewer “soft” barriers to rail travel with “hard” factors such as time, cost and geographical coverage of the rail network being the main limiting factors on rail travel. For bus travel, travel time is the main hard factor acting as a barrier, but there are several soft factors.

The main “soft” factors acting as barriers were personal security, information, and ticketing issues. Employment constraints were the main “complementary” factors affecting public transport use.

Bridges to modal shift from car to public transport, walking and cycling can be categorised as: improvements to alternatives, making car travel less attractive, management and administration, and technology information and marketing.

In addition to time, cost and reliability improvements, priority measures to improve the attractiveness of alternatives to the car include: the quality of the waiting environment at bus stops and rail stations, improved security with CCTV and reduced vandalism, electronic and printed information at bus stops, larger station car parks, enforcement of bus lanes to improve bus travel times, employment factors, reallocation of road space to give more priority to pedestrians and better integration between modes covering physical interchanges, timetables, information and ticketing.

To make car travel less attractive, there were mixed views about introducing road user charging, but a marginal balance in favour of increased direct charges on motorists. People did not have strong opinions about the need for new road capacity, but marginally more people opposed than supported the need for new roads in the city. For trips to the city centre, parking restraint is a major determinant of choice of mode.

The survey work demonstrates that there is a general awareness of growing environmental problems, but limited acceptance of personal responsibility for these. There was, however, very little understanding of the negative social and economic impacts of car use. It may be that environmental problems are perceived as being too big an issue for individual action. Future marketing effort on the social and economic impacts of individual action might help to deliver positive change. There was wide recognition of the health benefits of walking and cycling. Greater publicity about the health benefits of walking to bus stops and rail stations could be influential factors in supporting mode shift.

To achieve behaviour change requires people to accept more responsibility for the current problems and that, through changing their own behaviour, they can be 'part of the solution'. Future management mechanisms for public transport need to better reflect this growing agenda to help manage behaviour change. A number of key institutional barriers to change therefore need to be overcome before the barriers to modal shift faced by users can be fully resolved.

The research suggests that a wide range of parameters from travel information to lifestyle issues can be incorporated in transport models by linking travel demand and accessibility models and measures. It also provides some very limited evidence on the relative priorities of measures designed to achieve modal shift.

Even the most committed car drivers have a future vision of a good transport system being much more dominated by public transport and car free areas than at present. The vision is underpinned by limited car access to city centres and a well managed network of bus, rail, tram, and underground services supported by park and ride from outlying areas. Progress towards this long term vision is currently frustrated by a number of short term barriers. The conclusions of this research should allow progress with the planning, management and use of public transport as a practical alternative to car travel for more trips.

1.0 Introduction

1.1 Significant modal shift is needed to deliver national and international sustainable development aims for a strong economy, an inclusive society and a clean environment. That so many people currently choose car travel for their journeys is a function of the real and perceived benefits from car travel in terms of time, cost, comfort, reliability and image. The practical plans developed in Scotland must therefore address many factors in order to encourage more efficient travel choices.

1.2 The main aim of this project was to identify and examine the actual barriers that are preventing car travellers from shifting mode to rail, bus, walk or cycle, or not undertaking a journey at all.

1.3 The work seeks to build on and input to the substantial quantity of analysis being undertaken for the Glasgow area to assist with integrated transport planning. This includes work for the Glasgow and Clyde Valley Structure Plan (GCVSP), the Central Scotland Transport Corridor Studies and the strategies and plans of the local councils and Strathclyde Passenger Transport Executive (SPT).

1.4 The project has been undertaken for the Scottish Executive by DHC assisted by Professor Peter Jones of the University of Westminster and psychologist Nick Reed. The work was carried out between May and December 2002.

Approach to the project

1.6 The project was undertaken in two main stages:

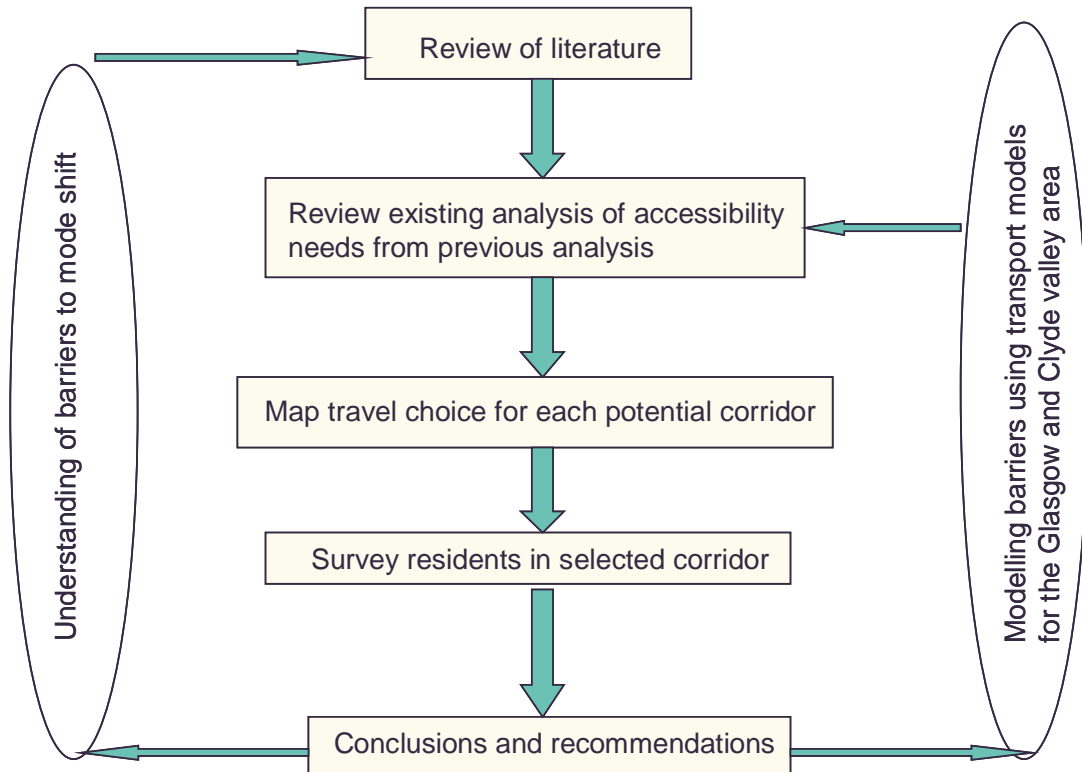
- Stage 1 - Review of existing data and literature
- Stage 2 - Survey programme

1.7 The review of existing data and literature included analysis of travel choices in the Glasgow area as discussed in Chapter 3.

1.8 The survey programme consisted of interviews and analysis work using personal construct psychology techniques, focus groups, and a postal questionnaire.

1.9 Figure 1 summarises the main steps.

Figure 1 – Summary of Research Approach



2.0 Literature Review

2.1 There is a growing body of literature on the social, economic, cultural, and environmental factors affecting travel choices. Yet progress to incorporate this growing body of knowledge within practical transport planning and transport modelling has been slow. Consistent with the aims of this project, this literature review considers what lessons can be drawn about barriers to mode shift from the car to other modes, and policies to overcome these barriers based on published research on travel behaviour. It then reviews experiences on the application of these lessons within transport modelling and analysis.

Part 1 - Barriers to mode shift

2.2 In considering barriers to mode shift from car travel to other modes there are a number of strands that need to be considered. Firstly it is necessary to consider the main gaps between public policy aims and public attitudes and behaviour. If there is a gap between what is socially desirable for mode choice and what people desire, then it is necessary to understand and address the factors which define this gap. The review therefore starts by considering car dependence and the costs and benefits of travel. It then looks at the components of these costs and benefits under three main categories:

- Time and money costs of travel, car ownership levels, and land use plans which are measured or estimated and taken account of in conventional transport models, sometimes called “**hard factors**”.
- Other factors affecting travel choices not currently included in travel demand models (e.g. travel information) sometimes called “**soft factors**” (Halcrow 2002).
- **Complementary factors** such as the need to carry loads or young children, lifestyle issues, the weather etc.

Components of car dependence

2.3 In considering why people do not shift mode from the car it is useful to start with the literature on the reasons for car dependence. Car dependence has been classified as (Farrington et al 1998):

- Structural dependence – Those who are dependent on their cars because they have no other viable alternatives.
- Conscious dependence – Those who rely on cars but could realistically undertake their journeys by other modes.

2.4 Market distortions that contribute to car dependency have been classified as (Litman 1999):

- Limited choice - Consumers often lack viable choices, or information about those choices so are unable to make efficient decisions. Lack of choices include non transport factors such as

limited availability of attractive non car dependent locations to live and transport factors such as the lack of reliable public transport, or pleasant walking routes.

- Limited competition – Lack of competition in public and privately provided roads and public transport limits incentives for innovation, quality and value in provision.
- Cost based pricing - Consumers do not bear the full costs they impose with development of automobile dependent land being underpriced and some transport choices not covering their full environmental costs.
- Wider economic factors – There are many public policies (laws, taxes, subsidies, and investment policies) that support car dependency.

2.5 Car dependence is therefore context specific and, in considering the potential for mode shift from cars, the effectiveness of policies will be highly dependent on the correct targeting of measures. It has been suggested that such targeting can be linked to types of locations, such as rural areas, types of people, such as those with a mobility impairment, and types of trip such as supermarket shopping (RAC 1995, Stradling 2002). Car dependent places are discussed below under “hard factors”, and car dependent people and types of trip are discussed under “soft factors”.

Costs and benefits of travel

2.6 The most commonly identified reasons why people use cars rather than other modes is that car travel offers opportunities not available by any other means (AA 1998). The last fifty years have seen large reductions in the cost and time of travel by car, which has opened up many new opportunities. Over the same period, few new opportunities have opened up for public transport travel, and in some places public transport opportunities have declined (SCC 1998). With car ownership levels in Scotland currently just over half the level that they might be expected to reach in the future (SE 2002a, Goodwin 1997), the challenge for the next fifty years it is develop a balanced approach to the costs and benefits of travel by promoting policies which achieve a sustainable approach to economic, social and environmental improvements.

2.7 Overall in the UK, travel costs for consumers are a higher percentage of GDP than for many other developed economies (SACTRA 1999). If, through market mechanisms, taxation and current public funding, society is delivering less than optimal solutions, then the challenge for transport planning is to find more socially acceptable, economically beneficial and environmentally sustainable approaches to the development of transport systems.

2.8 Traditionally, transport planning has looked at social and economic factors such as land use development plans and car ownership growth in order to predict the demand for travel. This has considered travel as a purely derived demand and constrained the range of solutions to transport factors such as new roads, buses, or trains (Ecotec 1993). In Scotland since the early

1990s, there has been a growing realisation that the demand for travel needs to be managed (SO 1992, SE 1998). If transport planners now wish to manage travel demand then a broader approach needs to be taken which includes both transport and non-transport levers to facilitate change. Rather than simply predicting the demand for travel, transport planners now need to understand travel behaviour (Jones 2002).

2.9 A broader approach to considering the costs and benefits of travel has been proposed based on travel behaviour concepts (Mokhtarian et al 2001). This suggests that travel needs to be viewed in much the same way as other “goods” having both positive and negative characteristics. People weigh the pros and cons of travel and non-travel alternatives and choose an option that involves travel where the costs or disbenefits of travel are exceeded by the combined benefits of:

- The utility of arriving at a destination – This is the accessibility benefit, and depends on both the quality of the opportunity that can be reached and the travel or telecommunications options available.
- The utility of activities that can be conducted whilst travelling – In most cases these activities can be undertaken without travelling (e.g. listening to music, working, talking to friends, reading, thinking) but they help to increase the utility of a particular choice over other travel choices or non-travel alternatives.
- The utility of travel itself – Numerous sports and hobbies revolve around the travel for its own sake (e.g. hiking). Almost by definition undirected travel is largely a leisure activity, so this element dominates for leisure travel.

2.10 From the large surveys carried out (Mokhtarian et al 2001) it has been shown that trip purpose and people group are particularly significant factors in affecting the balance between these three components of travel. “Travel liking” and “adventure seeking” personalities behave very differently from other personality types such as “calm”. To assess how the costs and benefits of travel for each behavioural class are perceived, more widespread surveys of travel attitudes and behaviour will be needed to support future analysis. The Scottish Household Survey already includes some questions on attitudes to travel, but there is scope for these to be rationalised and strengthened (SE 2002b).

2.11 Overall, a behavioural model which considers the costs and benefits of travel on a continuum, from directed to undirected travel, should have the capability of reflecting observed patterns, and the scope for behaviour change, more realistically than traditional approaches considering all travel as a derived demand.

2.12 This project is looking specifically at mode shift from car to public transport, walking and cycling. The “hard factors” are most relevant to directed travel, and the “soft factors” are most relevant to the travel experience and the activities that can be undertaken whilst travelling. The “complementary factors” provide the context within which each travel decision is made. This

review therefore considers each of these in turn, within the general theory of travel behaviour summarised above.

Hard factors

2.13 Probably the greatest influences on mode choice are the money costs and travel time costs of each alternative. For many car journeys, the main barriers to mode shift are simply that the time and/or costs of alternative modes are not competitive. When considered on a trip by trip basis, public transport is very often more expensive than car travel (RCEP 1994, SCC 1998) in terms of money costs. For these trips, public transport would need to offer other benefits in terms of travel time or comfort for cost barriers to mode shift to be overcome.

2.14 For making the trade offs between different modes on the basis of cost and time, it is convenient to convert time to costs by using values of time, to create 'generalised costs' for each modal alternative. There is a very extensive literature on the valuation of travel time (Wardman 1998) and, although there is an ongoing need to update and refine this (SACTRA 1999), a number of key points emerge from the existing research as follows:

- The use of a single value of time, as applied in most current public sector appraisals, does not reflect real travel behaviour. Abandoning the single value would greatly increase the complexity of modelling and introduce equity problems for cost benefit analysis, but might be more realistic and insightful.
- However, in schemes involving cash payments (e.g. bridge tolls), such disaggregation is necessary to derive demand curves and so predict levels of use at different price levels.
- Value of time varies by income level, age of traveller, journey length, trip purpose and mode.
- The influence of mode on value of time is highly correlated with income, but within income groups bus travel attracts higher values of time and rail lower values than car, reflecting the relative perceived comfort of these modes.

Travel reliability

2.15 Travel behaviour research has consistently shown that reliability is one of the most important factors affecting individual travel decisions. Despite this importance it has rarely been considered effectively in appraisal (Bates 2001). Recent multi-modal studies have aimed to measure public transport reliability in terms of the difference between timetabled and actual travel times, and for car travel reliability is measured as variability in actual travel times (DETR 2000). In practice most assessments have lacked good quality data (MVA 2002).

2.16 If a delivery of goods is regularly late, or a businessman keeps missing meetings, or an employee is repeatedly late for work due to transport delays then the company, businessman, and individual are accountable for their

failure to perform. Reflecting this accountability, the behavioural response of the company or traveller is usually to seek to change those aspects of the transport system over which they have control to allow them to meet their needs better (Halden 2002). As highlighted in paragraph 2.23, car travel is associated with “control” so lack of reliability in transport systems will be a significant barrier to mode shift from car to public transport.

Car dependent places

2.17 The links between urban form, the sets of travel choices available to people in each type of location and the way that these choices influence travel behaviour have been studied in some depth (Handy 1992). Although it has been shown that land use patterns have a very substantial impact on travel behaviour, the relative influence of population density, land use mix, and urban design is not well defined.

2.18 Although studies have compared travel behaviour for different types of urban area and shown significant differences based on area type, the lessons for travel behaviour have been far from clear. In particular, there is a likelihood that part of these observed differences reflect the fact that people choose to live in areas that meet their lifestyle requirements: people who are heavy car users choose locations where parking is easy. Similarly, groups who like to be able to walk or cycle to destinations choose to live in high density areas. Thus, if high density housing is built in order to attract people from suburban areas, they may not display the same travel patterns as those currently living in high density areas due to the personality differences noted in paragraph 2.10.

2.19 One promising approach to understanding the effects of location is to analyse the choices faced by different types of people in different environments. It has been shown that when urban form is characterised in terms of accessibility to various activities, rather than more traditional geographical classifications (e.g. sub-urban), then links to travel behaviour become more apparent (Hansen 1982). A similar finding for rural areas of Scotland was recently demonstrated (DHC 2002).

2.20 However such analysis is very dependent on the variables used to define the choices available to people. Increasing specialisation results in longer trips to more centralised facilities but quantifying this in a meaningful way is problematical since perceptions of people change over time, vary markedly across society, and are dependent on many complex factors and interactions. Despite these many unknowns, it is clear that policies to improve accessibility to defined land uses through transport and land use initiatives can be successful in reducing car dependence (Ecotec 1993).

Soft factors

2.21 In considering the “soft” factors affecting travel choices, the barriers tend to be specific to types of people or types of trip. The barriers relate not so much to the costs and time of travel, or the physical location of activities, but to the way that journeys and modes are perceived and the quality of the travel experience.

Car dependent people

2.22 Whilst travel behaviour and attitudes vary markedly across the population, behavioural classifications do not correlate well with demographic classifications, except for some particular groups such as those with mobility impairments (RAC 1995).

2.23 Psychological attitudes which categorise positive attitudes to car dependence include: independence, variety seeking, privacy, speed, convenience, and control. The people who derive the greatest psychological benefit from car use are the least likely to want to use their cars less. Negative attitudes towards car travel include: stress, discomfort, isolation, lack of exercise, and anti-social. (RAC 1995, Mokhtarian et al 2001, Mackett 2001, Stradling 2002). In these studies there are also many reasons given for car dependence which, although justifying car dependence, have some negative connotations towards car use such as: poor weather, no-choice, and safety considerations.

2.24 Car travel also allows users to express their personality through the type of car they drive and the way they drive it (Stradling 2002). However, the ability to express personality through travel is not unique to car travel. The options to express personality through public transport and walking are certainly more limited than for car travel but are still significant, and many cyclists express their personalities through their choice of cycle and behaviour (DHC 2001) and walkers through their walking style and choice of fashion footwear.

2.25 Reasons given in the Scottish Household Survey (SE 2002b) for not using public transport include: laziness, inconvenience, insufficient reliability of public transport, too slow, too costly, don't feel safe, too crowded, uncomfortable, too much to carry, dislike waiting, filthy, need a car at work, health reasons, difficult access, and infrequent or unavailable service.

2.26 However, stated perceptions of the characteristics of the choices available often differ from the real choices, for a number of reasons such as: a lack of information; because people feel a need to justify their car dependence (SCC 1998), resulting in the phenomenon of 'cognitive dissonance', where drivers adjust their perceptions and attitudes in order to support their current behaviour (e.g. Tertoolen *et al*, 1998); and sometimes because the commonly used objective measures do not reflect the ways in which consumers perceive the services offered. For example, bus reliability may be characterised in transport models as average excess waiting time, but it is the extreme values that more commonly shape passenger perceptions.

2.27 In terms of person characteristics, some clear patterns can be found in the National Travel Survey. Overall, men still have higher rates of driving licence ownership than women (though this disparity is greatly reduced among younger people), and consequently make more trips as car drivers. On average, women's work trips are shorter than men, partly reflecting the greater incidence of part-time working, and the greater need to fit around school hours and other daily constraints. Women with cars in families with children often exhibit more complex trip chains than their male partners, and are more car dependent as a consequence.

2.28 There has been little published research in the UK on the influence of ethnicity and faith on travel patterns. A current study commissioned by DfT (Social Research Associates 2002) is seeking to: identify patterns of use of public transport by minority ethnic and faith communities and how this is related to use of cars and other modes; analyse how religious, cultural and racial attributes affect use, non-use and times of use, and draw out transport needs and requirements, and propose a range of measures to encourage ridership. Preliminary findings highlights some key differences such as trips to churches and other religious centres, and the unacceptability in some communities of certain groups of women travelling alone.

Trip characteristics and car dependence

2.29 In paragraph 2.9 trips were defined as directed or undirected. For trips that are predominantly directed, the trip purpose is explicit but for predominantly non-directed trips the purpose can be more complex. However, all trips must be worthwhile for the people who make them, otherwise they would not be made. The concept of car dependence implies that part of the value or purpose of a trip is the use of the car. In considering barriers to mode shift within this broad view of travel behaviour, the most important issue is to understand what travel or non-travel choices might substitute for a car based travel choice.

2.30 In most demand modelling, the primary classification by trip purpose is into work and non-work trips. This reflects real behaviour since non-work travel decisions are much more complex than work journeys, allowing a wider range of choices including mode, timing, frequency, destination and route. Work trips have more constraints on timing, frequency, and destination so the mode and route choices available to people are relatively more important (Jones 1991).

2.31 One of the most significant trip characteristics affecting car dependency is trip complexity. Physical (e.g. the length of a walk), cognitive (e.g. knowing where to find the bus stop) and affective effort (e.g. concerns that the bus may be late) are all needed to plan and undertake travel (Wardman et al 2001). Time and money costs have been the focus of efforts to promote mode shift, but affective effort caused by the uncertainty of travelling by public transport can be the greatest barrier particularly where interchange is involved.

2.32 Trip complexity is also evident in the formation of trip chains. Rather than simply travelling between, say, home and work and back, people add in additional stops (to go shopping, visit friends, etc.). Many studies have found that trip chaining is more common and more complex among car users than public transport users, and this makes it difficult to switch from the former to the latter, without a more basic restructuring of travel into simpler trip chains (Hensher and Qeyes 2000, Jones 2002a). This requires considerable cognitive and affective effort.

Complementary factors

2.33 Complementary factors can also be important. For example, widespread availability of mobile phones can allow people to stay in touch with the home or office more easily, increasing the attractiveness of travel

(Mokhtarian 2002). They can also help to counter the disruption caused by cancellation of bus/rail services or delays on route, since travellers are able to notify those they are meeting of the delay. A study of Manchester to London business rail travellers in the 1990s showed that one of the main triggers for initially purchasing a mobile phone was to counter the effects of service unreliability (TOI 1998).

2.34 With portable computers and printers, cars are increasingly being used as mobile offices. The advantages of public transport, offering opportunities to work whilst travelling, are still significant, but without continued improvements to facilities on public transport these advantages will be eroded by the developing in car technology.

2.35 Travel choices need to fit with people's lifestyles and trends in society. Car dependence is an individual and social characteristic, and to reduce car use individual trip types need to be considered (SCC 1998). Leisure trips are growing rapidly and it has been suggested that this is associated with the loss of pleasant local opportunities, as walking and cycling have become less pleasant from busier roads (WA 2000). Transport planning which deals only with the consequences of social change will not be successful (Jones 2002). However barriers to mode shift can be overcome through joint working between communities, transport and non-transport sectors to develop coherent programmes for economic, social, and environmental enhancement (DHC 1999).

Lifestyle issues

2.36 With so many variables involved in travel behaviour, the stability of travel time budgets is both interesting and potentially very important for overcoming car dependency (Noble and Potter 1998). There is evidence both in the UK and other countries that daily travel time budgets have remained stable – at around an hour a day per person – over the last forty years, despite large increases in the volume of travel¹. This has been possible by switching from slower to faster modes, thereby covering a greater distance in a given time. About 70% of the growth in annual car-based distance per person seems to be associated with a growth in car ownership, but around 30% reflects the increase in door-to-door speeds brought about by improved roads and land use decentralisation to less congested areas (Jones 2002c).

2.37 Around 10,000 miles per year appears to be a pivotal level of car use for English drivers below which most drivers would like to use their cars more and above which they would like to use their cars less (Stradling 2002). At an average car speed of about 40mph, 10,000 miles would account for about two thirds of the average one hour a day travel time budget.

2.38 The implications of stable travel time budgets are that if people can be persuaded to switch from car to other (slower) modes, for example, to walk to their local park for leisure purposes instead of driving to a more distant leisure centre, then they might drive less, not just for leisure, but also for other trip purposes, and so reduce overall annual distances travelled. However, the

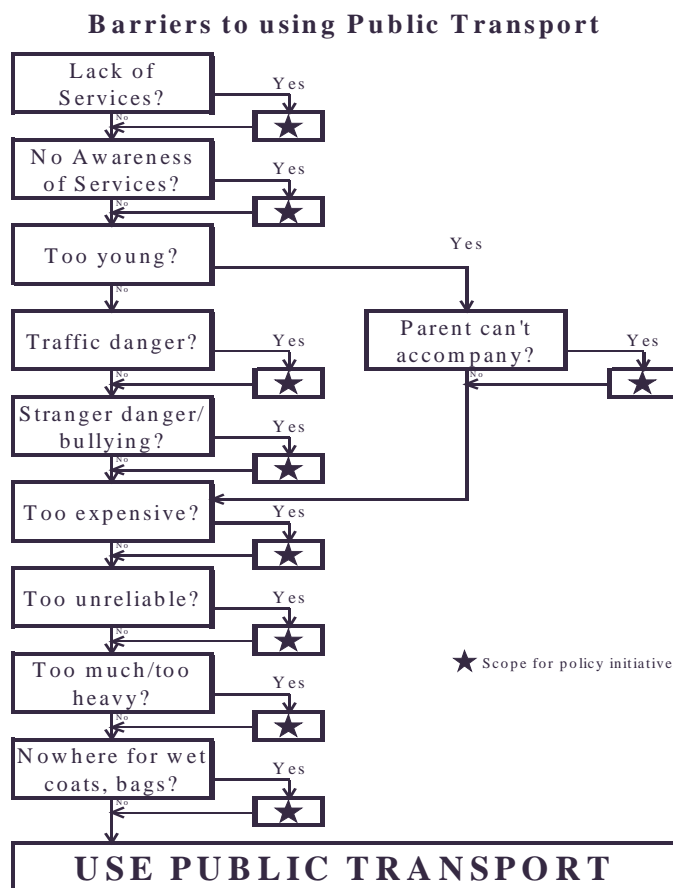
¹ This refers to UK domestic travel only, and does not take into account the growth in international travel. But covers day-to-day travel behaviour.

converse also applies. If there were to be fewer pleasant places to walk then it might be that people would want to use their full travel time budget on car travel resulting in greater annual distances being covered.

The complexity of travel choices

2.39 In the preceding discussion on barriers to mode shift, these have for clarity of presentation been separately characterised under three headings: hard, soft and complementary factors. In practice, however, mode decisions can often involve the traveller taking into account all three of these types of factors at the same time. This is illustrated in Figure 2 for school travel (taken from Jones and Bradshaw, 2000).

Figure 2: Barriers for School Travel



2.40 Parents who drove their children to school were asked why they did so and what changes would be needed for them to feel comfortable letting their children travel by an alternative mode. A range of factors were identified, with around half the parents questioned indicating that they would prefer not to have to chauffeur their children to school. One of the key lessons from the study was that - in many cases - there are multiple barriers preventing people switching from car to other modes. Tackling one or two issues may not be enough: change will only be brought about when all the relevant barriers have been addressed.

2.41 This theme was further developed in Scottish research which showed that many people were making school travel choices which they considered to be less than optimal to obtain what were perceived as wider social benefits (Halden 2002). Overcoming barriers to walking, cycling and public transport use therefore often needs to include both transport and non transport interventions.

Summary of barriers to mode shift

2.42 Table 1 summarises the main barriers to mode shift from car, under the three characteristics of “hard”, “soft” and “complementary” factors. As previously noted, the importance of each will vary according to local initial conditions, trip purpose and the characteristics of the travellers.

Table 1 – Barriers to Mode Shift

Factor	Barrier
Hard factors	<ul style="list-style-type: none"> • No other practical option based on land use and access needs (lack of services when and where needed) • Cost of public transport use • Public transport, walking and cycling too slow. • Lack of reliability in public transport
Soft Factors	<ul style="list-style-type: none"> • Lack of information about public transport, cycling and walking choices • Poorer comfort and travelling environment by public transport, walking and cycling - particularly in poor weather or on crowded public transport. • Need for independence and personal control. • Dislike of waiting. • Desire for convenience and variety provided by car travel in terms of time and route of travel, and opportunities for trip chaining. • Dislike of having to plan behaviour in advance, rather than acting on impulse • Higher physical, cognitive or affective effort (e.g. uncertainty and stress) required to use public transport. • Need for privacy and ability to undertake activities whilst travelling such as listening to music, thinking, and private conversations with passengers. • Employment factors such as subsidies for car travel, (e.g. mileage allowances, free car parking) or employer’s policy or requirement for employees to have a car available at work. • Enjoying car travel as an end in itself. • Real or perceived safety benefits of car travel, both in terms of personal security and risk of traffic accident injury. • Ability to express personality through driving style and driving a particular type of car. • Car used as portable office or mobile home.
Complementary factors	<ul style="list-style-type: none"> • High non transport costs • Social factors and perception of low status of public transport users • Legal and tax disadvantages of public transport travel. • Personality characteristics of travellers • Limited time budget. • The need to carry goods or children • Unable to use other modes due to health factors or disability.

Part 2 - Bridges to mode shift

2.43 There is a very extensive literature on the impacts on travel behaviour of policy measures for travel demand management and mode improvement. Table 2a summarises a range of 'hard' measures which have been shown to be successful, Table 2b summarises the equivalent 'soft' measures and Table 2c summarises the 'complementary' measures (Halcrow 2002, Litman 2002, Rye 2001, DHC 2001). Again, it is through introducing complementary combinations of these factors that success in encouraging mode shift is likely to be greatest.

Table 2a – Hard Factors to Encourage Mode Shift

Initiative	Mechanism
<i>Improvements to alternatives</i>	
Infrastructure changes	<ul style="list-style-type: none"> • Station upgrading, new bus shelters, improved waiting areas • Improve walking and cycling routes and facilities • Reallocation of road space from car to other modes. • Design of new infrastructure which facilitates safe use by all road users including children, disabled people, elderly people etc.
Service changes	<ul style="list-style-type: none"> • More frequent, reliable and cheaper public transport services with improved integration between modes. • Higher quality public transport vehicles • Reduced public transport fares
Park and ride sites and services	<ul style="list-style-type: none"> • Facilitating public transport use for parts of journeys to avoid congested roads or in areas of constrained parking supply².
Improve choices through land use planning	<ul style="list-style-type: none"> • New development with quality public transport. Transport development areas with intensive transport users located at public transport hubs. • Mixed use development opening up more short trip options. • Car free housing developments.
<i>Making car travel less attractive</i>	
Road user charges and taxes	<ul style="list-style-type: none"> • Charges and taxes for using roads including variable tariffs by time of day and day of the week. • Variable tax and insurance based on vehicle mileage.
Parking charges and taxes	<ul style="list-style-type: none"> • Wider charging for parking and controls on workplace parking.
Infrastructure	<ul style="list-style-type: none"> • Limit supply of road space in key locations • Limit supply of parking
Network management	<ul style="list-style-type: none"> • Reduce speed limits and increase enforcement in urban areas • Traffic calming and traffic mazes/traffic cells • Traffic signal timings favouring non-car modes.

2.44 Improvements to modal alternatives can be effective at increasing patronage, though usually only a minority of the passenger growth comes from former car users³. In general, light rail or guided bus schemes are more

² This needs to be carefully planned to avoid mode shift from public transport to car for the parts of journeys in uncongested areas.

³ To the extent that the service improvement achieves other policy objectives, such as reducing social exclusion, then the non-car growth may also be seen as a benefit.

effective at encouraging modal shift from car than conventional bus improvements. Park and Ride schemes are particularly popular with motorists by reducing the need to drive through congested areas. However the design of the schemes, and in particular the location of the “Park” areas, is critical if they are to achieve a net reduction in car kilometres.

2.45 There is now a strong body of evidence showing that long term price and service frequency elasticities are around twice the short term values (Goodwin, 1992), indicating that the benefits of public transport improvements build up over time – and may take five to seven years to achieve their full effect. There are several reasons for this, relating both to ‘soft’ factors (lack of information, poor image) and structural reasons that cause travel choices to be reappraised (e.g. moving home location, starting a family, retiring).

2.46 In general, restrictions on car use have a stronger effect on behaviour – at least in the short term – than improving alternatives (Jones, 1996). However, as with Park and Ride, careful monitoring is required to assess the overall net effect. The numbers of cars travelling into an area may decrease following an increase in parking charges, but some of these former users might switch to an alternative destination (especially for non-work trips) and in the process travel further by car.

2.47 Research into congestion charging around the world has shown a hierarchy of types of behavioural responses, depending on the level of the charge (Jones, 1992). At quite low levels of charge, drivers who can do so re-route or re-time their trips to avoid the charge. At higher charge levels significant mode shift may occur (depending on modal alternatives), together with some destination switching. At even higher levels, significant trip suppression may result – in cases where there is no reasonable mode or destination alternative.

2.48 Integrated policy approaches where public transport, walking and cycling alternatives are implemented in conjunction with measures to discourage car use in the same area have been shown to be effective both in terms of changing behaviour and in public gaining acceptability for the policies.

2.49 If British towns and cities are compared to their European counterparts such as Munich, Vienna or Zurich, where high quality rail-based public transport services have been provided in conjunction with parking restrictions and limits on car access, higher levels of car use are found in Britain. The lower levels of car usage in the European cities have also been sustained over several decades, despite rising incomes and car ownership (Jones, 2002).

Table 2b – Soft Factors to Encourage Mode Shift

Initiative	Mechanism
<i>Improvements to alternatives</i>	
Facility and site improvements	<ul style="list-style-type: none"> • Lockers, showers, changing facilities at workplaces and educational establishments.
Regulatory measures	<ul style="list-style-type: none"> • Encouragement for innovation, competition, diversity and efficiency in the regulation of public transport.
<i>Management and Administration</i>	
Institutional support including school and workplace travel plans	<ul style="list-style-type: none"> • Incentives for individuals and groups which encourage alternatives to car travel. • Individualised travel plans
Financial incentives	<ul style="list-style-type: none"> • Public transport subsidies matching or exceeding any car subsidies such as the provision of workplace parking. • Charging employees for workplace parking.
Alternative work schedules	<ul style="list-style-type: none"> • Fit work schedules to public transport availability
Support for public transport users	<ul style="list-style-type: none"> • Guaranteed emergency ride home for public transport users • Pool cars/vans for business use when public transport cannot be used.
<i>Technology, information and marketing</i>	
Electronic communications	<ul style="list-style-type: none"> • Modification of trip patterns (e.g. as a result of PT information)
Intelligent transport systems	<ul style="list-style-type: none"> • Management of system operation and capacity to prioritise efficient travel.
Business and marketing	<ul style="list-style-type: none"> • Improved public transport information. • Special event management encouraging quality competitive public transport and ticketing provision for football matches, concerts, conferences etc. • Tourist travel management with flexible integrated public transport ticket options.
Public transport information	<ul style="list-style-type: none"> • Target public transport information where it is most useful

2.50 'Soft' improvements to non-car modes largely rely on a combination of better information, fares discounts, marketing and small scale improvements at workplaces and other sites (EU 1999).

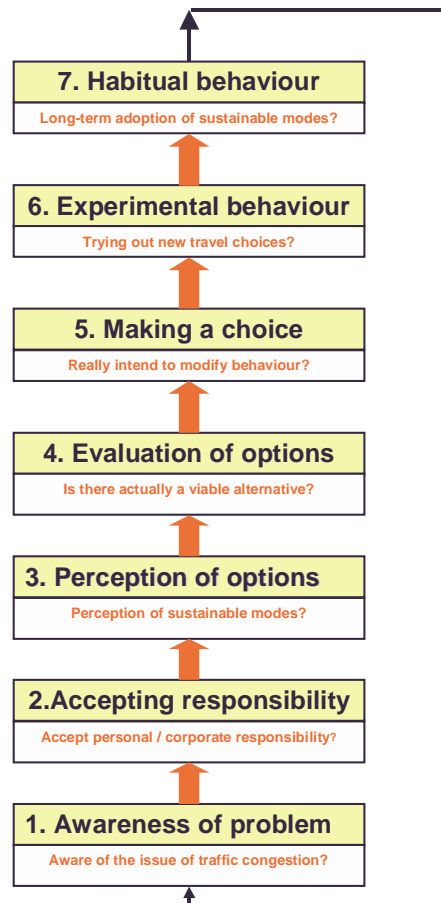
2.51 A significant impediment to public transport use is lack of information, or incorrect information. In general, the perceptions of non-users regarding public transport are worse than the reality: they think services are less frequent, slower and more expensive than is actually the case (EU 1999).

2.52 Better pre-trip information can thus remove some barriers to public transport use, through the provision of user-friendly timetables, a telephone enquiry service and information on the internet. The effectiveness of this measure can be enhanced by real-time in-trip information (e.g. real-time information at bus stops and railway stations), and by marketing campaigns that raise awareness of the benefits and advantages of public transport use (Jones 1995). Again, this may also increase use among non car drivers.

2.53 Encouraging car drivers to switch voluntarily to public transport is potentially a long and complex exercise, involving a process of psychological and behavioural change. Figure 3, taken from the on-going EU 'TAPESTRY' research project, identifies up to a seven-stage process of change that may

be involved in achieving a permanent change in their travel behaviour (TAPESTRY 2001).

Figure 3 – Process of Travel Behaviour Change



2.54 First, there needs to be an awareness that there is a problem that has to be addressed (e.g. traffic congestion, air pollution). Next the driver has to accept personal responsibility – both for the problem and to recognise that changing their own behaviour would make a difference and therefore would be worthwhile. Drivers then need to be aware of alternative modes, identify whether there are any viable options – given their particular circumstances – and decide to make a change. Given that an alternative has been identified, the driver then experiments with this alternative and – only if the experience is positive – does a permanent change in behaviour take place.

2.55 Studies in the UK and elsewhere (e.g. Ciaburro *et al* 1994) have found that drivers typically report that about 10% of trips they currently make by car could easily be made in some other way, or not at all. More in-depth investigations have found that the true figure is nearer to 20% of trips currently made by car are not car dependent (RAC, 1995), e.g. as noted previously for school travel, around half of parents who drive their children to school say that they would rather not have to undertake this task.

2.56 Recent research for the Department for Transport (DfT 2002) reviewed the effectiveness of a wide range of 'personalised journey planning techniques', from computer-based journey planners, through dialogue marketing approaches, to teachers' packs, mobility centres and travel awareness campaigns. This identified that one of the most promising and successful approaches was the 'Individualised Marketing' approach, developed by Socialdata in Munich. Here all households in an area were directly approached, and asked if they would like information on travel alternatives to the car; customised information packs were then sent out based on requests received.

2.57 A separate study (UITP 1998), reports on the success of 32 small scale pilot projects carried out in ten European countries, with the aim of increasing public transport use. Across the 32 sites, the average increase in public transport trips was 18%.

2.58 Recent experiments in Perth, Australia (Rose 1997) have used the same approach, but aiming to increase walking and cycling as well as public transport use. As a result of households being sent customised information packs and incentive packages, reductions in car trips of about 14% and in trip distances of around 17% have been achieved in a project involving all households in South Perth. These changes seem to have been sustained over several years. The city authorities have now decided to extend the approach to the whole city, on a rolling programme of area initiatives.

2.59 A recent small scale pilot study in Gloucester using Individualised marketing achieved a 9% reduction in car use (SUSTRANS, 2002). The Department for Transport is currently piloting fourteen studies using this kind of approach, and Transport for London is setting up four similar pilot projects in London.

2.60 Other types of soft measures are to be found in a range of Travel Plans, that are being introduced at workplaces, schools, hospital sites and major leisure sites (e.g. football grounds). These measures are usually targeted at particular modes. For example cycling is promoted with secure bicycle parking, with lockers and showers, plus a business mileage allowance (tax free). The emphasis is on practical measures to facilitate alternatives to car commuting such as the development of a database for car pooling, and a guaranteed ride home. These are being assessed in another current EU research project, MOST⁴. Initial results from this research and other UK based research has been encouraging (e.g. Rye 2001, DHC 2001 Halcrow 2002).

2.61 International experience on the results of the implementation of hard and soft measures is growing. Success in encouraging mode shift is found to be context specific and heavily dependent on combinations of measures for their effectiveness (Halcrow 2002). Survey work on attitudes to potential policies suggests that more reliable and cheaper public transport, shorter journey times and integrated ticketing would be the most effective measures in promoting mode shift (Steg 1997).

⁴ Project website <http://mo.st>

2.62 However, over half of car drivers in Scotland already make regular or occasional use of bus or train, and nearly a third of drivers would like to use their cars less (NFO 2001). This, therefore, appears to suggest that there is a broad willingness to use public transport where it is perceived to be a practical alternative.

2.63 There are measures that can be taken to encourage a reduction in car travel, other than by improving modal alternatives (or awareness of them), or directly restraining car use. These ‘complementary measures’ include initiatives that can be taken by organisations in other sectors that will assist in achieving a mode shift from car. Table 2c lists some examples.

Table 2c – Complementary Factors to Encourage Mode Shift

Initiative	Mechanism
<i>Technology, information and marketing</i>	
Business and marketing	<ul style="list-style-type: none"> • Substitution of some travel (e.g. tele-working and tele-conferencing) • Health education publicity encouraging more walking and cycling. • Providing travel information in connection with housing choice.

2.64 In the business area there is scope for reducing the need to travel, by encouraging tele-working and tele-conferencing. There are mixed views, however, as to whether overall car travel declines as a consequence of adopting such practices. There are concerns that car use for non-work travel might increase to compensate (under the constant travel time budget hypothesis), or that commuters may move to more rural locations further from their workplace, if they only have to travel in on a limited number of days per week – perhaps maintaining the same weekly commuting mileage/time as previously (Lehto 2002, Zumkeller 2001).

2.65 There are initiatives that other sectors can take which will also help to reduce car use. The most obvious example is in the health sector, where doctors may encourage walking and cycling as a form of physical exercise, in order to reduce the incidence of heart disease. One such initiative is currently being implemented in Gavle, Sweden, as part of the TAPESTRY project (see www.eu-tapestry.org).

2.66 It is increasingly becoming recognised that changes in habitual travel behaviour are most likely to be achieved when habits are broken as a result of major life events. These may be associated with changes in occupational status (getting a job, retiring), in life cycle stage (e.g. having a baby), or in physical fitness. Another occasion when travel choices are reappraised is when people move house. In a recent German research project called Mobiplan, web-based software was developed to enable prospective moves to assess the likely travel implications of moving to particular sites. Details can be found at: www.rwth-aachen.de/mobiplan.

2.67 The software provides information on the availability of a range of services from a chosen location (e.g. schools, shops, libraries). In addition, by inputting details of work location and the activities that would be undertaken in a typical day or week, the software indicates how these activities could be

reached using a variety of transport modes (car, public transport, walking and cycling). In each case it estimates total travel times and costs, and environmental impacts in terms of air pollutants and CO₂ production.

Part 3 - Implications for transport modelling

2.68 As discussed above, rather than simply predicting the demand for travel, transport planners now need to understand travel behaviour (Jones 2002). This involves analysis of what motivates people to travel and how they will respond to changes. Relevant costs in transport planning can therefore be as diverse as: the differences in land prices between a rural greenfield and city centre brownfield development, or the costs of travellers purchasing and using a mobile phone to keep in touch when travelling. *Benefits* might include issues as diverse as improved social cohesion, better air quality, and local economic growth.

2.69 Faced with no established analytical framework within which to consider these diverse and complex issues, current integrated transport planning (SE 2001) draws heavily from inherited modelling approaches originally developed to support “predict and provide”. Analysis of wider costs and benefits continues to be much less rigorous than for transport costs pending the development and application of new modelling techniques (Simmonds et al 2001).

2.70 Surveys of travel behaviour and barriers to mode shift need to fit within a robust behavioural analysis framework if they are to be used in practical transport planning. Behavioural analysis can include: activity analysis including trip chaining, longitudinal analysis looking at trends in travel behaviour, analysis of cultural factors including structural or conscious dependence on a mode, accessibility constraints with travel cost thresholds by trip purpose taking account of lifestyle factors, and analysis of the cost and value of travel (Hensher 2001).

2.71 Despite the large volume of research on travel behaviour, there has been relatively little effort to implement the findings of this in practice. Current state of the art evaluation procedures lag significantly behind the understanding of travel behaviour (Jones 2002). One of the reasons why travel behaviour research has been largely ignored in modelling is that it is not easy or perhaps practical to include a range of important behavioural relationships within the current four stage demand models which are widely deployed.

2.72 One exception has been the move in some cases from trip-based to (simple) round-trip tour based modelling. It is intuitively obvious that mode choice decisions, between travelling by car or by public transport, are not made on a (one-way) trip by trip basis, but looking at the whole sequence of travel, from home until returning home: it is the ‘weakest link’ on this chain that determines whether a non-car option is feasible.

2.73 Yet, only the most recent models in Scotland have been based on tour data. The advent of modelling exercises designed to look at the impacts of congestion charging (where total costs incurred depend both on the numbers of affected trips in a tour and the times of day at which boundaries are

crossed), have required modellers to develop tour-based models. These were first used in London in the 1980s, and are now being employed in the current study for City of Edinburgh Council to model congestion charging options in the city (MVA 1999).

2.74 Activity based transport modelling would provide a framework for more robust consideration of travel behaviour, but is currently regarded as a distant goal (Simmonds 2001). Therefore, whilst travel behaviour research increasingly works with a general presumption that activity based models will become practical in the future, at present there remains a significant gap between theory and practice.

2.75 In some countries, limited activity based modelling is now underway, particularly in The Netherlands, Japan and the USA (Arentze *et al* 2001). More general activity-based analysis is now being applied where this supports policy goals (e.g. maximising time spent on particular activities) (Jones 2002). However, in Scotland there are no national policy goals related to travel time or time budgets, so travel behaviour research needs to be fitted within an analytical framework designed to support transport policy objectives for economy, accessibility, integration, environment and safety (SE 1998).

2.76 Recent research in England (Halcrow 2002) classified influences on travel demand according to whether or not they were included in current transport models for multi-modal studies. The changes most likely to impact significantly on car travel demand, which are not generally included in transport models were considered to be:

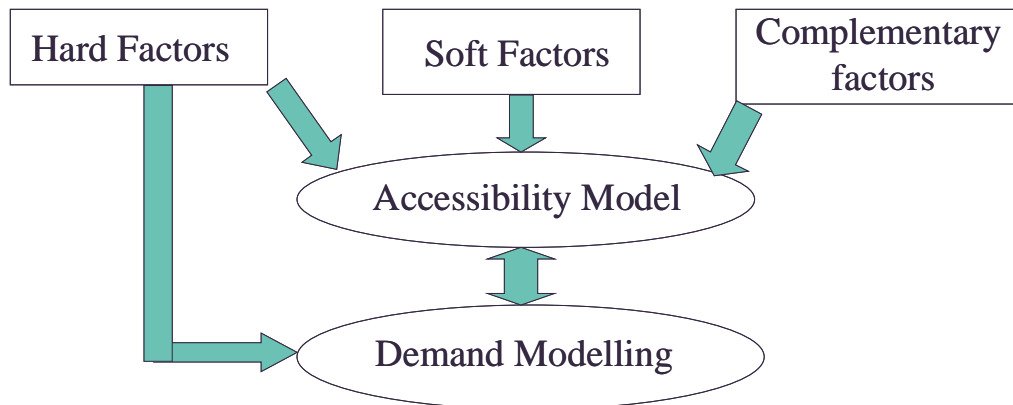
- Electronic communications and travel – e.g. tele-working, and videoconferencing.
- Focused initiatives to change travel behaviour - Individualised marketing campaigns, targeted public transport information, workplace travel plans, and school/higher education travel plans.
- Public transport improvements – Particularly bus quality partnerships and fares and ticketing initiatives.

2.77 Most of the current modelling activity concentrates on transport economic efficiency and presents the results as present value benefits within a multi-criteria analysis framework. However the results of such cost-benefit evaluation have often led to recommendations that are at odds with what the public and politicians regard as preferred solutions (Jones 2002). This is partly because the aspects of transport that particularly interest the public and politicians are the links between transport and the wider economy, society and the environment. Yet these links are rarely considered robustly in appraisal (Mackie 2000). SACTRA (1999) highlighted the wide range of spurious claims about the impacts of transport on the wider economy, but the reality remains that these spurious claims probably still have more influence over transport decisions than established transport modelling (Shaw 2002).

2.78 When looking at links between transport and non transport factors, it has been identified that accessibility models can include a very wide range of non-transport factors (DHC 2000, DfT 2002). They can therefore be used to

reflect a wider range of impacts than is usually practical with demand models. By considering the impacts on people rather than on vehicles, they also offer advantages when looking at barriers to mode shift as shown in Figure 4.

Figure 4 – A Possible Analytical Framework



2.79 Although there are many uncertainties in aspects of travel behaviour, the accessibility analysis allows a highly disaggregate approach to be taken to the important variables, including types of people and types of trips. With this approach the best available research on soft factors and complementary factors can be included in the accessibility analysis alongside the hard factors.

2.80 Another approach which is gaining favour based on demand modelling, is to gear the analysis to assess the sensitivity of travel patterns to specific interventions (Halden 1996). In such analysis, the design of policy models need not be constrained to transport factors, but can include whatever relationships are needed to assess the range of policy scenarios being investigated (Walker 2001). However, the accuracy of the predictions from strategic policy models will only be as good as the algorithms which define the behavioural responses to diverse interventions. This relies upon effective translation of findings from behavioural modelling into policy modelling.

2.81 There is already a very extensive body of research which can be used to value particular variables within transport models relating to interchange, information and other factors (e.g. Cook 1999). The focus of much of this is on discrete elements or components of a journey. However in travel behaviour theory (Mokhtarian 2001) it is the travel choices which are discrete, and the different components of a journey such as cost, time, effort, route, interchanges, etc. are viewed as a package by travellers.

2.82 Despite the development of many complex models for the recent national transport corridors study in Scotland (MVA 2002), including network models, four stage models, and land use transport interaction models, it was still necessary to undertake relatively simple logit choice analysis to estimate park and ride demand. A similar approach is likely to be needed for other "barrier modelling", interfacing such analysis with policy models, network models and accessibility models as required to ensure appropriate decision support.

3. Analysis of Travel Choices

Review of Existing Analysis of Travel Choices

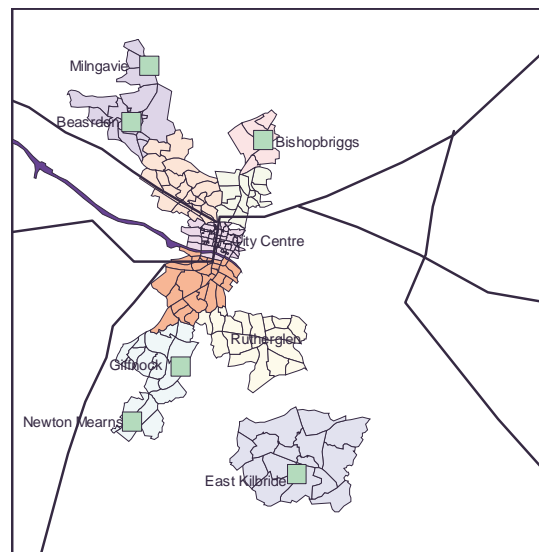
3.1 The Glasgow area has many of the highest and lowest car ownership areas in Scotland, benefits from an extensive urban rail network, and has seen significant changes in patterns of bus services in recent years. In taking forward the developing transport strategy for the West of Scotland Strategic Transport Partnership it is important to understand the range of travel choices available throughout the area and the scope for mode shift to be achieved.

3.2 Four potential corridors were identified in the research brief as suitable for more detailed study:

- Milngavie/Bearsden to Glasgow
- Bishopbriggs to Glasgow
- East Kilbride to Glasgow
- Giffnock/Newton Mearns to Glasgow

3.3 These corridors all have rail, bus and car travel options available and include both high and low car ownership areas. To consider the characteristics of the corridors, eight sectors were identified. The boundaries for these were based on the zonal structure for the Strathclyde Integrated Transport Model. This is a four stage travel demand model which is developed and managed by SPT and can provide a detailed breakdown of modelled modal split across the area. These boundaries of the selected zones are shown in Figure 5.

Figure 5 – Select Zones from SITM for Modal Split Analysis



3.4 Table 3 compares some key social and demographic indicators for the eight sectors in the four corridors.

Table 3 – Comparison of Social and Demographic Characteristics

	Population	% econ. inactive	% elderly	% 0 car	% 2+car
Bearsden and Milngavie	31013	23%	16%	29%	27%
Bishopbriggs	15615	18%	13%	27%	27%
East Kibride	69958	17%	12%	28%	19%
Giffnock and Newton Mearns	47458	22%	12%	27%	34%
City North	19890	30%	17%	75%	3%
City North West	60724	28%	14%	61%	7%
City South	55926	23%	13%	48%	7%
Cambuslang/Rutherglen	70566	23%	15%	51%	9%

Source SITM courtesy of SPT

3.5 It can be seen that the highest car ownership is for Giffnock and Newton Mearns and the lowest is for the City North area. However, in broad terms the four outer areas show similar characteristics, and the four inner areas show similar characteristics. The city sectors generally have slightly more economically inactive people and elderly people than the outer sectors and there is a greater contrast between rich and poor for the two corridors on the north side of the city.

3.6 To consider the transport characteristics of the four corridors, the starting point was to identify what previous analysis had been undertaken by the relevant Councils, Strathclyde Passenger Transport (SPT) Executive and the Glasgow and Clyde Valley Structure Plan (GCVSP) Team.

3.7 Based on consultations with staff in each of these authorities, the recent previous analysis relevant to the current research and the main findings are summarised in Appendix A. A key issue to emerge from these local studies is the high importance given to public consultation. The organisations with a more regional brief, SPT and GCVSPT, have also undertaken detailed analysis of travel patterns and trends.

3.8 The local consultations demonstrate that if people see personal benefits from public transport improvements they are likely to support them. At present many car users have no intention of using buses, so do not support the changes to bus services which might make the services more attractive to them. Rail service improvements serve many fewer people than buses but are generally supported, including by car users, since car travellers also sometimes travel by rail.

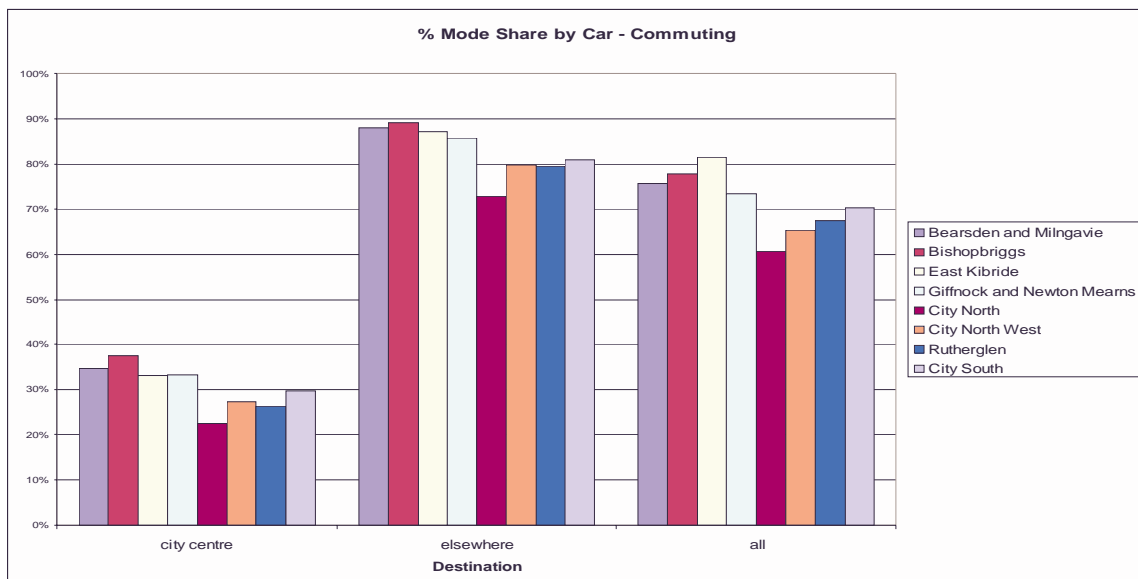
3.9 Data was sought on mode split for each of the corridors. Unfortunately, survey data was only available for two of the corridors, as described in Appendix A. In the absence of recent survey data covering all corridors and all modes, SPT was able to supply estimated data on the car/public transport mode split from the Strathclyde Integrated Transport Model (SITM) trip matrices. The SITM travel matrix data had been estimated from origin-destination survey data collected over many years and some of the surveys dated back nearly 10 years. Nevertheless the estimation programmes used to develop the trip matrices involve sophisticated procedures that take account of the age of each data set so should have ensured that a reasonably robust representation was obtained. The reliability of the data is further demonstrated

by the ability of SPT to calibrate the SITM travel demand against observed levels. Eight areas were chosen for analysis of mode split as follows:

- Bearsden/Milngavie,
- Bishopbriggs,
- East Kilbride,
- Giffnock/Newton Mearns,
- City North,
- City North West,
- City South
- Cambuslang/Rutherglen.

3.10 Figure 6 shows the percentage of car travel for each of the four corridors for travel to work and Figure 7 shows the percentage of car travel for other trip purposes.

Figure 6 – Mode Share for Car Commuting by Destination

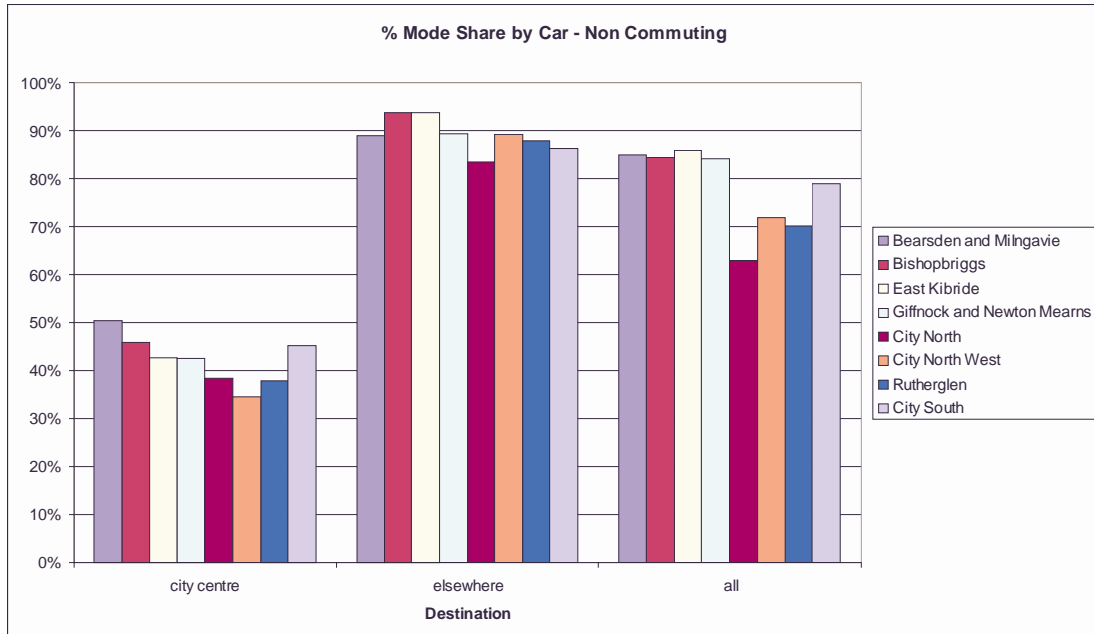


3.11 For travel to the city centre, around 30% of trips are by car, but this varies considerably from area to area. Car attracts the highest mode share from Bishopbriggs, but the lowest mode share is from the city north area which is also on the Bishopbriggs to city centre corridor.

3.12 Of the four corridors being considered, Giffnock/Newton Mearns has the lowest mode share by car, but this is still considerably higher than other more central parts on the south side of the city such as Rutherglen.

3.13 Even though the mode share for trips from East Kilbride is similar when compared by type of destination, it has much the highest mode share by car overall since there are a lower proportion of trips to the city centre.

Figure 7 – Mode share for Car Travel for Non Commuting Trips



3.14 For non commuting trips a different picture emerges (Figure 7). Bearsden/ Milngavie and East Kilbride have 85% of trips by car, and even for trips to the city centre, Bearsden/Milngavie has over 50% of trips by car.

3.15 East Kilbride and Bishopbriggs have higher percentages of car travel to non city centre destinations, but for all trips the car percentage is very similar for all four of the outer areas.

3.16 For trips to the city centre, the city north area has more trips by car than for other more central areas, contrasting significantly with the picture for commuting trips.

Mapping of Travel Choices

3.17 It is particularly important to understand the actual car and non car based travel choices available to people in the potential case study corridors. Generalised time and cost skims from the Strathclyde Integrated Transport Model have therefore been obtained from SPT for two scenarios:

- Modelled 2001 networks – Road and public transport skims and the associated planning data showing population employment etc.
- Forecast 2011 networks – Road and public transport skims with a best estimate of future transport schemes including the Larkhall railway, M77 completion, Glasgow Southern Orbital (GSO), M74 Completion, and Finnieston bridge. Since demand model test results for 2011 were not available with forecast Structure Plan planning data, the base planning data factored up in line with national economic trends was used.

3.18 This allows travel choices between modelled zones to be compared for car and public transport travel. Perhaps the clearest way to compare the car and non car choices available is to look at the ratio of car to non car accessibility by trip purpose.

3.19 Figure 8 shows the ratio of car to non car accessibility to work for 2001 am peak travel (i.e. car accessibility to jobs for each zone/non car accessibility to jobs for each zone)

3.20 It can be seen that of the four corridors East Kilbride is most dependent on car travel for access to jobs with large parts of the outer corridor having ratios of greater than 4. The other three corridors have similar overall ratios although Newton Mearns and Milngavie are further from the city centre and have higher ratios than Bearsden, Bishopbriggs and Giffnock.

3.21 A similar plot for the 2011 network is shown in Figure 8. This shows that over time the impact of the road building to the south of the city such as the M77, GSO, and M74 maintain the ratios at a similar level to the present day. However in the north of the city increasing levels of road congestion result in lower ratios with public transport becoming more competitive with car travel.

3.22 Figure 10 shows the ratio of car to non car accessibility for accessibility to people for 2001 am peak and Figure 11 shows the equivalent ratios for 2011. Access to population is the indicator most often used to describe accessibility levels independent of trip purpose.

3.23 The overall patterns of the accessibility ratios are similar to those for access to work, but since the population is more broadly distributed away from the city centre than employment, the overall level of the ratios tends to be higher indicating a higher dependence on car travel.

Figure 8 – 2001 Am Peak Accessibility to Jobs Ratio

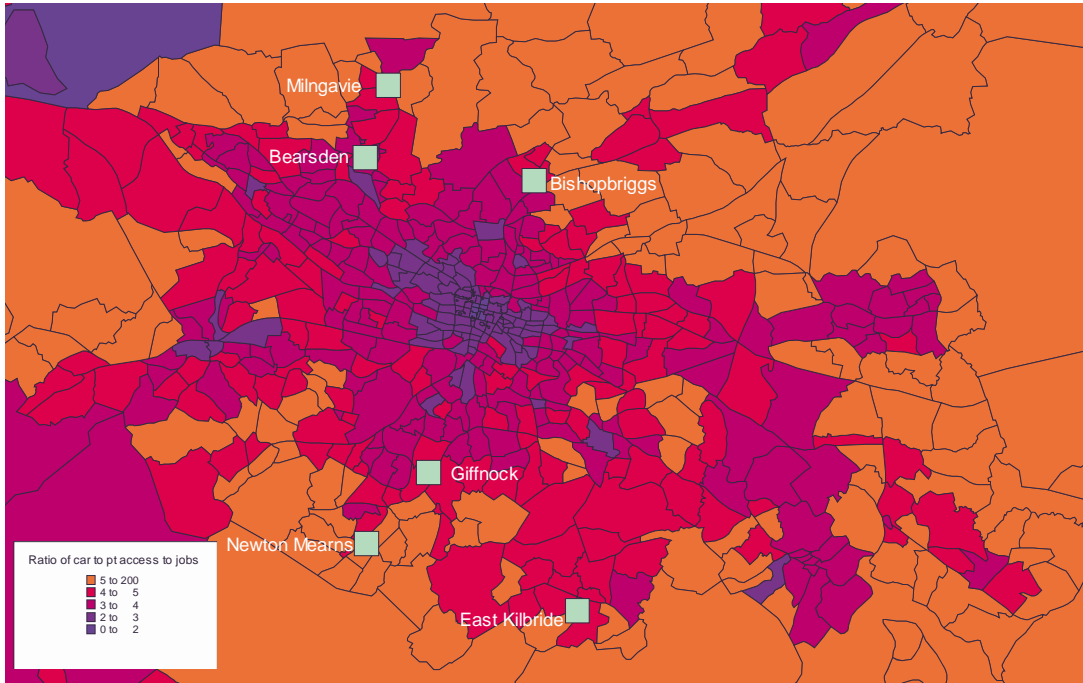


Figure 9 - 2011 Am Peak Accessibility to Jobs Ratio

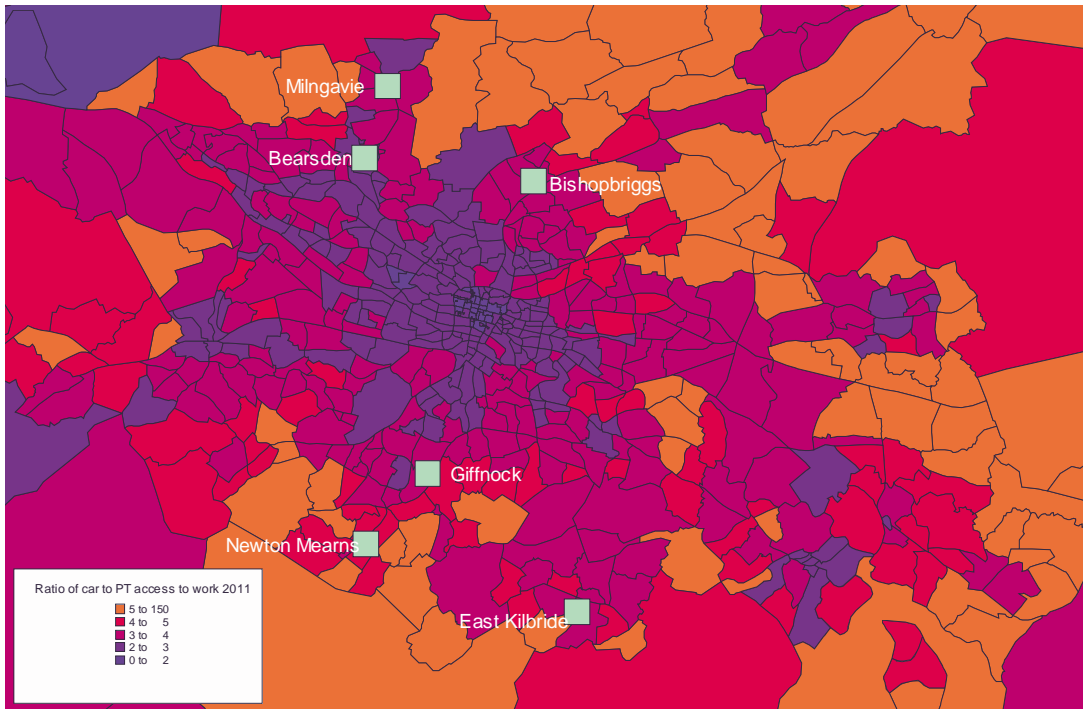


Figure 10 – 2001 Am Peak Accessibility to Population Ratio

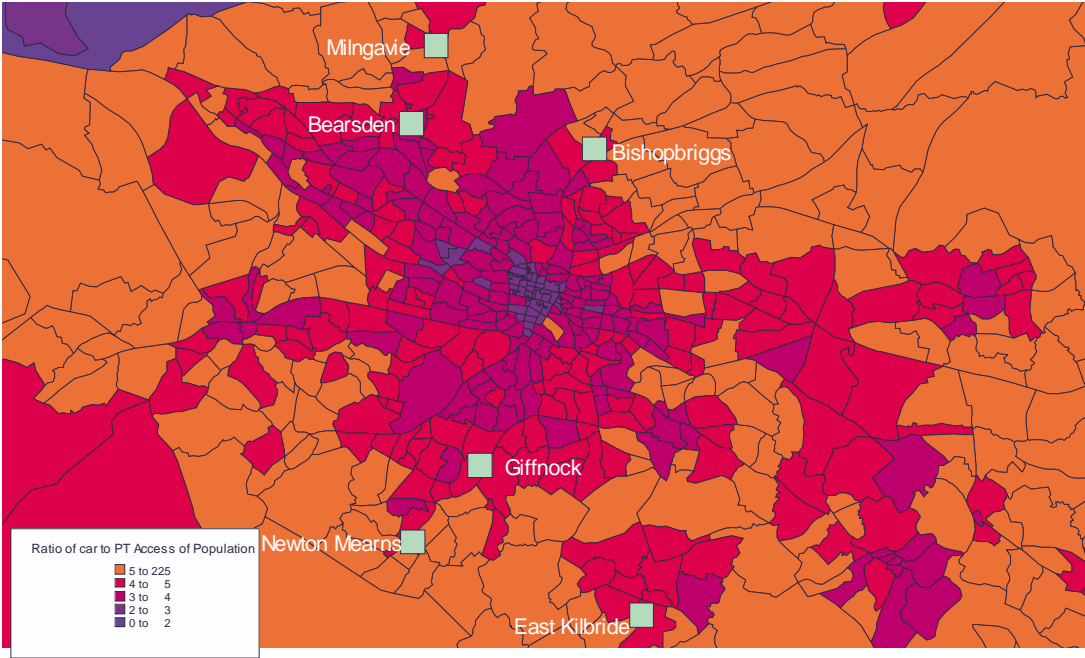
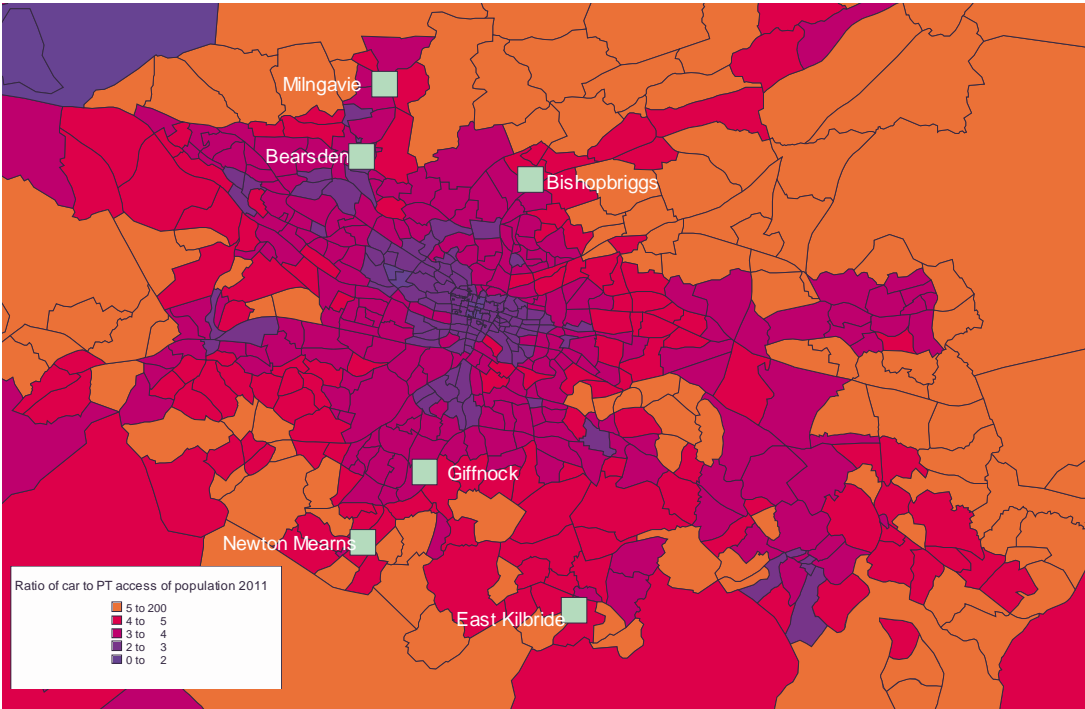


Figure 11 - 2011 Am Peak Accessibility to Population Ratio



Comparison of modal split with accessibility ratios

3.24 It would be expected that people living in zones with low accessibility ratios would travel more by public transport than those living in zones with high ratios. The mode split data have therefore been compared with the accessibility ratios for work and non work trips as shown in Figures 12 and 13. The data has been normalised to allow comparisons to be made between % trips by car and accessibility ratios.

Figure 12 Comparison of Mode choice and Accessibility for Work Trips

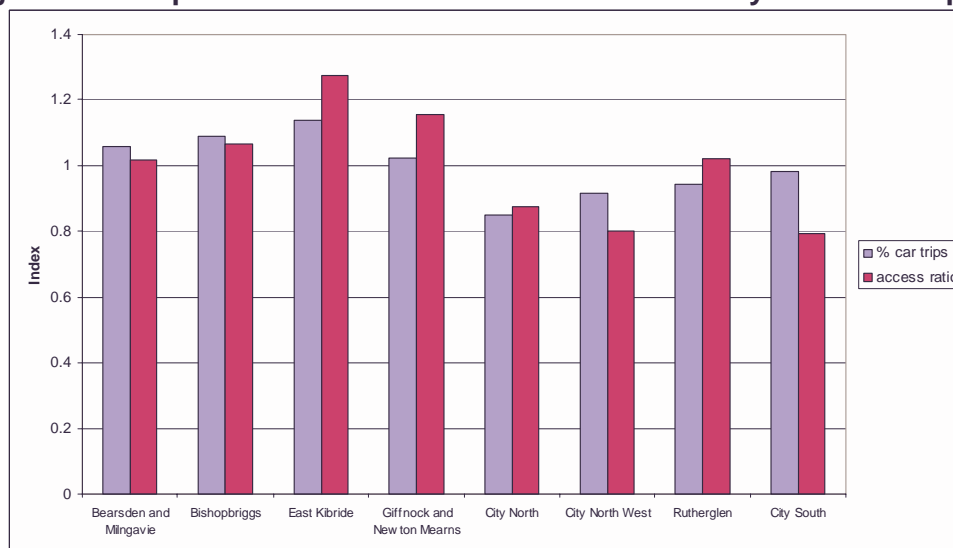


Figure 13 Comparison of Mode Choice and Accessibility for Non-Work Trips



3.25 It can be seen that in general there are more car trips than might be expected for Bearsden/Milngavie, City North West and City South. There are fewer car trips than might be expected for East Kilbride, Giffnock/Newton Mearns (for work), City North and Rutherglen. For the other areas there is a

close correlation between % car trips and accessibility. Work and non-work trips show similar trends with only Giffnock/Newton Mearns showing a marked difference

3.26 Characteristics of the four corridors are summarised in Table 4.

Table 4 – Summary of Corridor Characteristics

Corridor	Mode share	Accessibility ratios
Milngavie/ Bearsden to Glasgow	It is estimated that about 34% of commuting trips to central Glasgow are by car which is similar to the other corridors but at 51% of non commuting trips to the city centre this corridor has the greatest mode share by car. For trips to non city centre destinations the mode share by car is generally similar to Newton Mearns/Giffnock and lower than for Bishopbriggs or East Kilbride.	Much of Bearsden and parts of Milngavie have ratios of car to non car accessibility of 4 or less for access to work indicating that public transport is likely to be viewed as a practical option for some trips based on time and cost factors. For access to population, public transport is less competitive but parts of Bearsden still have ratios of 4 or less. These ratios are falling as road congestion grows suggesting that public transport will become more competitive in the future.
Bishopbriggs to Glasgow	There is a higher percentage of commuting trips by car to the city centre (38%) and to other destinations (89%) than for the other suburbs but also a higher percentage of trips to the city centre relative to other destinations. As a result the overall mode share by car (77%) is lower than for East Kilbride. For non commuting trips 84% of trips are by car.	Much of the Bishopbriggs into Glasgow corridor has ratios of 4 or less for both access to work and access to population but over the next ten years this is likely to fall to 3 or less for all but the most peripheral parts of the corridor. Public transport should therefore be a practical option for many current trips and can be expected to become increasingly attractive in the coming years.
East Kilbride to Glasgow	For commuting trips, the area has much the highest proportion of trips by car (82%) but this is accounted for by the lower proportion of trips to the city centre compared with other corridors. For non commuting trips the area has very similar overall mode share to the other suburbs but a lower level of car use to Glasgow city centre than for Bearsden/Milngavie or Bishopbriggs.	For parts of East Kilbride, public transport is likely to be a practical choice for both access to work and population. The model results suggest that the ratio of car to non car accessibility will reduce slightly in the coming years but the major road building such as the M74 and Southern Orbital balance the effects of growing traffic much more than in the north of Glasgow. Peripheral parts of East Kilbride and the city have higher ratios, but from Cambuslang/Rutherglen into the city public transport becomes increasingly competitive.
Giffnock/ Newton Mearns to Glasgow	The Giffnock/Newton Mearns area has a mode share by car that is fairly close to the average for the four suburbs being considered for both commuting and non commuting trips to both the city centre and elsewhere.	For most of Giffnock and parts of Newton Mearns car to non car accessibility ratios for access to work are 4 or less. By 2011 an increasing proportion of the corridor has ratios of 3 or less but the impacts of new roads such as the GSO appear to be greater for Newton Mearns than the impacts of growing traffic levels. For access to population the ratios are more patchy, perhaps reflecting the importance of peripheral travel on the south side of Glasgow. The ratios fall steadily towards the city centre for both access to work and access to population. However by 2011 most of Giffnock and some of Newton Mearns has ratios of 4 or less

4. Approach to Survey Work

Selection of Corridor for Case Study

4.1 It was necessary to focus the resources for the research on one corridor to allow the many factors affecting travel behaviour to be analysed in detail. Based on the analysis in Chapter 3, the Newton Mearns/Giffnock corridor was selected.

4.2 This corridor has high car ownership and has levels of car use and accessibility which are typical of the four potential corridors. It includes wealthy outer suburbs and travellers need to travel through poorer city areas to reach the city centre. It also is a corridor which needs fresh ideas on public transport to match the road investment in the south of Glasgow.

4.3 The mix of radial and peripheral travel needs from this part of the city allows a wide range of travel experiences to be considered in the research ensuring that the research findings can be applied widely across Scotland.

Approach to Survey Work

4.4 The literature review identified a very large range of factors associated with barriers to modal shift. To identify which combinations of these factors are relevant to which groups of people, and for what trip purposes, the survey programme involved several parallel and complementary strands:

- A telephone survey to define the main constructs that people have about the transport system and the barriers to using public transport, walking or cycling.
- Repertory grid completion to allow people to quantify the factors that act as barriers to modal shift in their own terms.
- Focus group discussions to consider broadly the strengths and weaknesses of travelling by each mode, allowing people to identify the most important barriers to modal shift.
- A postal survey to quantify the relative importance of the main factors emerging from the focus groups, both individually and in combination.

Corridor Characteristics

4.5 The general characteristics of the four potential corridors were described in Chapter 3. Before discussing the results of the survey work, it is worth looking in more detail at the transport characteristics of the Newton Mearns/Giffnock to Glasgow corridor. The general characteristics of the transport infrastructure and services are as follows:

- Road - The A77 road is generally free flowing between Newton Mearns and Giffnock but includes many congested sections between Giffnock and the River Clyde. From Eastwood Toll, most

drivers choose to divert westwards and use the M77 motorway into Glasgow City Centre. This new motorway was opened in the early 1990s, partly to relieve congestion on the A77 in the city. Peak hour congestion is however now experienced both on the A77 and on the motorway which experiences typical tailbacks of several kilometres to the Pollock area. Off peak journey times from Newton Mearns to the City Centre are approximately 22 minutes. The modelled peak period journeys are only a few minutes higher, dependent on the exact origin and destination, but this is averaged across a two hour peak period, and journey times throughout this period are likely to vary. Some people may therefore experience substantially longer journey times.

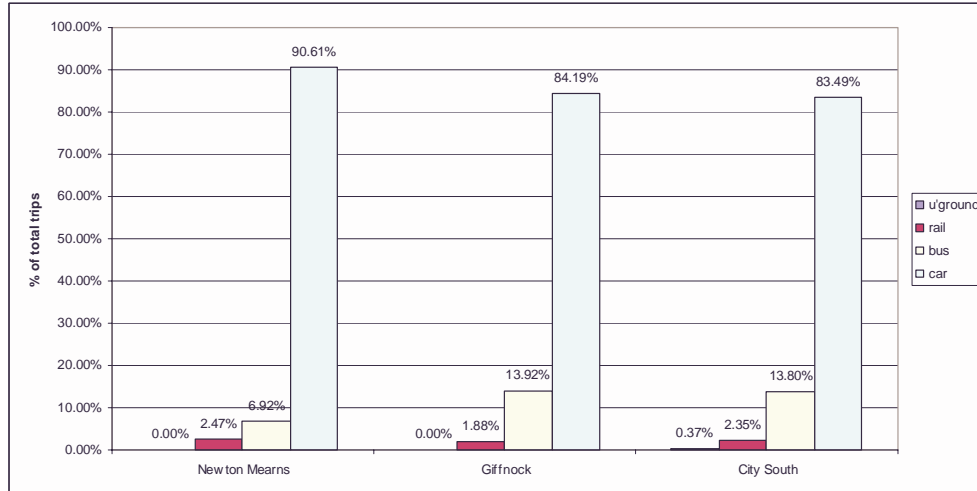
- Bus - Bus services in the corridor are very regular with about 15 buses an hour from Newton Mearns/Eastwood Toll area to the city centre and up to 50 buses an hour to the city centre from Giffnock via Pollockshaws Road. There are bus priority lanes on most of the congested sections but the effectiveness of these is often reduced by parked cars and bus journey times are typically 30 to 45 minutes from Eastwood Toll to Glasgow City centre. The majority of the services are operated by three bus companies First Glasgow, City Sprinter and Stagecoach.
- Rail – Newton Mearns is served by the Neilston Line which supports three services an hour in peak periods and a half hourly service for the remainder of the day. Giffnock is served by the Neilston, East Kilbride, Barrhead, Newton and Cathcart Circle services. Service frequencies are therefore better than half hour throughout the day and better than 15 minutes in peak periods with journey times of 18 minutes from Whitecraigs station to Glasgow city centre. The area immediately south of the Clyde is served by all the above rail services and by underground/subway services via Bridge Street, West Street and Shields Road stations.
- Walk/Cycle – Most walking routes are by roadside footpaths. There is some off road provision of both walking and cycling routes and in places on street cycle lanes have been provided.

4.6 Modal split in the corridor for car and public transport was summarised in Chapter 3. For this corridor it is possible to split the public transport market into rail, bus and underground using detailed data from SPT transport models and from ticket data on the number of rail and underground boarders at each station in the corridor. There was no readily available data on walking and cycling trip numbers. The best available information on walking and cycling activity data would have been from household survey data, but analysis of this was beyond the resources of this research.

4.7 For the rail/underground data it was necessary to adjust the total number of boarders at each station to exclude passengers from outwith the corridor. This included estimating the proportion of interchanging passengers from other modes (including car), and for stations near the boundary of the corridor the proportion of the walk in catchment from the corridor. The

estimated rail trip numbers were then subtracted from the total number of modelled public transport trips to estimate bus usage.

Figure 14 – Estimated Modal Split in Corridor



4.8 The proportion of car use declines moving towards the city centre. The data includes both home and non-home based trips. The vast majority of the non home based trips are by car. These non-home based work trips make up about a third of the totals and explain why even the city South area has over 80 per cent of trips by car.

4.9 Rail appears more attractive for the longer trips from Newton Mearns than from Giffnock. Bus appears to be much more attractive from Giffnock than from Newton Mearns.

5. Telephone Survey and Group Discussions

5.1 There were two main strands to this phase of the research:

- Telephone surveys and repertory grid completion
- Focus groups.

5.2 If practical measures are to be brought forward to achieve behaviour change it is important to be able to understand where people are in the cycle of behaviour change described in Figure 3. In this cycle, 7 steps were identified in the process of behaviour change:

- Awareness of the problem
- Acceptance of responsibility
- Perception of the options
- Evaluation of the options
- Making choices
- Experimental behaviour
- Habitual behaviour

5.3 In undertaking the detailed research through focus groups and the postal survey it is important first to understand the context. Peoples' perception of options will be very different if they are not aware of the problem or have not accepted responsibility for the problem. Therefore, before moving to the detailed research on peoples' views of options and choices through the focus groups and postal survey, telephone surveys and repertory grid analysis were undertaken to set the context. Repertory grids produce qualitative and quantitative data, which can be used in a variety of ways including establishing progress along the steps towards behaviour change.

Telephone survey and repertory grid construction

5.4 Repertory grids differ from questionnaires more commonly used in surveys, by having their content derived from the views of individuals from the target groups rather than being supplied by external parties. Therefore initial telephone surveys were needed to define the content for the grids.

5.5 Interviews were undertaken with 12 men and 6 women selected at random from a database of people on the electoral register in the Giffnock/Newton Mearns area.

5.6 The telephone interviews were loosely structured as follows:

Using a conversational format:

- A. The interviewee was asked a series of questions in the context of "travelling to work" for commuters and "travelling on a specific weekday journey" for non-commuters.
 - 1. What might be the **advantages** of travelling by **car**?
 - 2. What might be the **disadvantages** of travelling by **bus/train** (whichever is relevant)?
 - 3. What might be the **disadvantages** of travelling by **car**?
 - 4. What might be the **advantages** of travelling by **bus/train** (whichever is relevant)?
 - 5. What might persuade you to give up your car for travelling to work/travelling on a specific weekday journey (whichever is relevant)?
- B. The questioning continued as above but in the context of "making a leisure (non-work) journey."
 - 1. What might be the **advantages** of travelling by **car**?
 - 2. What might be the **disadvantages** of travelling by **bus/train** (whichever is relevant)?
 - 3. What might be the **disadvantages** of travelling by **car**?
 - 4. What might be the **advantages** of travelling by **bus/train** (whichever is relevant)?
- C. Question: "If you were to generalise, what sort of people travel by **bus** in your area?"
- D. Question: "If you were to generalise, what sort of people travel by **train** in your area?"
- E. Question: "If you were to generalise, what sort of people travel by **car** in your area?"

5.7 The aim of the repertory grids is to allow people to rate issues in their own terms. However amongst the telephone survey sample, different people expressed problems in different ways. To allow group completion of repertory grids it was necessary to pool the bipolar constructs elicited in the telephone interviews to identify common 'themes'. Using this method means that common values could be elicited. These high level constructs are ideal for understanding the process of behaviour change as opposed to the specific interventions which are discussed under the postal survey.

5.8 The constructs identified from the telephone interviews were all listed and from this pool of constructs overall themes were identified. These themes were then expressed as bipolar constructs to be used in the repertory grids. Table 5 lists these constructs.

Table 5 – Bipolar Constructs Used In The Repertory Grids

I think public transport meets my needs	Public transport does not meet my needs
I think there is no problem regarding pollution by cars	I think there is a problem with pollution by cars
My local railway station is too far away for regular use	My local railway station is not too far away for regular use
I choose public transport whenever possible	My first choice is to use the car
I get good information about local bus services	I get little or no information about local bus services
There is inadequate parking at my local railway station	There is adequate parking at my local railway station
I think the 'powers that be' listen to the travelling public	I think the 'powers that be' do not listen to the travelling public
I would use public transport if parking becomes even more difficult	I would always try to use the car
I think children will suffer if pollution by cars is not reduced	I do not think pollution by cars is a major risk to children
I think the 'powers that be' believe our public transport works well	I think the 'powers that be' believe our public transport leaves much to be desired
I believe my personal actions can make a difference to pollution by cars	I believe my personal actions cannot make a difference to pollution by cars

5.9 Although the telephone survey involves only a very small sample to identify the main constructs, the theory on which the procedure is based states that people who share a similar culture will share similarity in the ways in which they construe that culture. The eleven themes identify several important points. There were few specific user constructs relating to bus travel. It emerged from the interviews that, even if people would consider using buses, they would not actually do so because they said they had inadequate information about bus routes, timetables etc.

5.10 The pooling of constructs therefore identified that people viewed their use or non use of public transport in a fairly broad terms. Rather than detailed constructs relating to bus and rail travel the main themes that emerged were rolled into general constructs such as “meeting needs” and “choose public transport whenever possible”. These covered the many comments which were made that people would like to use public transport more but in most or all circumstances did not consider it convenient or practical to do so.

5.11 Unfocused views of transport providers also prevailed. The "powers that be" construct came across strongly under two discrete issues: powers as poor listeners and powers being out of touch. This suggests that people do not seem to know who to communicate to, generally preferring “the powers that be” to more specific references to bus and rail companies, councils, SPT, politicians, regulators, etc.

5.12 The telephone interviews also considered the factors that might discourage car use. Concern about pollution came across strongly as a key motivator for change. Congestion was also articulated as a particular concern but the word meant different things to different people. It was therefore not considered to be an appropriate construct since it would not have been defining the issue with sufficient clarity. For car use, the growing constraints on parking were identified as factors that might encourage people to switch to

public transport. Pollution and parking constructs were therefore included in the repertory grid.

Repertory Grid Analysis

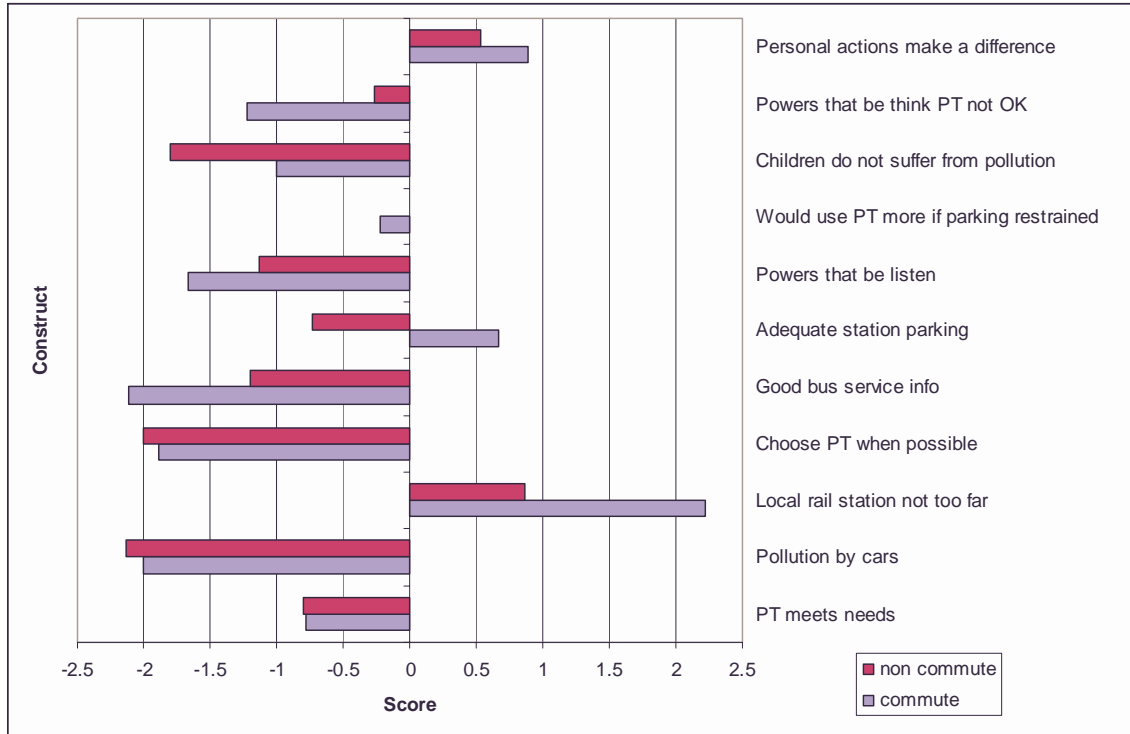
5.13 Completion of the repertory grids was undertaken on 30 September and 1 October at Parklands Country Club, Newton Mearns with each individual attending the focus groups completing the grids. In total 24 people completed the grids comprising 17 men and 7 women of which 9 were commuters and 15 non commuters. Although the focus group samples had a gender balance, fewer of the women who had said they would attend turned up on the evening.

5.14 The purpose of the repertory grids was to sift the many qualitative constructs to identify the most important themes for detailed quantification in the postal study. Application of this technique within transport has been limited but the approach built on that adopted in Dublin and reviewed in recent EC research (Tapestry 2001).

5.15 There were two parts to the grid completion: rating of the constructs on a 7 point scale and ranking of the constructs in order of importance. The grid survey forms and ranking sheets are included in Appendix B. Analysis of the results of the repertory grids provides a useful overview of the importance of the value constructs which people apply to transport systems. Although these findings need to be treated with caution, due to the small number of people involved the analysis, they have been important in guiding the later stages of the quantitative research using the postal survey.

5.16 As can be seen from Figure 15, there are many more constructs rated negatively than positively. To understand this Figure it is necessary to be aware that the scale at the bottom of the Figure has been changed from the 7-point scale used in the grid. For statistical purposes, it is necessary to have a scale with a mid-point of zero. The scale thus becomes one ranging from +3.00 through zero to -3.00. Because of the small samples, none of the differences between commuters and non-commuters are significant.

Figure 15 – Validation of Constructs



5.17 Perhaps most significant in addressing barriers to modal shift is that the second most negatively rated construct is “I choose public transport whenever possible”. If people are not validating this construct then they are disagreeing with the statement, indicating that they do not choose public transport when they could. This suggests that public transport use may be possible for many more trips, but people currently choose not to use it. The much less negative response to “public transport meets my needs” by both commuters and non commuters reinforces this finding indicating that some people think that public transport meets their needs even though they choose not to use it.

5.18 Although rail is perceived positively by commuters, it is viewed much less favourably by non-commuters. The differences in perception of station parking may be simply related to practical realities. Station car parks fill up with commuters so non commuters generally find them full.

5.19 Non-commuters rate the construct “the powers that be, believe that public transport works well” only slightly negatively but commuters rate it more negatively. Both commuters and non commuters validate the construct “the powers that be do not listen to the travelling public”. The clear message appears to be that people think that the "powers that be" (transport providers), are complacent, out of touch with reality and unwilling to listen

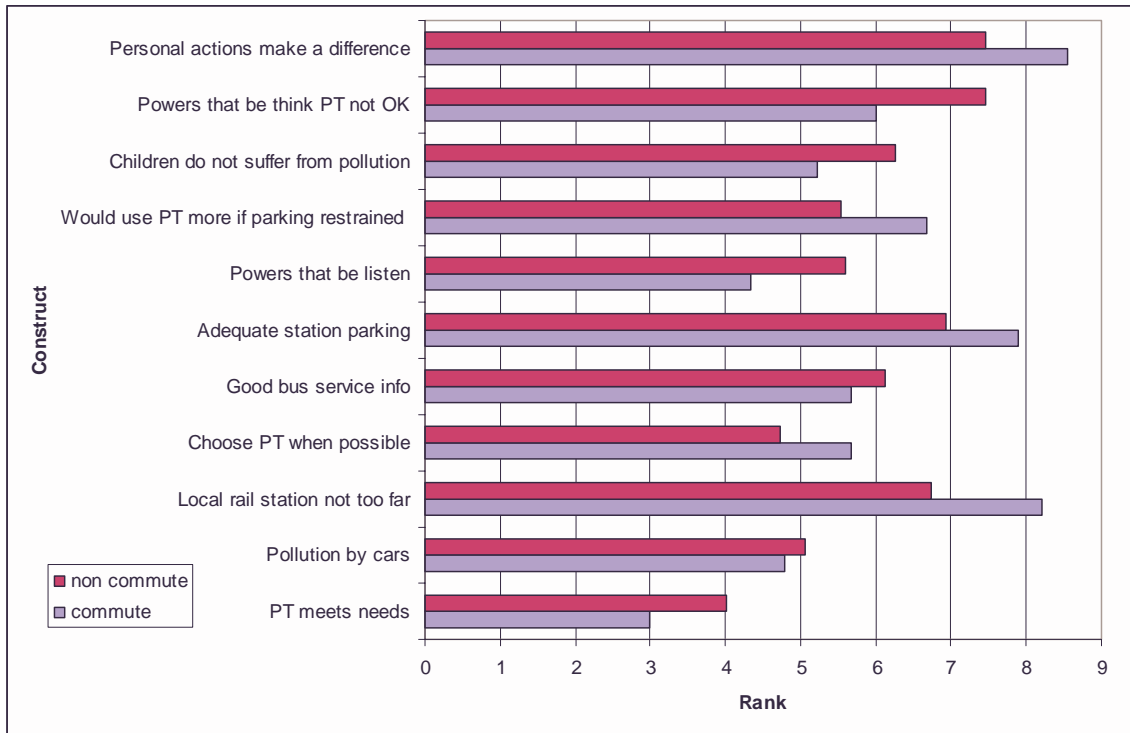
5.20 Other differences between non-commuters and commuters are that commuters appear to be less concerned about the impacts of car pollution on children than non commuters, and commuters are much more concerned about the availability of information on bus services.

5.21 People were also asked to undertake a similar rating of these constructs representing what they thought their view would be in a year's time. Overall people consider that public transport will be less able to meet their needs in the future than it is now.

5.22 Each person was then asked to rank the constructs in order of importance with a rank of 1 for the most important and a rank of 11 for the least important. The top rank is therefore denoted by the lowest number. It is only when people identify a course of action as both worthwhile and important that they are likely to be sufficiently motivated to change behaviour.

5.23 Figure 16 shows that the top ranked (most important) construct by some margin is "public transport meets my needs". However, this construct does not imply any real ownership of the problems and echoes the finding that personal actions are the least important issues. If people are not accepting responsibility for achieving change, then their views of the options and the possible choices to achieve such changes must be viewed within this context.

Figure 16 – Importance of Constructs



5.24 Despite the very small sample of women participating in the grid survey, there were a number of noteworthy differences between men and women in the results. In the analysis of the postal survey gender issues are therefore considered in greater depth.

Sampling for the Focus Groups

5.25 Four focus groups were held at Parklands Country Club, Newton Mearns for the evenings of 30 September 2002 and 1 October 2002 immediately following the repertory grid completion. On the first evening two groups were held for car non commuters and on the second evening two groups were held for car commuters. The samples for the focus groups were planned as:

- People who normally travelled by car for commuting into central Glasgow
- People who normally travelled by car for non commuting trips into central Glasgow.

5.26 Based on previous experience it was expected that attendance would be about two thirds of those that said they would attend, so a sample of 60 people was needed to populate four focus groups with a target of about 10 people in each and ensuring a gender balance. It had been planned that cold calling by a telemarketing company would be used to recruit the sample. However trials showed that responses to cold calling from people in this part of Glasgow were very poor, making this approach inappropriate.

5.27 A postal questionnaire was therefore issued to a random sample of 2000 people in the area, seeking responses identifying whether or not they used their cars for commuting and non commuting purposes to central Glasgow, and asking whether or not they would be prepared to participate in the research. A 26% response (i.e. 520 responses) was received to this questionnaire. Of the respondents about 30% (i.e. about 150) met the required criteria and stated they were prepared to participate. A random selection of 30 men and 30 women were then recruited for the focus groups by telephone. A confirmation letter was then sent to all participants confirming the time and location for one of four focus groups and providing travel information. 55% of these people actually attended with the numbers at each group being 8 and 10 on 30 September 2002, and 7 and 8 on 1 October 2002.

Focus groups

5.28 For each of the Focus Groups the format was as follows:

- The facilitator introduced the discussions by explaining the need to consider a wider range of factors than simply cost and time in transport planning. The aim of the focus groups was to identify the various factors affecting peoples' willingness or ability to use each mode. Participants for the groups had all been selected as car users.
- Lists were made on a flip chart of all the things that were good about travel by car, rail (including underground), bus, cycling and walking.
- Lists were made about all the things that were bad about car, rail (including underground), bus, cycling and walking.
- Using these lists the groups were asked to discuss which were the most important good and bad features for each mode seeking as much consensus as possible.
- The groups were then asked to make a list of all the practical things which could be done to overcome travel problems.
- After listing the practical initiatives to overcome travel problems, the groups were asked to discuss which they felt would be the most important and to define what sort of transport system they would like.

5.29 The results of the discussions are summarised in Appendix C. By looking at the positive and negative features of each mode in turn, the main motivators for change became apparent in addition to the barriers to behaviour change.

5.30 People appreciated that cars were inefficient if used by a single person and that by driving they were having adverse effects on others through increased congestion, pollution, and safety problems. However there was a unanimous view that despite these problems, the advantages of car travel exceeded the disadvantages for most trips. Therefore, whilst people would like to use public transport, in practice they used their cars and sometimes felt slightly guilty about the negative impacts they were imposing on others.

5.31 There was considerable discussion about what needed to be done to encourage occasional public transport use. Participants generally felt that, unless information and ticketing was much more straightforward for occasional users, then they would continue to use taxis when car use was not appropriate.

5.32 The issue of late night travel was a particular concern. There was a strong view that trains would be used more if they did not stop so early in the evening since “people wanted to enjoy their nights out in the city without the worry of having their cars”. There was also a strong view that people did not feel safe on buses late at night, so this was not a practical alternative. It was also suggested that, if people had bought a book of tickets for train travel which could be used over a period of months, then they might not only use them for evening trips but would be more tempted to travel by train at other times as well.

5.33 Even where public transport was faster and cheaper, people felt that it was easier to “just jump in the car” rather than check on bus times, find money to pay for the fare, and walk to the bus stop.

5.34 The most important barriers to bus travel were cited as ticketing, information, personal safety, and waiting. There was a strong view that “things are done to suit the bus companies not the passengers”. People associated the requirement for exact fares with being “old fashioned” and “treated like children”. They suggested more integrated tickets and carnets.

5.35 To improve information, personal preferences were important, with some group members wanting more paper information and others more electronic approaches. Bus routes, services, frequencies and “not knowing which stop to get off at” were perceived as complex, with the justification for this perception being comparisons with experience elsewhere “we don’t have problems using buses on holiday, we should have electronic information like elsewhere in Europe”.

5.36 People suggested recruiting more transport police to improve personal safety, but there were mixed views on the benefits of CCTV. They highlighted feeling like “second class citizens” whilst waiting for buses.

5.37 For rail travel, there was a high degree of satisfaction with the services, but a strong view that the role of rail was limited by a fixed network which did not meet changing travel needs. Priorities were improvements in comfort and reliability, but current standards were not seen as a major barrier to using rail.

5.38 The main barriers to using rail were the hours of operation, and the size of the station car parks. Several people commented that they drove into town shopping when they could have used trains, because the station car parks were full of commuters’ cars. They also suggested that more flexible tickets would encourage more rail travel.

5.39 Overall, there was a strong message that “public transport providers don’t listen to us”. People cited long standing concerns about poor information as evidence that public transport providers did not really care about users.

5.40 For cycling there was strong opposition to on-road cycle lanes which were perceived as unsafe. It was also commented that there was not a cycling culture in Glasgow. Everybody wanted to walk more to “stay healthy” but most people felt that their decisions would be weather dependent and they would not walk if they had “too much to carry”.

5.41 At the end of the groups people were asked what they would like transport to be like 20 years from now. Given that the people at the groups had been selected as regular car drivers to central Glasgow it is interesting that the list of improvements was dominated by public transport and environmental improvements:

- A system where you choose public transport because you want to.
- An extensive rail/underground/tram/bus network, where timings of services and locations of interchanges are integrated
- Pleasant city centres with limited car access and comprehensive park and ride services
- Transport costs included within the purchase price of visiting the destination.
- The ability to drive anywhere anytime without facing congestion when this was necessary.

6. Postal Survey

6.1 A postal questionnaire was sent to 2000 households in the Giffnock/Newton Mearns area of Glasgow and East Renfrewshire. The random sample avoided any of the 2000 households contacted for the focus group recruitment. 365 responses were received with is over 18% of the sample.

6.2 A copy of the questionnaire is attached at Appendix D. The questionnaire included five sections:

- General information about the respondents
- Travel patterns and perceptions
- Workplace/educational establishment employee travel influences
- Options to improve public transport
- Social and lifestyle choices

6.3 A detailed analysis of general information, travel patterns and perceptions, and options to improve public transport is described in Appendix E. The approach to the analysis and main findings from each section are summarised below.

General information about the respondents

6.4 Some key characteristics of the respondents are as follows:

- Gender - 49% female to 51% male
- Car ownership - 31% one car households, 56% two plus car households.
- Income – 26% with an income greater than £40k and 94% with an income of greater than £20k.

6.5 Relative to the 1991 census the respondents were generally higher income, higher car ownership and comprised more elderly people. Part of this may be accounted for by changes in the area since 1991, but it also reflects some bias in the responses towards older wealthier people.

Travel patterns

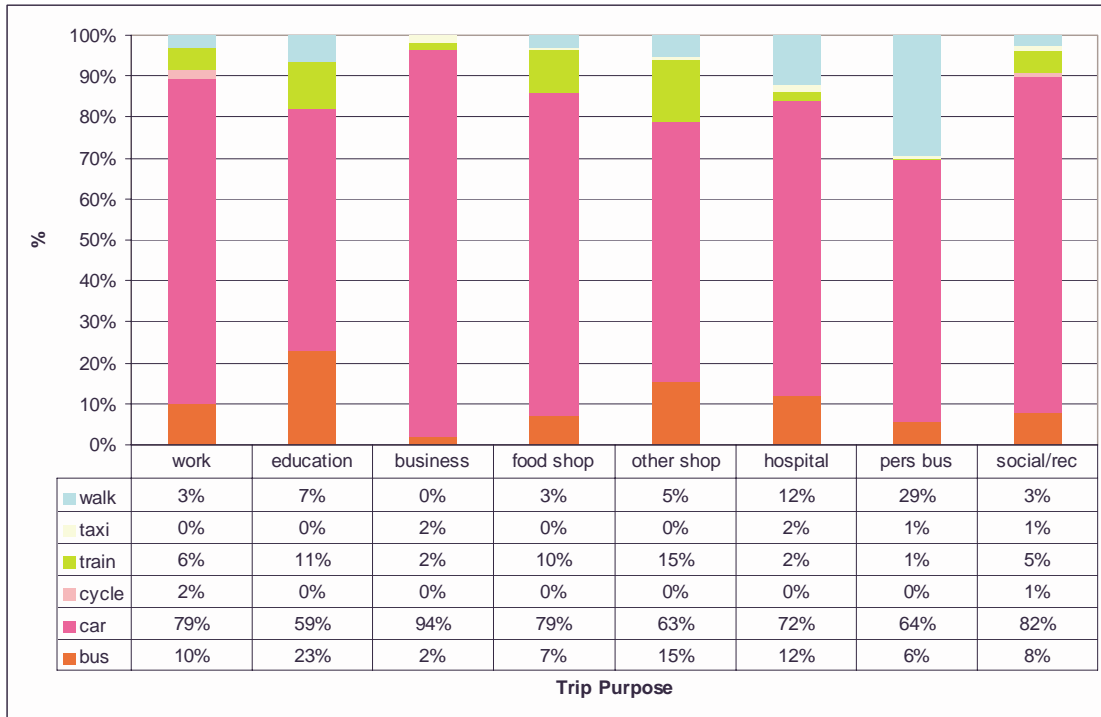
6.6 Respondents were asked to: describe their travel patterns, comment on the importance of each option to them and to state how satisfied they were with each option.

6.7 Car travel dominates for all trip purposes, peaking at 94% of business trips (Figure 17). When averaged across all trip purposes by trip frequency, these modal split figures are roughly consistent with the modelled figures in Figure 14.

6.8 Bus achieves its highest mode share for education trips and rail achieves its highest mode share for non food shopping trips. Walking

achieves a substantial mode share for personal business trips, with 29% of respondents identifying this mode. Cycling appears only to be regularly used for travel to work and leisure trips. Taxis are most often used for business trips and for trips to hospital.

Figure 17 - Modal Split by Trip Purpose



6.9 The choice of mode is heavily dependent on the trip destination. Rail and bus are popular choices for trips to Glasgow city centre, and walk trips are mainly local. For trips to non city centre destinations in Glasgow, and for trips elsewhere, car travel dominates. For trips to Glasgow city centre, car is still the dominant mode, but bus and rail achieve substantial mode shares for work (38%), education (58%), business (26%), food shop (73%), personal business (30%), and social/recreational (44%).

6.10 Only travel to hospital achieves as high a mode share for car to the city centre as for elsewhere. The city centre hospitals each have their own parking and are near the edge of the city centre, so “hard” factors may not be as much of a deterrent to car travel as for other city centre trips. Nevertheless it is also likely that soft factors are of relatively greater importance for hospital trips.

6.11 Overall the trip purposes with the greatest potential for achieving modal shift appear to be work, business, shopping and leisure.

Perceptions of travel

6.12 To consider perceptions of each mode, it is important to recognise that responses are heavily influenced by the importance people attach to each option. Respondents may state that they are very satisfied with bus travel simply because they have no intention of using buses. The process of

behaviour change described in Figure 3 requires an understanding of whether people are aware of problems and accept responsibility for them, before analysing how they perceive options and evaluate the travel choices available.

6.13 The focus groups (Chapter 5) had allowed 26 priority factors to be identified as follows:

Car

- The availability and cost of parking for trips to Glasgow City Centre
- Levels of stress whilst driving to work or education in congestion
- Travel time to work or education taking account of congestion
- The use of speed cameras to reduce accidents
- Cost of car ownership and use
- Environmental impacts

Train

- Personal security waiting at stations
- Lack of a seat for journeys to work and education trips
- Reliability of services in peak periods
- Links with other transport – physical interchanges, timing of services, and ticketing options
- Enjoyment of walk to station
- For non commuting trips space to park in station car parks
- The cost of non commuting trips when travelling with others

Walk/Cycle

- Road and personal safety concerns for commuting trips
- Road and personal safety concerns for non commuting trips
- Workplace showers and lockers
- Exposure to air and noise pollution

Bus

- Travel time for commuting trips
- Travel time for non commuting trips
- Information about bus services at bus stops
- Information about bus services by telephone or on the internet
- Paying exact fares on entry
- Personal security on buses and at bus stops
- Waiting for buses for commuting trips
- Waiting for buses for non commuting trips

- The maintenance condition and cleanliness of bus stops, shelters and buses

6.14 The analysis, described in Appendix E, starts by looking at the importance people attach to each factor affecting travel behaviour, before analysing the satisfaction with each factor. This ensures that satisfaction scores reflect factors of importance to users and potential users, rather than averages for the population as a whole.

6.15 If recognising problems, and taking responsibility for them, are important first steps towards behaviour change, then perceptions of relevance and importance are a useful starting point in understanding current barriers to modal shift. Table 6 shows the percentage of people who considered each of the factors affecting travel behaviour as not relevant for travel into central Glasgow.

Table 6 - % of Not Relevant Responses

Car	%	Walk/Cycle	%
A1 – Parking	25.0	C1 – Safe commuting	54.3
A2 – Stress	42.6	C2 – Safe non commuting	43.8
A3 – Travel time	40.3	C3 – Showers and Lockers	66.5
A4 – Speed cameras	14.5	C4 – Exposure to pollution	39.8
A5 – Cost	17.9	Bus	%
A6 – Environment	12.5	D1 – Commuting time	51.5
Train	%	D2 – Non commuting time	32.1
B1 – Personal security	26.2	D3 – Information at stops	22.5
B2 – Lack of a seat	40.0	D4 – Other information	39.2
B3 – Reliability	32.7	D5 – Exact fare on entry	33.8
B4 – Transport links	31.8	D6 – Personal security	25.4
B5 – Walk access	33.5	D7 – Waiting when commuting	51.5
B6 – Parking	29.9	D8 – Waiting non commuting	26.5
B7 - Cost	35.8	D9 – Maintenance	22.0

6.16 Key issues are:

- Environmental impacts of car use are considered to be the most relevant factor.
- Cost of car ownership and use and the use of speed cameras are also regarded as relevant factors for most travellers.
- Despite the flexibility of buses to serve a wide range of destinations and to develop new markets during peak periods when roads are most congested, more than half of respondents described commuting time by bus as not relevant. This is partly due to the number of retired people in the sample, but across the sample car and train were much more likely to be viewed as the modes for commuters and workers, with bus, walk and cycle as modes for social and leisure purposes.
- Walking and cycling factors were considered to be least relevant given the 5km distance from Giffnock to the city centre.
- Personal security issues are regarded as the most relevant rail travel factor.

6.17 To overcome barriers, the factors considered most important, are those for which there are low levels of satisfaction and which are regarded as of high importance. The importance scores given to each factor were on a five point scale from not important to very important.

6.18 Six of the 26 factors were regarded as of high importance, with average importance scores of 4 and above:

Car

- Travel time to work or education taking account of congestion

Walk/Cycle

- Road and personal safety concerns for commuting trips
- Exposure to air and noise pollution

Bus

- Travel time for commuting trips
- Information about bus services at bus stops
- Personal security on buses and at bus stops

6.19 None of the rail factors achieved average importance scores of greater than 3 indicating that the rail factors identified at the focus groups were not important barriers to the use of rail.

6.20 Although the average scores were only of high importance for six factors, for all of the 26 factors there were some people who gave importance scores of 4 or 5. For these people, their satisfaction with each factor was analysed and plotted as shown in Appendix E. A score of 1 indicated “not satisfied” and a score of 5 indicated “very satisfied” so scores of 3 or more indicate that further improvements would be unlikely to remove any barriers.

6.21 Key findings relating to the satisfaction by mode are that:

Car

- The use of speed cameras achieved a satisfaction score of greater than 3 indicating satisfaction with this factor, but all other car factors received average scores of between 2 and 2.5.
- The over 60s and under 30s are generally more satisfied than the 30 to 60 age group.
- Higher income groups (>£30k) are less satisfied than lower income groups, with the exception of “stress when driving” where lower income groups are less satisfied. This is likely to result from many of the lower income respondents being older people who find driving more stressful.
- Men are much less satisfied than women with speed cameras, costs of car ownership and use and the impact on the environment.

Rail

- Enjoyment of the walk to the station is the only rail factor achieving an average satisfaction score of greater than 3, with all other factors achieving average scores of between 2 and 2.5.
- Satisfaction scores are broadly consistent across age and income groups.
- Women are more satisfied than men with all factors other than reliability.

Walking/cycling

- All average satisfaction scores for walking and cycling were below 2.5 indicating a low average level of satisfaction.
- Respondents were least satisfied with levels of pollution (score 1.9) and most satisfied with safety on non commuting trips (score 2.4).
- Women were slightly less satisfied with workplace showers and lockers than men but were more satisfied than their male counterparts with levels of exposure to noise and pollution.

Bus

- Average satisfaction scores for bus travel are all between 2 and 2.5.
- Women are generally less satisfied than men particularly for pay on entry, waiting for buses, commuting travel time, and maintenance of bus stops, shelters and buses.

6.22 Overall, the importance and satisfaction analysis identifies that the six factors identified in paragraph 6.17 are the main barriers to travel by each mode.

Improving public transport

6.23 For 16 potential ways to improve public transport, people were asked to state whether improvements were not needed, welcome or a high priority.

6.24 People were also asked if they would be likely to shift mode if their high priorities were implemented. In some cases people indicated several high priority improvements necessary to encourage them to shift mode and in other cases only one or two factors were high priorities.

6.25 Table 7 shows the huge percentage of respondents who would be prepared to use public transport.

Table 7 - % Likely to Use Public Transport if High Priorities Implemented

<i>Trip Purpose</i>	<i>Train</i>	<i>Bus</i>
Commuting, education and work journeys	28	31
Other trip purposes	73	73
<i>Total</i>	<i>75</i>	<i>74</i>

6.26 Overall only 7% of the respondents indicated that they would not use bus or train for any trip purpose. 4% of people would be prepared to use

buses but would not use trains and 6% of people would be prepared to use trains but not buses. That as many as 74% of respondents indicated that they would be prepared to use buses for commuting or non commuting purposes if all their stated high priority changes were implemented is significant. Compared with the low numbers currently using buses this is a huge change.

6.27 Table 8 shows how rail improvements were ranked amongst those who indicated that they would be prepared to use rail services if their high priorities were implemented. A score of 1 indicates that the factor would be a welcome change and a score of 2 indicates that the improvement is a high priority. Therefore average scores as high as 1.6 imply that nearly two thirds of respondents who were prepared to use rail identified the factor as a high priority.

Table 8 – Ranking of Rail Improvement Options by Respondents Likely to Shift Mode

Option	Score for welcome or high priority response
Better maintenance of trains and stations particularly where there has been vandalism	1.61
CCTV on trains and at rail stations	1.59
More space to park in station car parks	1.34
Trained security staff on trains and at rail stations	1.29
More flexible payment methods covering all bus and rail operators	1.18
Reduce cost of tickets when travelling with others by 20%	1.01

6.28 A similar analysis was undertaken for bus travel. For this mode there were differences between the perceptions of commuters and non commuters as shown in Table 9.

6.29 Perceptions of bus travel also vary by age group, with the over 60 age group viewing bus journey times and real time bus information much lower than the under 30 age group, who rate these two issues as the most important factors.

Table 9 – Ranking of Bus Improvement Options by Respondents Likely to Shift Mode

Option	Score for welcome or high priority response	
	<i>Commute</i>	<i>Non commute (rank)</i>
Reduce bus journey times by 20%	1.52	1.29(4)
Electronic information at bus stops telling you if buses are on time	1.51	1.44(2)
Better maintenance of buses and bus stops particularly where there has been vandalism.	1.50	1.53(1)
Published bus timetables including paper information at bus stops telling you the scheduled times of buses.	1.42	1.44(3)
Reducing the stopping time at bus stops with bus conductors or “smart card” ticketing	1.25	1.20(7)
More flexible payment methods covering all bus and rail operators.	1.24	1.20(6)
CCTV on buses and at bus stops	1.24	1.28(5)
Reduce bus fares by 20%	1.21	1.14(8)
Electronic information on buses telling you where you are so that you can get off at the right stop	1.02	1.02(10)
Trained security staff on buses.	0.95	1.03(9)

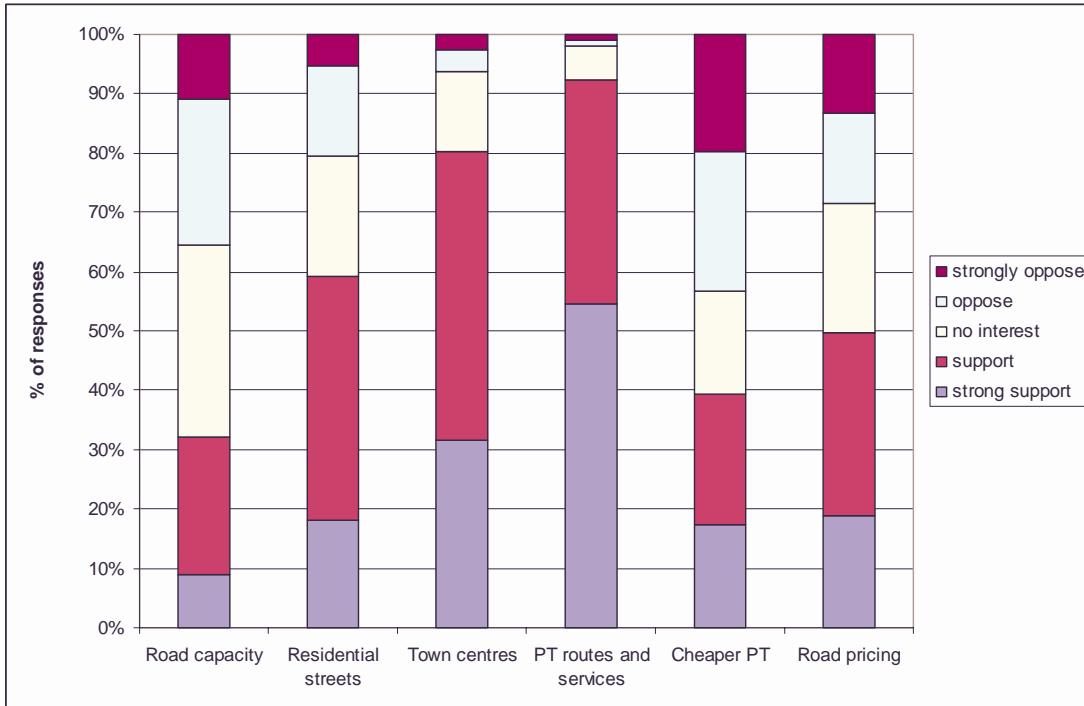
Future Changes

6.30 People were asked to state their views on six key changes to transport provision:

- More road capacity and multi-storey car parks in town centres
- Less priority for cars in residential streets.
- More pedestrian priority areas in town centres.
- New public transport routes, improved capacity and cleaner, more secure services.
- Cheaper public transport financed partly by motoring taxes and charges
- Cheaper motoring costs financed by road pricing/congestion charging.

6.31 Figure 18 shows how people indicated their support or opposition to each change.

Figure 18 – Support for Future Changes



6.32 The strongest support is not surprisingly for new public transport routes, improved capacity on existing routes and cleaner more secure trains stations and bus stops. This was the only option that did not identify any trade offs with reduced capacity for cars, road charging or higher pollution.

6.33 When asked about more road capacity and parking versus higher pollution, the most popular response was the neutral one indicating they would neither support or oppose changes. There was slightly stronger opposition than support for this measure.

6.34 People appear happy to support physical restraints on car use in town centres and, to a lesser degree in residential areas. However in both cases support rather than strong support is more popular suggesting that respondents have some reservations.

6.35 Opinion is divided on cheaper public transport fares financed partly by higher charges on motorists. On average respondents were more prepared to support road pricing/congestion charging schemes if the revenue is used to reduce petrol tax and vehicle excise duty.

Workplace Travel Planning

6.36 Specific questions were asked about the policies of employers in relation to travel to work. At the focus groups, some people had highlighted the policies of employers as major influences on travel behaviour. Car and cycle parking at the workplace, flexible working practices and active support for public transport and car sharing by employers were all identified.

6.37 Of the 35 respondents who drove to Glasgow city centre to work, 15 were provided with free parking by their employers. For all those who used their car to get to work, 63% were provided with free car parking at the workplace. There were only four respondents who cycled to work and they all had free cycle parking at the workplace. Just under 3% of the sample received loans or subsidies towards the cost of public transport travel and less than 2% worked for employers who managed or participated in car sharing schemes.

6.38 43% of respondents considered that their employment conditions constrained their use of public transport. The comments made by respondents fall into six main categories:

- Need to use car during day (25%)
- Too much to carry (6%)
- Working hours do not fit with PT (35%)
- Flexibility needed to cope with emergencies or to work late (28%)
- Need to be regularly on time (4%)
- Car expenses important for income (2%)

6.39 The 28% of people who highlighted that public transport was not flexible enough to cope with their needs included many people who could have used public transport in most circumstances. For example, several people noted that leaving to get the bus or train home was not perceived in a positive light by most employers. It appears that most employers would not want to encourage public transport use for fear of staff using public transport problems as a reason for loss of productivity.

Lifestyle Choices and Travel

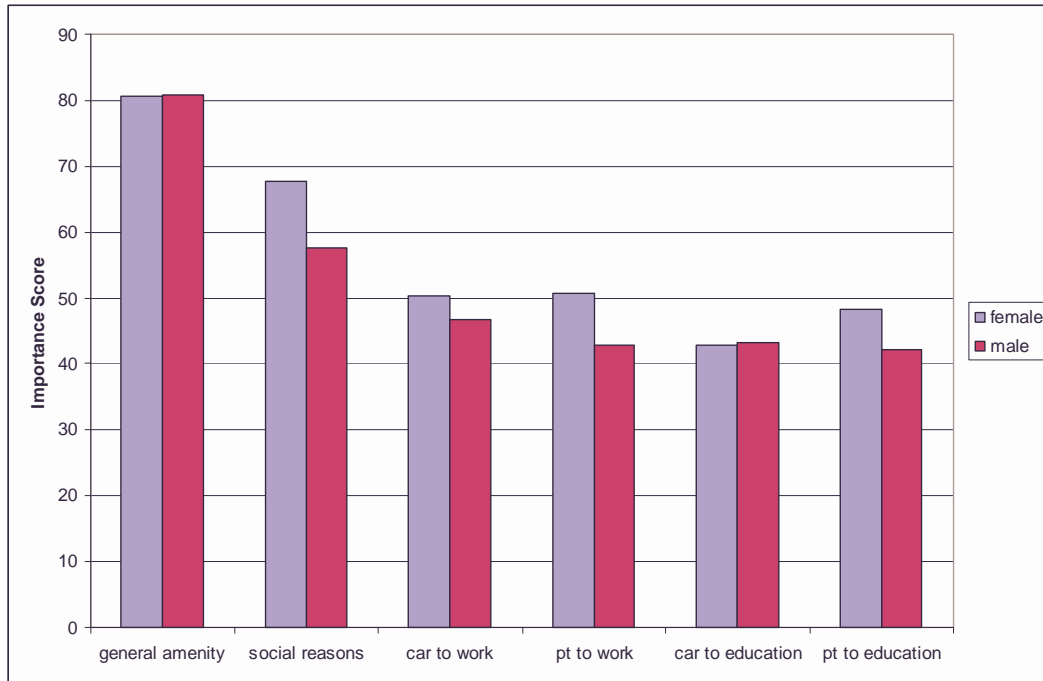
6.40 It is important to consider barriers to modal shift within the context of the lifestyle choices which people have made. If people cannot use public transport to get to work, that constraint may depend more on a lifestyle choice of where to live than any particular problem with public transport systems.

6.41 Figure 19 shows the importance which people attach to six factors affecting where they live:

- General amenity and quality of life
- Social reasons/involvement in the community/family ties
- Car access to work
- PT access to work
- Car access to education
- PT access to education

6.42 People were asked to indicate whether each of these factors was: very important, important, not important, or of no interest. The responses were then factored to obtain a composite score in the range 0-100.

Figure 19 – Factors Affecting Residential Location Choice

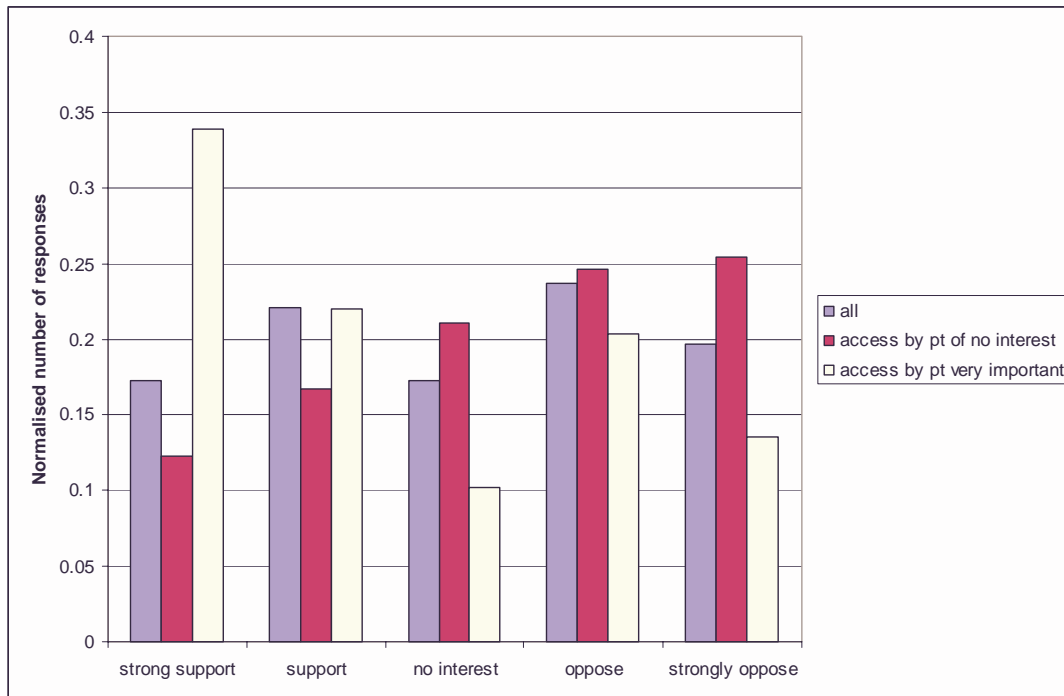


6.43 General amenity issues such as the environmental quality of the location ranks very high, with a score of over 80. Women are more concerned than men about the accessibility of the location in relation to their work, and to education using public transport. This perhaps reflects greater family responsibilities, lower levels of car use among women, and the need to work close to home.

6.44 Further analysis was undertaken for those who stated that good access by public transport was of no interest to them in their choice of where to live. It might have been expected that these people would be more likely to indicate that they would not use public transport or would oppose policies such as congestion charging. Although this group may be slightly more likely than the average to hold such views, there are no strong relationships evident from the data.

6.45 In contrast, those who regard it as very important to live in locations which have good public transport access to work, are more likely than average to use public transport, and to support road pricing. Figure 20 compares support for the “cheaper public transport financed by congestion charging” policy for the full sample, and those with extreme views of the importance living in locations with good public transport accessibility. The responses are considered on a common scale using ratios for each location category (number by level of support/sample by perception of location).

Figure 20 – Support for Financing Public Transport with Road Charges



Additional Comments by Respondents

6.46 Nearly 80% of the respondents added comments at the end of the questionnaire. The largest proportion of these comments (38%) was on specific infrastructure and service changes which people would like to see including new roads, cycle lanes, bus services, parking etc. A further 37% of the comments related to perceptions of service reliability, convenience, comfort, cleanliness, etc.

6.47 Some of the remaining comments included:

- Enforcement of traffic law and in particular parking in bus lanes
- Particular problems for mobility impaired users
- Comments on the effects of the poor weather
- Support for friendly service from some bus drivers
- “What is the point of owning a car and not using it”.

6.48 It is clear from these responses and from the focus group work that progress can only be made through a better dialogue between users and providers of transport. Good public transport cannot be delivered without understanding public needs and public needs cannot be met without delivering better public transport. Travel awareness publicity can provide a starting point from which to deliver a wider range of active communication mechanisms.

7. Planning and Delivery Challenges

Delivery Challenges

7.1 Based on the findings of the survey work, public transport providers in the corridor were given an opportunity to comment on what they were already doing to tackle the main barriers to modal shift, and what more they would like to do but could not due to institutional constraints. Table 10 summarises the main issues to emerge.

Table 10 – Opportunities and Barriers to Implementing Improvements

<i>Initiative</i>	<i>Issues</i>
Information	<ul style="list-style-type: none"> • Without information cases it has not been possible for bus operators to provide information at bus stops. From April 2003 Scottish Executive funding of £1.35 million will support a two year programme to install information cases at over 3,000 of the 10,000+ bus stops in the SPT area. Timetable booklets and leaflets will be promoted in parallel. • It is difficult to get agreement on a single geographical positioning system technology for all bus operators. This will be needed for wider application of real time information. Wider commercial interests within parent companies mean that different technologies are being promoted.
Ticketing	<ul style="list-style-type: none"> • Ticket prices are one of the principle competition mechanisms between bus companies in Glasgow so joint tickets are unlikely to be as cheap as single operator tickets. • The SPT zonecard system requires voluntary co-operation by the bus operators to work. This means that changes are difficult to achieve whilst maintaining goodwill from all participants. Small bus operators consider that they lose out for several reasons: the administrative costs exceed the revenue, the success of their businesses depends on undercutting the fares of the larger operators and the revenue is biased toward rail. • Exact fares on buses are a particular problem since people do not know what to pay before they get on the bus. The better information highlighted above will help with this. • SPT recognise the need for change and are currently undertaking a major consultation towards a ticketing strategy. • Rail fare dodging is a big problem so the scope for more flexible tickets than are already offered is limited. Without electronic barriers at all stations there is no totally satisfactory solution, and there are no quick solutions. Industry standards for ticket sales change slowly so significant changes could probably not be managed by a single operator such as ScotRail. • Rail will struggle to compete on costs with a full car for individual journeys. Family railcards and group save discounts offer about the maximum feasible support at present. • Ticket prices associated with entry to destinations (e.g. Prestwick Airport, Britannia) have been a success and there is scope for extension of this. • People want to buy integrated bus and rail tickets on buses, (which will be closer to their homes) but this is not possible given national requirements for rail tickets. • Smart card tickets offer the best prospects in the medium term for integrated tickets but a single industry standard will be required since different operators currently have stakes in different systems.
Personal safety	<ul style="list-style-type: none"> • This is a large and growing problem which is leading to the withdrawal of bus services from parts of Glasgow. • Small local operators do not seem to have a significant problem.
Reliability	<ul style="list-style-type: none"> • Bus lanes were not particularly effective since there was limited enforcement and one parked car was all that was needed to block a bus lane.

Control	<ul style="list-style-type: none"> • The bus industry, with its reliance on incremental management processes and patchy competition for commercial success, does not fit well with public aspirations for stability and responsiveness to new needs. • Partnerships have not managed to tackle social and other public policy issues adequately.
Infrastructure	<ul style="list-style-type: none"> • Track access curfews for maintenance restrict the opportunities for late evening trains. • Station car parks are limited in size due to historic constraints from the size of the coal yard. There is scope for managing demand better to favour off peak travellers. • Standards for provision of cycle lanes are under review and there have been extensive comments on good and bad practice in a recent consultation. • The split of responsibilities between bus companies, SPT and the Councils on issues such as developing high quality bus shelters can result in delays in improvements and maintenance.

7.2 Rail improvements can be slow to implement but there were no major barriers to rail use other than the limited coverage of the rail network. Without greater integration of rail and bus services, the scope for rail to play a much more significant role in reducing car use will be limited.

7.3 One of the most difficult issues to resolve is the extent to which greater regulation of bus services is needed to meet community needs. The current structure delivers higher frequencies and lower fares than would be likely with a more regulated approach, but the survey work demonstrates that service frequency and ticket prices are not currently the critical issues for people who do not use buses at present, but might be prepared to do so in the future.

7.4 Buses are not perceived as a mode of last resort in other European countries, but this seems to be the view expressed through this research. To develop bus services which overcome barriers to modal shift, better ways need to be found to deliver improved security, information, and integrated tickets and to develop partnerships capable of enforcing bus lanes.

Personal safety

7.5 The installation of CCTV at rail stations has been a major success in reducing crime and improving safety. The ScotRail systems allowing two way communication between the control centres and each station has many benefits. It is not surprising that personal safety problems should be of concern in this corridor, since two of the most important stations for the affected population, Patterton and Whitecraigs, are not well sited from a security perspective.

7.6 Personal safety on buses presents more of a problem. Bus crime is rising rapidly, and people reading local news will become less likely to use buses. However this can mask other less newsworthy realities. City Sprinter, one of the main operators in this corridor have no reported problems of vandalism against their buses and bus crime is not regarded as a problem. It is clear that the greater the community ownership/acceptance of buses as a key asset, the more likely it will be for personal safety to improve.

7.7 Maintenance of bus shelters was one of the highest priorities of local people. The image of bus travel suffers as shelters are seen as focal points

for vandals and anti-social behaviour. The costs of maintaining high quality bus shelters are low compared to the benefits (Litman 1999).

Information and ticketing

7.8 People need to feel confident about using public transport and good information can be one of the cheapest ways to change perceptions of whether transport meets their needs (Litman 1999). Information and ticketing issues were consistently at the top of the agenda during the survey programme, so until these seemingly small issues are resolved by public transport providers, people will continue to be sceptical that they can trust public transport.

Control

7.9 One of the main reasons why car drivers are attached to their cars is that they feel in control. In reality there are many aspects of car journeys such as variable journey times due to congestion and accident risk, which reduce this level of control, but nevertheless car travel offers real and perceived control advantages over public transport. Measures which increase the real and perceived level of control that public transport users experience, can be very important in overcoming this important barrier.

7.10 There are several strands to this. Firstly the construct of the “Powers that Be” emerged strongly from the repertory grid analysis. For public transport users to develop a sense of control they need clear communication mechanisms and clear responsibilities and accountabilities for success and failure. The survey work demonstrates that people are generally confused about who is responsible for what and their response is “Just provide a service which meets my needs and I will use it”. However this involves no shared sense of responsibility in delivering successful services and systems, so it does not help to motivate and deliver behaviour change.

7.11 For rail it is reasonably clear from the surveys that the public hold ScotRail accountable for delivery. Although ScotRail are constrained in many ways by other parties, the clear regulatory structure is appreciated. However, for buses there are several operators providing different levels of service and there is uncertainty about who is being held to account if things go wrong. Given this uncertainty, a few people complain to Councils or SPT or perhaps bus companies, but most respond by choosing not to use buses.

7.12 To secure the future of bus travel as a mode of travel for all, rather than a mode of travel for those with no choice, some administrative changes are needed to allow travellers more control and to build confidence in the stability and reliability of the system. People highlighted examples of buses bypassing stops to make up time and of unhelpful bus drivers. If an independent body was responsible for ensuring that services ran in accordance with the commitments made through timetables, then this stabilising and controlling influence could help to overcome important barriers to modal shift.

7.13 There are many alternative contractual and administrative structures for the bus industry which could deliver this higher degree of central enforcement. There are no clear lessons from this research about how the transport

industry should organise itself to present a united front to the consumer. However, it is clear from the views of travellers that a central point for providing information about services, receiving feedback from customers, and enforcing standards which meet customers expectations will be needed if many of the barriers to bus travel are to be overcome.

Workplace travel planning

7.14 The survey work showed that 63% of the respondents were provided with free car park spaces. This is a very large subsidy for car use provided by employers. Even if the resource costs of land at the workplace are ignored, there are still significant maintenance and management costs. This can be set against the 3% of the respondents who received any form of support or loans towards the costs of public transport travel.

7.15 Transport investment to encourage public transport use will not be as effective as it could be if it works against market mechanisms driven by employers encouraging staff to drive to work. It appears that employers see more risks than benefits from staff travelling to work by public transport, and changing such attitudes will require an incremental process as more people use public transport successfully for commuting and business travel.

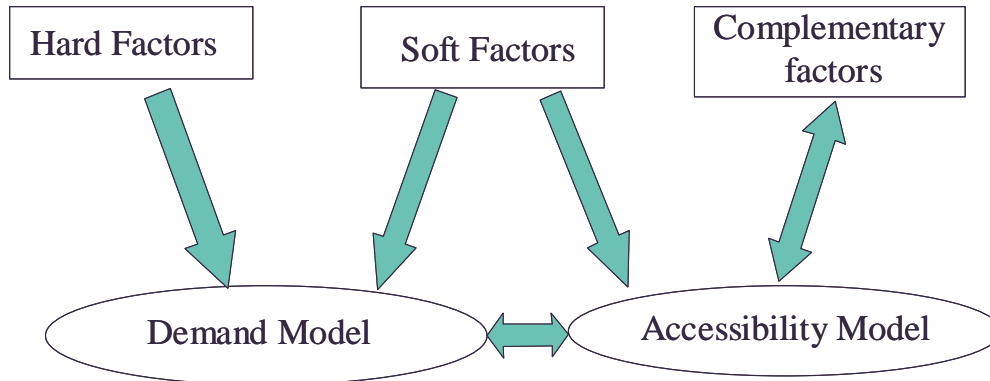
7.16 Many of the largest employers are public sector organisations. Although employment practices can make change more difficult for such organisations, than for private companies, it is important that national and local government show leadership in developing employee travel plans. Practical support assisting the development of employee travel plans by Government could result in a major additional investment in public transport, if employers shift some of their investment from car parking provision to public transport support, for both business travel and commuting.

Modelling of Soft and Complementary Factors

7.17 The conclusion in Chapter 6 that there were only small differences in perception of the alternative improvements by different user groups suggests that it may well be practical to include many more soft factors in demand models. One approach might be to factor generalised travel costs as suggested above to reflect more accurately the ways that the deterrent effects of travel are considered.

7.18 In Figure 4 a possible analytical structure was put forward. The results of the research suggest a slightly different structure as shown in Figure 34.

Figure 20 – An Analytical Structure for Appraisal



7.19 The research suggests that infrastructure related soft factors such as information, cleanliness, perceptions of safety, and payment mechanisms can most effectively be considered as elements of the generalised cost of travel within the demand modelling.

7.20 Management and administration soft factors such as travel plans, travel awareness, health education, etc. are less easy to include in models. The range of issues in workplace travel plans such as working hours, travel expenses, and financial incentives cannot generally be included in demand models. For these soft and complementary factors it is still possible to quantify impacts for the targeted groups by using accessibility models. This will have the dual purpose of helping make the case for investment and managing the changes by informing travellers of the changes in accessibility for the affected individuals.

7.21 The research findings also have other more specific implications for modelling. Current appraisal may significantly overestimate the deterrence effect of walk access time to public transport, Walk access time is currently treated in the same way as wait times. However survey respondents regarded walk access as a major positive feature of using public transport due to the health benefits. In contrast waiting for buses was a very negative factor.

7.22 The attractiveness of walk access to public transport will be highly dependent on issues such as the weather, how much people need to carry, and the availability of suitable routes. These issues could be researched more fully by monitoring progress with managed approaches for “safe routes to stations” and initiatives in bus quality partnerships to improve routes to bus stops. A starting point would be to review the community consultation work already undertaken by ScotRail on routes to stations.

8. Conclusions

Part 1 - Barriers to modal shift

8.1 Despite the significant investment in public transport in Scotland, car travel still offers better accessibility for many trips, and for many places, the gap between car and public transport accessibility is set to grow further. If society to develop more socially acceptable, economically beneficial and environmentally sustainable approaches to travel, a broader approach is needed to understanding and managing travel behaviour.

8.2 Barriers to modal shift can be considered under three main categories hard factors, soft factors and complementary factors. For many trips, the main barriers to modal shift will be hard factors such as the cost, time and reliability of travelling by public transport. Soft factors include information, comfort, security, employment factors, and a wide range of personal and social needs and attitudes. Complementary or lifestyle factors include non transport costs and taxes, limited travel time budgets, and the need to carry goods.

8.3 For any trip there may be several barriers. Tackling one or two issues will have no impact if other barriers remain. Changes in behaviour will only be achieved when all the relevant barriers have been addressed.

Hard factors

8.4 Surveys in the Newton Mearns/Giffnock to Glasgow corridor show that most car users currently view modal shift in terms of the scope for them to use rail. People in the corridor currently have relatively good accessibility by both bus and rail and car ownership is also relatively high.

8.5 Rail travel is well regarded, and the main barriers to travelling by train are hard factors such as the competitiveness of travel time and cost, the limited geographical coverage of the rail network, and rail capacity and reliability.

8.6 Travel time is the main hard factor acting as a barrier to bus travel.

8.7 Even the most committed car drivers have a future vision of good transport much more dominated by public transport and car free areas than at present. The vision is underpinned by limited car access to city centres and a well managed network of bus, rail, tram, and underground services supported by park and ride from outlying areas.

8.8 There were fewer barriers to rail than bus travel for mobility impaired people.

Soft Factors

8.9 Behaviour change will only be achieved if experimental behaviour using public transport is perceived by users as having been successful. The survey work showed that current information and ticketing approaches were not appropriate for occasional public transport users. Simpler information which

did not require detailed knowledge (e.g. of street names) and more flexible tickets and ticket purchase options were needed.

8.10 Personal security was also a major issue. Although people may have not personally experienced any threats, evidence of vandalism at bus shelters and railway stations give the impression that personal safety is a major problem. This could be reduced with better maintenance. CCTV was also supported and the huge successes in improving safety with CCTV at rail stations would merit greater publicity.

Complementary Factors

8.11 Workplace constraints are a major barrier to modal shift. 43% of respondents to the postal survey considered that their employment conditions constrained their use of public transport. The employers and managers at the focus groups commented that they would not encourage staff to use public transport since this might dilute the personal responsibility of employees to work effectively.

Part 2 - Bridges to Modal Shift

8.12 Measures to encourage modal shift from car to public transport walking and cycling can be categorised as: improvements to alternatives, making car travel less attractive, management and administration, and technology information and marketing.

Improvements to alternatives

8.13 Although time and cost factors are important in ensuring that public transport, walking and cycling become more attractive, other factors can be more important in achieving modal shift. The survey work showed that top priorities were:

- The quality of the waiting environment at bus stops and rail stations.
- Improved security with CCTV and reduced vandalism
- Electronic and printed information at bus stops.
- Larger station car parks
- Enforcement of bus lanes to improve bus travel times.
- Reallocation of road space to give more priority to pedestrians.
- Better integration between modes covering physical interchanges, timetables, information and ticketing.

8.14 Although less than 30% of respondents to the postal survey currently use buses for any trips, 73% of respondents stated that they would be prepared to use buses if their stated high priority improvements were made.

Making car travel less attractive

8.15 There were mixed views of road user charging but a marginal balance in favour of increased direct charges on motorists if offset by reductions in other motoring costs. People did not have strong opinions about the need for

new road capacity but marginally more people opposed than supported the need for new roads in the city.

8.16 The surveys demonstrated that people do not see the future of city transport as car based, and they recognise that some restraints on car travel will be needed.

8.17 For trips to the city centre, parking restraint is a major determinant of choice of mode. Many commuters were able to use free spaces provided at the workplace. Parking restraint could be expected to have a major influence on mode choice.

Management and administration

8.18 People appreciate the perceived level of control that they have when travelling by car. This level of control cannot be fully replicated for public transport, but current barriers could be largely overcome by developing community acceptance and “ownership” of public transport and improving accountability for problems and solutions. This will require new approaches to management, regulation, administration, joint working and community participation.

8.19 Public transport needs to be viewed as a more integral and relevant service for all sections of the community. Rail largely appears to achieve this, being perceived as a fixed asset with a high degree of stability. New ways need to be found to change perceptions of bus services. From the public perspective, the only fixed assets are the bus stops and even these are poorly maintained and do not provide even basic information on services. By changing relatively small things quickly such as bus information, providers can help to build trust that they are listening to the needs of users and potential users.

8.20 Achieving behaviour change requires people to accept more responsibility for the current problems. Future management mechanisms for public transport need to better reflect this growing agenda engaging more closely with communities to help manage change. If attempts to achieve mode shift are perceived as being driven by top down initiatives, then they are unlikely to succeed. Several key institutional barriers therefore need to be overcome to develop the required culture of co-operation.

8.21 In particular, there needs to be a better awareness from transport providers and policy makers of the need to engage much better with transport users. Integrated transport will be delivered as much through the purchasing decisions of travellers as from public funding. Effective company travel plans need to become the norm. Incentives such as workplace parking charges could encourage more action by businesses, and a fresh look at legislation on this may be appropriate. Also public transport providers need to see business as a key potential client group (e.g. for bulk season ticket purchases) and respond with services meeting changing needs. The transport industry needs to offer modern products such as flexible integrated tickets, which allow people and businesses to buy into integrated transport delivery.

Technology, information and marketing

8.22 Since many people are not identifying the potential use they can make of public transport, and the benefits of this, there is a clear role for improved information and marketing of options, exploiting new and emerging technologies where practical. In particular, better targeting of marketing, and support for potential mode switchers, should be a high priority. Together with the improvements listed in 8.13 a coherent travel awareness agenda backed up by local action could be expected to be very effective.

8.23 The survey work demonstrates that there is a general awareness of growing environmental problems resulting from transport but limited acceptance of responsibility for change. There was very poor understanding of the negative social and economic impacts of car use. In taking forward targeted marketing and individual action programmes, there would be benefits in concentrating on the social and economic benefits of behaviour change. Environmental benefits will also be important, but they are perceived by many as less relevant motivators for individual action.

8.24 There was wide recognition of the health benefits of walking and cycling. In the postal survey, walking to rail stations was the attribute receiving the highest positive scores in terms of public transport use. Greater publicity about the health benefits of walking to bus stops and rail stations could be influential factors in supporting mode shift.

Part 3 – Transport planning and transport administration

8.25 Transport planning has sought to inform the providers of transport with the knowledge they need to meet travel needs. If a broader approach is now needed to manage travel behaviour and demand, then new approaches to transport planning are also needed. Rather than only looking at transport systems from the perspective of providers, it is necessary to analyse the choices that travellers face and the scope for these to be changed.

8.26 This research suggests that a wide range of parameters from travel information to lifestyle issues can be incorporated in transport models. By linking travel demand and accessibility models and measures growing problems can be better understood and information can be generated to help manage change.

8.27 The research also provides some very limited evidence on the relative priorities of measures designed to achieve modal shift. However, if major investment is planned in any individual factor, then detailed stated preference surveys are recommended to derive more robust values for use in appraisal.

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Appendix A
Existing Surveys and Analysis in Corridors

Table A1 – Summary of Previous Analysis

Study	Key Findings
GCVSP	
Analysis of travel patterns	Data on travel demand and travel patterns to support the development of the joint structure Plan and the transport strategy in the West of Scotland.
SPT	
Transport demand modelling results	The modelling results identify growing congestion and capacity problems and allow the testing and economic evaluation of alternative strategies to reduce these problems.
Household, travel diary and stated preference surveys	The findings of this work were used in the development and updating of the SITM during 2001 and 2002. Separate findings were not reported.
Travel behaviour analysis	Recent analysis of SHS data identified that a very wide range of factors were suggested by people as acting as barriers to mode shift. However analysis of travel patterns showed that none of these barriers individually was statistically significant in explaining the observed patterns of behaviour. This suggests that many of the barriers to mode shift will be combinations of factors e.g. cost and uncomfortable, or dislike waiting and too crowded.
Glasgow City Council	
Mapping of access to public transport	These maps have identified areas of Glasgow within 500 metres of rail stations, and 300 metres of bus stops. The analysis also distinguishes between high frequency bus and rail services and other more basic services. High frequency public transport is defined as 12 or more buses per hour, 6 or more trains per hour or 12 or more underground trains per hour.
Consultations on the development of bus quality corridors	These surveys have sought the views of residents on future bus needs and on how quality bus services are perceived. Some of the problems identified, such as loss of parking, are not addressed directly by the bus corridors themselves and require complementary transport policy measures.
East Dunbartonshire Council	
Surveys of local residents and businesses	Detailed surveys of travel patterns and attitudes to travel have established the patterns for movement to, from and within East Dunbartonshire by mode and trip purpose. Analysis of the results is still underway.
East Renfrewshire Council	
Public consultation on transport strategy	There has been strong opposition to the installation of bus shelters in some areas since residents say they are unsightly and they have no intention of using the bus.
Analysis of travel patterns	60% of population of East Renfrewshire work in Glasgow with a high proportion having city centre office jobs. There is very high car ownership in the area.
Monitoring of bus patronage	There have been attempts to develop new circumferential services round the outskirts of the city but these have generally failed so bus travellers need to travel via the centre of Glasgow to reach other areas.

South Lanarkshire Council

Analysis of travel to work patterns and trip origin and destination surveys in 1999.	Over the 1980s and 1990s East Kilbride has become more of a dormitory town with residents travelling elsewhere to work including to Glasgow. Associated with this has been the development of more up market housing and greater car dependence since many of the new housing areas are poorly served by public transport.
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Table A2 compares the current (2001/2) modal split for work and retail/leisure travel for Glasgow City with the equivalent mode split from Milngavie/Bearsden. Surveyed data on mode split is not available for the other corridors.

Table A2 - % of Trips by Mode and Purpose

Trip Origin		Car	Walk	Bus	Train	Cycle	Other	Source
Glasgow City	work	53	15	21	7	1	2	Glasgow City Council based on SHS data
	retail/leisure	46	33	14	3	0	4	
Milngavie/Bearsden	work	62	13	8	16	0	1	East Dunbartonshire Council based on local household surveys
	retail/leisure	68	18	5	8	0	0	

Appendix B
Repertory Grid Forms and Results

Commuter

Non-Commuter

Male

Female

1. Me as a car user

	1	2	3	4	5	6	7	
Think public transport meets my needs								Public transport does not meet my needs
Think there is no problem regarding pollution by cars								Think there is a problem with pollution by cars
My local railway station is too far away for regular use								My local railway station is not too far away for regular
I choose public transport whenever possible								My first choice is to use the car
I get good information about local bus services								I get little or no information about local bus services
There is inadequate parking at my local railway station								There is adequate parking at my local railway station
I think the 'powers that be' listen to the travelling public								I think the 'powers that be' do not listen to the travelling public
I would use public transport if parking becomes even more difficult								I would always try to use the car
I think children will suffer if pollution by cars is not								I do not think pollution by cars is a major risk to
I think the 'powers that be' believe our public transport works well								I think the 'powers that be' believe our public transport leaves much to be desired
Believe my personal actions can make a difference to pollution by cars								Believe my personal actions cannot make a difference to pollution by cars

2. Me as a car user in 12 months' time

	1	2	3	4	5	6	7	
Public transport will meet my needs								Public transport will not meet my needs
There will not be a problem regarding pollution by cars								Think there will be a problem regarding pollution by cars
My local railway station will be too far away for regular use								My local railway station will not be too far away for regular use
I will choose public transport whenever possible								My first choice will be to use the car
I will get good information about local bus services								I will get little or no information about local bus services
There will be inadequate parking at my local railway station								There will be adequate parking at my local railway station
I think the 'powers that be' will listen to the travelling public								I think the 'powers that be' will not listen to the travelling public
I will be using public transport if parking has become even more difficult								I will always try to use the car
I will think children will suffer if pollution by cars is not reduced								I will think pollution by cars is not a major risk to children
I will think the 'powers that be' believe our public transport works well								I will think the 'powers that be' believe our public transport leaves much to be desired

Believe my personal actions will make a difference to pollution by cars								Believe my personal actions will not make a difference to pollution by cars
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**PLEASE PUT THE FOLLOWING ISSUES IN ORDER OF
IMPORTANCE TO YOU AS A MEMBER OF THE
GENERAL PUBLIC**

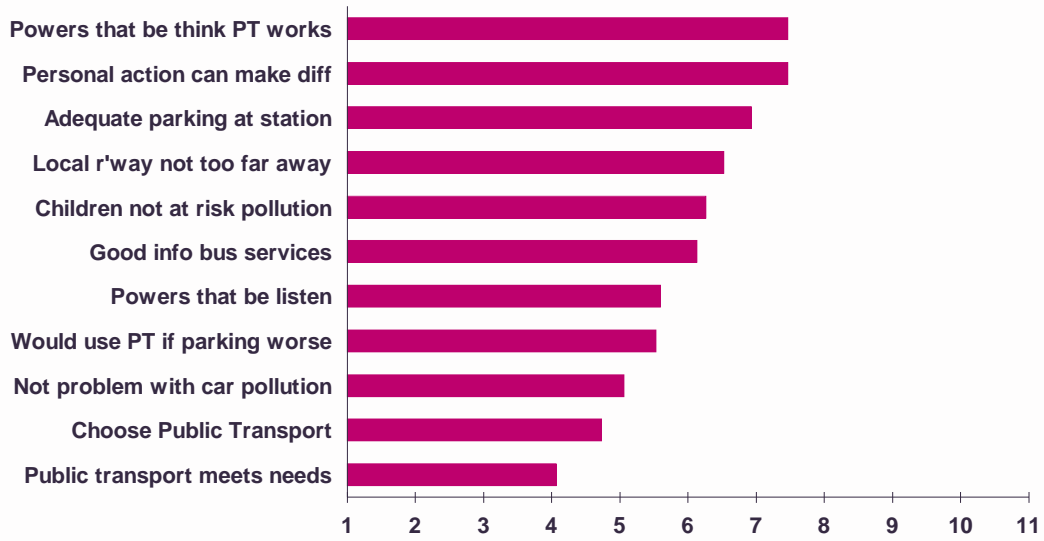
Ranking Public transport meets my needs -v- Public transport does not meet my needs	
There is no problem regarding pollution by cars –v- There is a problem with pollution by cars	
My local railway station is too far away for regular use -v- My local railway station is not too far away for regular use	
I choose public transport whenever possible -v- My first choice is to use the car	
I get good information about local bus services -v- I get little or no information about local bus services	
There is inadequate parking at my local railway station -v- There is adequate parking at my local railway station	
The 'powers that be' listen to the travelling public -v- The 'powers that be' do not listen to the travelling public	
I would use public transport if parking becomes even more difficult –v- I would always try to use the car	
Children will suffer if pollution by cars is not reduced -v- Pollution by cars is not a major risk to children	
The 'powers that be' believe our public transport works well -v- The 'powers that be' believe our public transport leaves much to be desired	
My personal actions can make a difference to pollution by cars -v- My personal actions cannot make a difference to pollution by cars	

PLEASE PUT THE FOLLOWING ISSUES IN ORDER OF IMPORTANCE, SPECIFICALLY IN TERMS OF THEIR RELEVANCE TO YOU USING YOUR CAR LESS

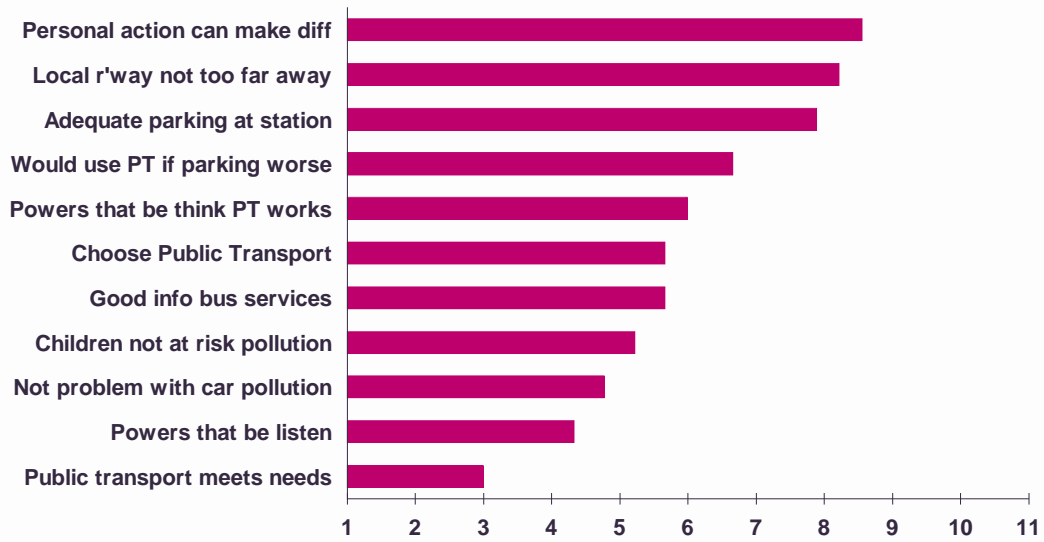
Ranking

Public transport meets my needs -v- Public transport does not meet my needs	
There is no problem regarding pollution by cars -v- There is a problem with pollution by cars	
My local railway station is too far away for regular use -v- My local railway station is not too far away for regular use	
I choose public transport whenever possible -v- My first choice is to use the car	
I get good information about local bus services -v- I get little or no information about local bus services	
There is inadequate parking at my local railway station -v- There is adequate parking at my local railway station	
The 'powers that be' listen to the travelling public -v- The 'powers that be' do not listen to the travelling public	
I would use public transport if parking becomes even more difficult -v- I would always try to use the car	
Children will suffer if pollution by cars is not reduced -v- Pollution by cars is not a major risk to children	
The 'powers that be' believe our public transport works well -v- The 'powers that be' believe our public transport leaves much to be desired	
My personal actions can make a difference to pollution by cars -v- My personal actions cannot make a difference to pollution by cars	

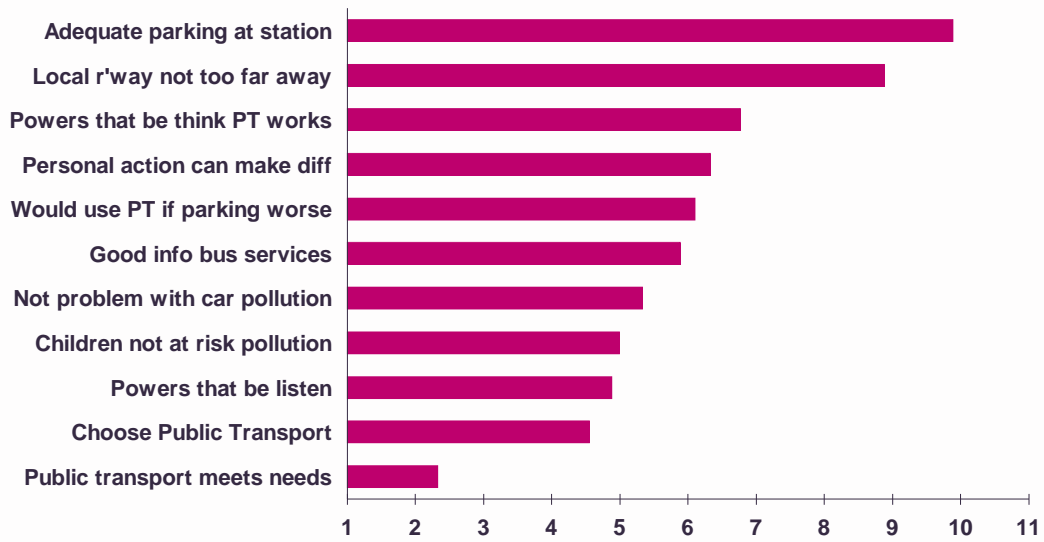
Rankings: Member of the General Public (NON-COMMUTERS)



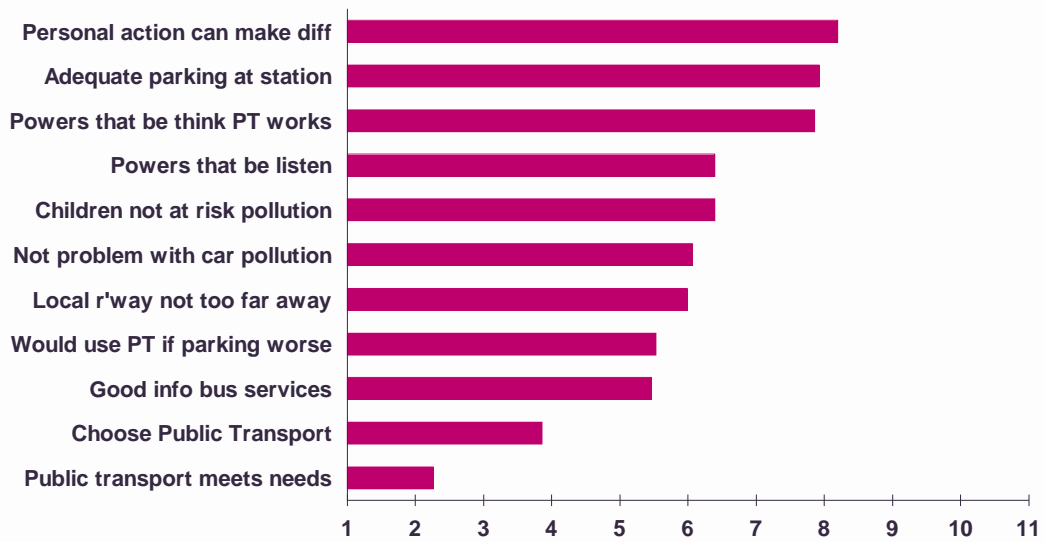
Rankings: Member of the General Public (COMMUTERS)



Rankings: Using Your Car Less (COMMUTERS)



Rankings: Using Your Car Less (NON-COMMUTERS)



Appendix C
Focus Group Findings

Table C1 - Key Findings from the Focus Groups for Commuters

Good	Bad	What needs to be done
<i>Car/Motorcycle</i>		
<ul style="list-style-type: none"> • Flexible - Can go where you want when you want • Quicker – even in congested periods • Comfortable – can control own environment • Safer - particularly personal safety • Cheaper than PT once you have a car • Ability to use for other trips e.g. in the course of work. 	<ul style="list-style-type: none"> • Parking expensive and not always available • Inefficient if used by a single person • Can't drink and drive • Pollution impacts – especially in congested areas • Unpleasant to drive in congestion. • Bad driving by other drivers. • Sometimes stressful and tiring. • Speed cameras. • Poor state of road surface • Can't work when driving. 	<ul style="list-style-type: none"> • Acknowledge that cars are here to stay and plan for them. • Plan areas where car impacts are reduced – home zones, traffic calmed areas, pedestrianised city centres, lorry management for delivery by time of day. • New motorways. • More parking capacity e.g. multi-storey car parks • Better maintained roads. • Manage car traffic better rather than restrict it. • Promote car sharing • Better use of flexible working hours. • Switch traffic lights to priority junction mode at night. • Promote motorcycling. • Explain strategy for transport to the public – rely more on transport experts. • Take account of transport in new developments. • Park and ride to manage parking in central areas.

<i>Train/ underground</i>		
<ul style="list-style-type: none"> • Reliable • Clean • Fast • More comfortable and reliable than buses • Easy to obtain and understand rail timetable • Environmentally friendly 	<ul style="list-style-type: none"> • Personal security – unmanned stations and lack of security on trains • Unreliable • Overcrowded and uncomfortable in peak hours • Restricted destinations and lack of route flexibility. • The need to change services. • Problems walking to and from stations. • Poor links with other transport – timings and ticketing • Services stop too early in the evening, • Underground cramped • Can't work on the train when commuting due to overcrowding. 	<ul style="list-style-type: none"> • Increase capacity and frequency at peak times • More staff on trains
<i>Bus</i>		
<ul style="list-style-type: none"> • More flexible than rail. • No worry about parking. • Good for environment. 	<ul style="list-style-type: none"> • Unreliable and affected by congestion. • Difficult to use e.g. with children • Uncomfortable • Poor information about fares and routes • Exact fare needed. • Personal security • Dirty, cold and poorly maintained. • Different operators do not work together • Slow • Poor layout of bus lanes means that they are not as useful as they could be. • Pollution problems 	<ul style="list-style-type: none"> • Better information on vehicle and at stops "something to let you know where the bus is and when it will be arriving at your stop" • Simpler pricing • Joint ticketing by bus operators. • New ticketing options such as carnets. • Customer service staff on buses. "Reducing delays from ticket sales at stops and having the security of trained staff"

Walk/Cycle		
<ul style="list-style-type: none"> • Healthy • Cheap • Predictable • Pollution free • Best in good weather 	<ul style="list-style-type: none"> • Often not practical e.g. when carrying goods and equipment, • Exposed to pollution • Dangerous • Not easy on hills • Weather dependent • Widespread cycle use is not going to happen in Glasgow. 	<ul style="list-style-type: none"> • Workplace showers and cycle parking facilities • Quieter roads • Walking buses for school children

Table C2 - Key Findings from the Focus Groups for Non Commuters

Good	Bad	What needs done
Car		
<ul style="list-style-type: none"> • Flexibility in where you travel and takes you door to door. • No time constraints and no need to plan in advance. • Fastest mode of travel • Personal space. "Choose who you travel with and privacy when required". • Good for short distances • Can carry loads such as shopping • Comfort and protection from weather. • Good personal safety • Trust your own driving skills • Entertainment whilst travelling. • Only option for many trips 	<ul style="list-style-type: none"> • Pollution from cars • Poor road maintenance • Lack of signing including street names • Road rage • Cost of fuel • Congestion • Restricted and costly parking • Unsafe traffic management. • Negative safety and environmental impacts on other people. "Feeling of guilt that I could have used public transport" • Speed cameras. 	<ul style="list-style-type: none"> • New roads particularly bridges over the Clyde A77 dualling and roads round Glasgow. • Reduce cost of petrol • Cleaner cars • Better maintained roads • Develop transport systems to serve new housing, shopping and business development. • Price parking consistent with availability of alternatives to car travel.
Train / underground		
<ul style="list-style-type: none"> • Speed • More comfortable and reliable than buses. • Easy to obtain and understand rail timetable • Takes you right into the centre of the city. • Environmentally friendly • Often don't need to pay myself 	<ul style="list-style-type: none"> • Walk to/from station not always convenient. • Personal security – unmanned stations and lack of security on trains • Station car parks too small. • Services don't take you where you want to go. "Cities have developed since the railway was built and transport has not kept pace" • Overcrowded and uncomfortable in peak hours • Cost of tickets particularly for a family. • Services stop too early in the evening • Poor reliability particularly in poor weather. • Can't smoke on trains • Other people don't pay their fares. • Quality suffers due to vandalism • Rail services times and tickets are not integrated with buses. 	<ul style="list-style-type: none"> • 24 hour timetables • More railway stations and new lines • Develop light rail network and extend underground.

Bus		
<p>Don't have to worry about traffic or parking. Good value - Free for OAPs Services are improving</p>	<ul style="list-style-type: none"> • Lack of information at stops and on buses. • Poorly maintained and attracts vandalism • High polluters • Paying exact fares inconvenient • Waiting for a bus particularly from the city to the suburbs. • Limited routes "they don't take you where you want to go" • Poor ride with sharp braking and fast acceleration is unsuitable for some users. • Fares inconsistent with a family travelling for leisure. • Can't smoke on buses • Safety issues particularly trouble on late night buses. • Unreliable service. • Journey times too slow • Too time consuming getting to bus stop. 	<ul style="list-style-type: none"> • Buses with security people on them. • Promote "day out" ticket concepts. • New bus routes particularly to get access to new hospitals or other new development and with limited stops to the city. • 24 hour timetables • More bus park and ride • Value tickets for occasional users
Walking/cycling		
<ul style="list-style-type: none"> • Healthy exercise • Cheap 	<ul style="list-style-type: none"> • Dangerous 	<ul style="list-style-type: none"> • Need for safe cycle lanes and remove existing cycle lanes which are dangerous to use. • Improve safety by better enforcement of traffic law.

Table C3 Priority Factors Acting as Barriers to Choice of Mode

Car
<ul style="list-style-type: none"> • Congestion • Parking • Stress/tiring • Speed cameras • Cost of ownership • Can't work when travelling • Concerns and guilt about environmental impacts and danger to others
Train
<ul style="list-style-type: none"> • Uncomfortable due to overcrowding • Can't work on the train due to overcrowding • Reliability
Buses
<ul style="list-style-type: none"> • Travel time • Information • Ticketing – exact fares • Personal safety • Waiting for buses • Vandalism/maintenance
Walk/Cycle
<ul style="list-style-type: none"> • Weather • Danger

Table C4 – Future Vision

<ul style="list-style-type: none"> • Transport systems where you choose PT because you want to • An extensive rail/underground/tram/bus network where timings of services and locations of interchanges are integrated • Pleasant city centres with limited car access and park and ride services • Transport costs included within the purchase price of visiting the destination. • The ability to drive anywhere anytime without facing congestion when this was necessary.

Appendix D
Postal Questionnaire

Car Dependence in the Newton Mearns/Giffnock Area

This survey forms part of a research project which is investigating what prevents people from using the bus, train, walking or cycling, rather than the car. The Scottish Executive has commissioned this work and it is being undertaken with the assistance of the local Councils in the area and Strathclyde Passenger Transport Executive. The transport planning and research consultancy DHC is carrying out the work.

Current national and local transport policy aims to maximise use of public transport whilst recognising that for many trips car travel is essential. The aim of the research is to increase understanding of the reasons why car travel is necessary and the factors affecting car dependency. By participating in the research you will help transport providers to meet all travel needs and to make better use of public funding.

All responses will be treated as strictly confidential and will only be used within this research project to understand travel behaviour and choice better to help with future transport planning.

If you have any questions regarding the completion of this questionnaire please contact Paul at DHC by telephoning 0131 524 9610 or e-mailing paul@dhc1.co.uk. Completed questionnaires will be entered into a prize draw for a hamper. If you wish to be entered into the prize draw please enter your telephone number here_____.

Section 1 – About Your Travel

Q1 How many *return* trips do you make per week by purpose and mode?

<i>Trip purpose</i>	<i>Approximate number of RETURN trips per WEEK</i>	<i>Main Mode of Travel (e.g. car, van, walk, bus, taxi, train, underground, cycle)</i>	<i>Most Frequent Destination (e.g. Central Glasgow, East Kilbride, Paisley)</i>
To work			
To school or further education			
Travel in the course of business			
Food shopping			
Other shopping			
To or from hospital/ health centre			
Personal business e.g. bank, post office			
Social/ recreational			
Other			

- Q2** This question asks how satisfied you are with your travel experiences *into central Glasgow* and how important travel in this corridor is for you.
Please tick TWO boxes on each line below. One tick should show how important each travel experience is for you and one tick should show how satisfied you are with your experience

<i>Travel Characteristic</i>	<i>Importance of this travel characteristic to you</i>					<i>Satisfaction with this travel characteristic</i>					
	<i>Not relevant</i>	<i>Not important</i>		<i>Very important</i>			<i>Not satisfied</i>		<i>Very satisfied</i>		
		1	2	3	4	5	1	2	3	4	5
A. Car											
A1 The availability and cost of parking for trips to Glasgow City Centre.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A2 Levels of stress whilst driving to <i>work or education</i> in congestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A3 Travel time to <i>work or education</i> taking account of congestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A4 The use of speed cameras to reduce accidents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A5 Cost of car ownership and use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A6 Environmental impacts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Train/Underground (including rail park and ride)											
B1 Personal security waiting at stations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B2 For <i>work or education</i> trips lack of seat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B3 Reliability of services in peak periods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B4 Links with other transport – physical, timing and tickets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B5 Enjoyment of walk to station	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B6 For <i>non commuting</i> trips space to park in station car parks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B7 The cost of <i>non commuting</i> trips when travelling with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Cycle/Walk(i.e. 3 miles from Giffnock to City Centre)											
C1 Road and personal safety concerns for <i>commuting</i> trips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C2 Road and personal safety concerns for <i>non commuting</i> trips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C3 Workplace showers and lockers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C4 Exposure to air and noise pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q2 (contd).

Travel Characteristic	Importance of this travel characteristic to you					Satisfaction with this travel characteristic					
	Not relevant	Not important		Very important		Not satisfied		Very satisfied			
		1	2	3	4	5	1	2	3	4	5
D. Bus											
D1 Travel time for <i>commuting</i> trips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D2 Travel time for <i>non commuting</i> trips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D3 Information about bus services at bus stops (printed and electronic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D4 Information about bus services on the phone or internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D5 Pay on entry buses with exact fares	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D6 Personal security on buses and at bus stops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D7 Waiting for buses for <i>commuting</i> trips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D8 Waiting for buses for <i>non commuting</i> trips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D9 Condition and cleanliness of bus stop, shelter and buses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 2 - Travel to Work or Educational Establishment

If you are not in work or full time education please go to question 8.

		Cost to you (please tick)			
Q3. Does your employer provide you with workplace car parking (please tick)	No	Free	Less than £1.50 per day	Over £1.50 per day	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q4. Does your employer provide you with cycle parking	No	Free	Pay for use (state cost per day)		
	<input type="checkbox"/>	<input type="checkbox"/>	£ _____		
		Cost to employer (please tick)			
Q5. Does your employer provide subsidy for public transport fares to work including interest free loans? (please tick)	None	Loan	Subsidy less than £1.50 per day	Subsidy over £1.50 per day	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q6. Does your employer manage, or participate in, a car sharing scheme.		Yes	No		
		<input type="checkbox"/>	<input type="checkbox"/>		
Q7. Do any of your employment conditions (including flexibility of working hours) constrain your use of public transport		Yes	No		
		<input type="checkbox"/>	<input type="checkbox"/>		

If yes please explain _____

Section 3 – Improving Public Transport

Q8. This question seeks your views on ways to improve public transport

Improvement

Train/Underground (including rail park and ride)

- 8.1 Trained security staff on trains and at rail stations
- 8.2 More flexible payment methods covering all bus and rail operators
- 8.3 CCTV on trains and at rail stations
- 8.4 More space to park in station car parks
- 8.5 Reduce cost of tickets when travelling with others by 20%
- 8.6 Better maintenance of trains and stations particularly where there has been vandalism

	<i>Not needed</i> 1	<i>Welcome change</i> 2	<i>High priority</i> 3
8.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bus

- 8.7 Reduce bus journey times by 20% (i.e. about 10 minutes for a single journey from Eastwood Toll to the city centre)
- 8.8 Reducing the stopping time at bus stops with bus conductors or “smart card” ticketing
- 8.9 Electronic information at bus stops telling you if buses are on time (i.e. next bus number 32A in 2 minutes)
- 8.10 Published bus timetables including paper information at bus stops telling you the scheduled times of buses.
- 8.11 CCTV on buses and at bus stops
- 8.12 Reduce bus fares by 20% (i.e. about 30p for a return trip from Eastwood Toll to the city centre)
- 8.13 More flexible payment methods covering all bus and rail operators.
- 8.14 Trained security staff on buses.
- 8.15 Electronic information on buses telling you where you are so that you can get off at the right stop
- 8.16 Better maintenance of buses and bus stops particularly where there has been vandalism.

	1	2	3
8.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q9. If **ALL** the improvements which you have listed as **HIGH PRIORITIES** were implemented how likely would you be to use public transport?

Not likely *Likely* *Very Likely*

Improvement

- 9.1 Train travel for commuting, education, and work journeys
- 9.2 Train travel for other purposes
- 9.3 Bus travel for commuting, education, and work journeys
- 9.4 Bus travel for other purposes

9.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 4 - Transport and Society

Q10. How important are the following factors as influences on the choice of where you live? (please tick one box on each line)

	<i>Very important to me</i>	<i>Important to me</i>	<i>Not particularly important</i>	<i>Of no interest to me</i>
10.1 General amenity environmental quality and quality of life factors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.2 Social reasons/ involvement in the community/ family ties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.3 Good access by car to work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.4 Good access by public transport to work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.5 Good access by car to suitable schools, colleges and universities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.6 Good access by public transport to suitable schools, colleges and universities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q11. What changes would you support the government and other transport providers making in the future? (please tick one box on each line)

	<i>Strongly support change</i>	<i>Support change</i>	<i>Change of no interest</i>	<i>Would oppose change</i>	<i>Would strongly oppose change</i>
11.1 More road capacity and multi-storey car parks in town centres even if this results in higher levels of air and noise pollution and congestion in some places.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.2 Changes to road layouts to give less priority to cars in residential streets if this can deliver safer, quieter, and cleaner streets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.3 More pedestrian priority areas in town centres if this will deliver safer, quieter, and cleaner places to work and shop.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.4 New public transport routes, improved capacity on existing routes and cleaner, more secure trains, stations and bus stops.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.5 Cheaper public transport services financed partly by higher motoring taxes and charges such as congestion charging.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.6 Cheaper petrol tax and vehicle excise duty financed by road pricing/congestion charging.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 5 - About you

Q12. Please state your age

Adult aged 16 to 29	Adult age 30 to 44	Adult age 45 to 60	Adult over age 60
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q13. Are you

Male	Female
<input type="checkbox"/>	<input type="checkbox"/>

Q14. What is the approximate annual income of your household

£10,000 or less	£10,001 to £20,000	£20,001 to £30,000	£30,001 to £40,000	Over £40,000
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q15. How many members of your household work *full time*

Q16. How many members of your household work *part time*

Q17. How many cars/vans does your household have available

Number

If there is anything you would like to add about barriers to using public transport or walking or cycling or other changes which you would like to see made to transport then please use the space below, e.g. reasons why you would not use public transport even if all the improvements which you have identified in Question 8 were made.

Thank you for your time.

Please now return this form in the enclosed FREEPOST envelope.

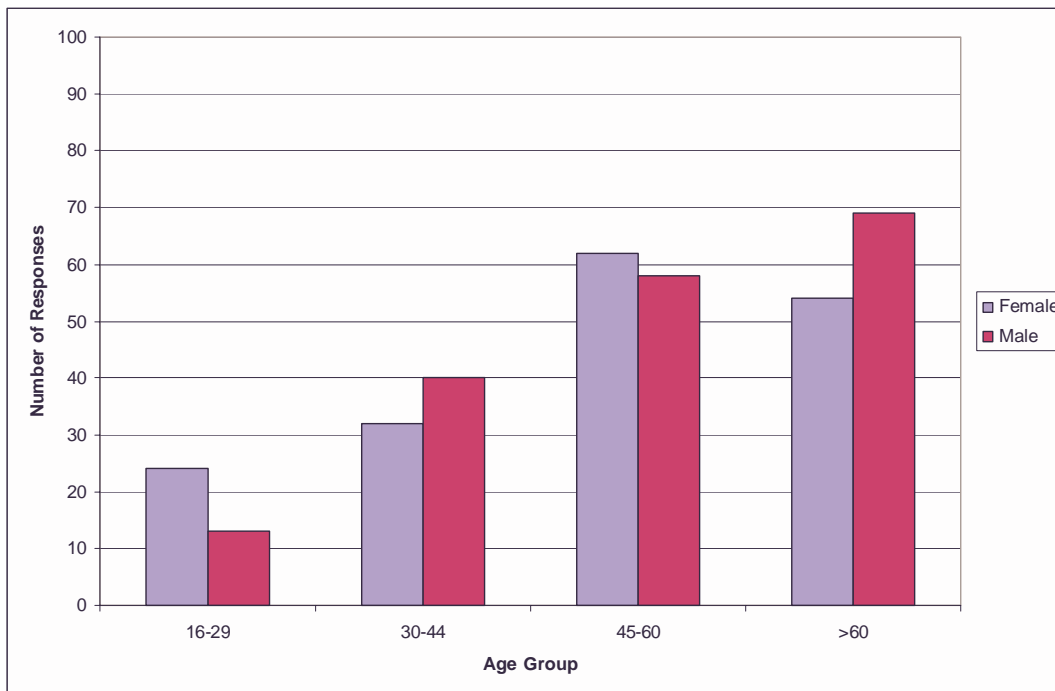
Appendix E
Postal Survey Analysis

General Characteristics of Respondents to the Survey

E.1 A total of 365 responses were received which is over 18% of the sample. Given that completion of this questionnaire was estimated to take over 15 minutes, this is considered to be a good response rate.

E.2 The respondents are reasonably balanced between male and female, but many more elderly people responded than younger people. The response rate amongst the 60+ age group is estimated to be around 50% falling to about 13% for the younger adults.

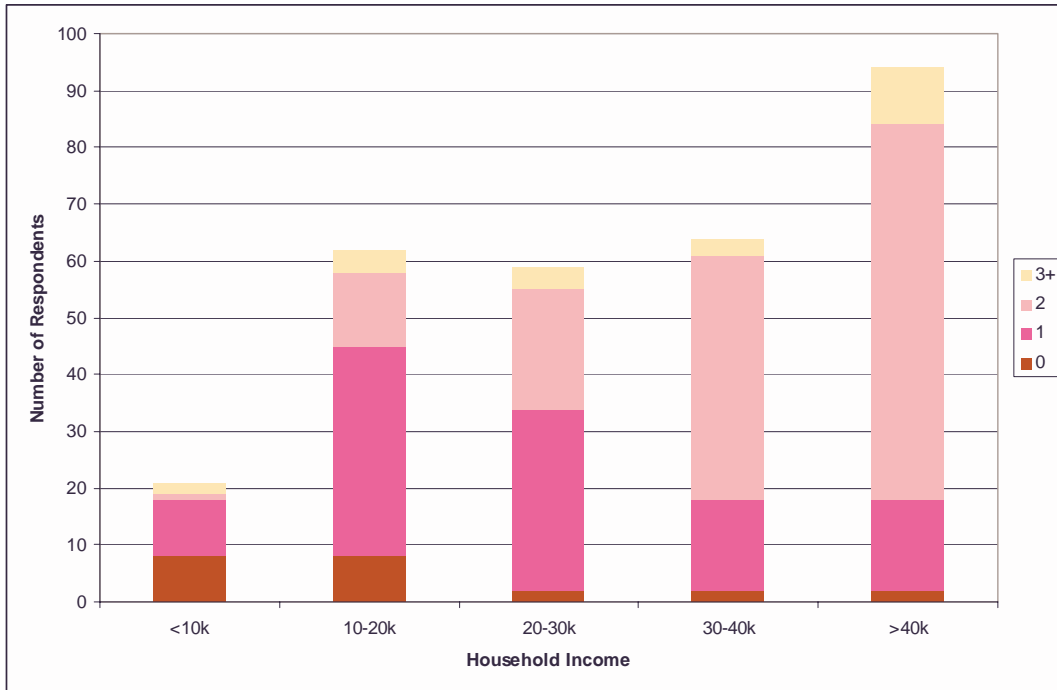
Figure E1 – Respondents by Age and Sex



E.3 87% of the sample is made up of one and two car households, comprising 31% one car households and 56% two car households. This compares with the estimated data for the area based on the 1991 census of 39% one car households and 34% 2+ car households. It is likely that there has been a significant increase in 2 car households since 1991, but it also appears that relatively more of the higher car owning households have responded. This is perhaps not surprising for a questionnaire entitled “Car Dependence in Newton Mearns/Giffnock”

E.4 Figure E2 compares household income with household car ownership.

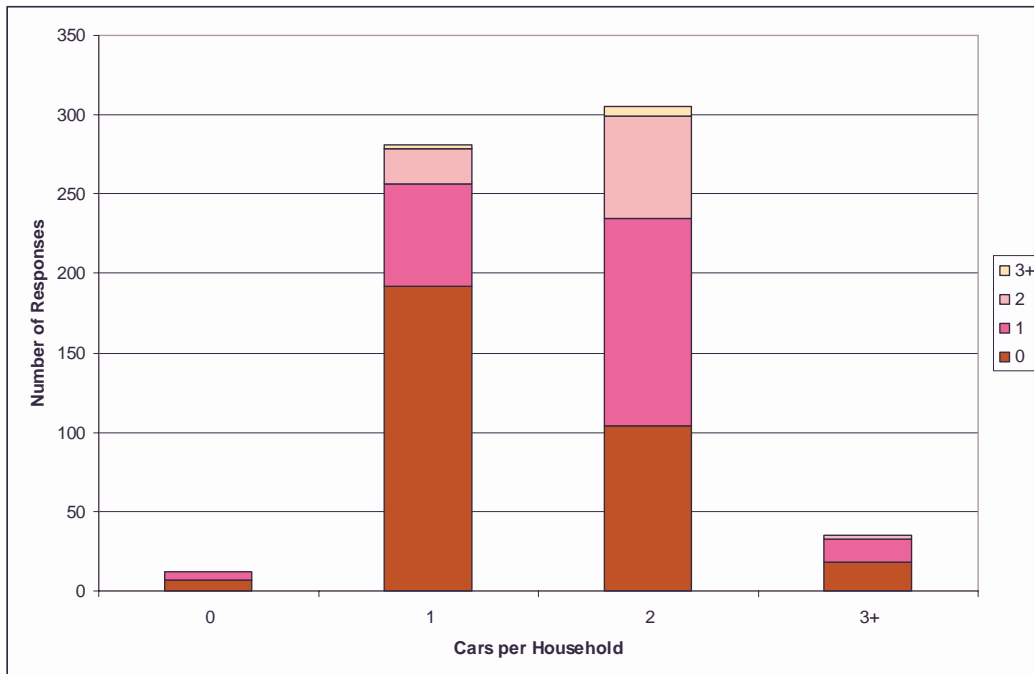
Figure E2 Car Ownership by Household Income



E.5 31% of the respondents live in households with an income of greater than £40k per year and only 21% of the sample live in households with an income of £19k or less. A large proportion of the respondents therefore have significant disposable incomes and financial constraints will not be the dominant factors in their social and lifestyle choices.

E.6 9% of one car households have more than one person working full or part time compared with an equivalent figure of 23% for 2+ car households as shown in Figure E3. This is likely to be related not just to income factors but to the practicalities of two household members travelling to work in different places.

Figure E3 – Working Members of the Household by Car Ownership



E.7 Car ownership does not seem to be particularly dependent on the need to travel to work, with over 50% of 3+ car households having no members of the household in work compared with about 34% for 2+ car households and 68% for 1 car households. These figures, however, exclude students who may need cars to travel to educational establishments.

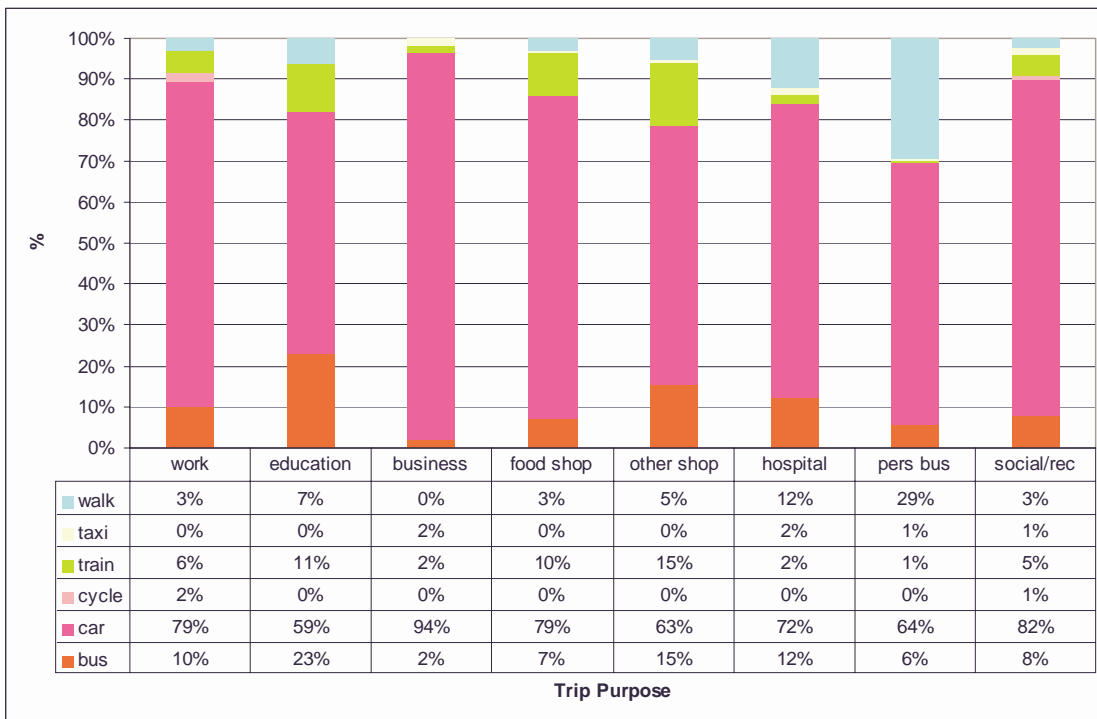
Travel Patterns and Perceptions

E.8 People were asked to state the number of return trips they made each week for eight trip purposes, describing their main mode of travel, and most frequent destination. The eight trip purposes identified were: work, school or further education, in the course of business, food shopping, other shopping, hospital or health centre, personal business (e.g. banking or post office), and social/recreational trips.

E.9 It can be seen from Figure E4 that car travel dominates for all trip purposes, peaking at 94% of business trips. When averaged across all trip purposes by trip frequency, these modal split figures are roughly consistent with the modelled figures in Figure 14.

E.10 Bus achieves its highest mode share for education trips and rail achieves its highest mode share for non food shopping trips. Walking achieves a substantial mode share for personal business trips, with 29% of respondents identifying this mode. Cycling appears only to be regularly used for travel to work and leisure trips. Taxis are most often used for business trips and for trips to hospital.

Figure E4 - Modal Split by Trip Purpose



E.11 For the more popular modes: car, bus, train and walk, the choice of destination has been plotted by trip purpose (Figures E5 to E8). This shows that the choice of mode is heavily dependent on the trip destination. Rail and bus are popular choices for trips to Glasgow city centre and walk trips are mainly local. For trips to non city centre destinations in Glasgow and for trips elsewhere car travel dominates.

Figure E5 – Car Destination Choice by Purpose

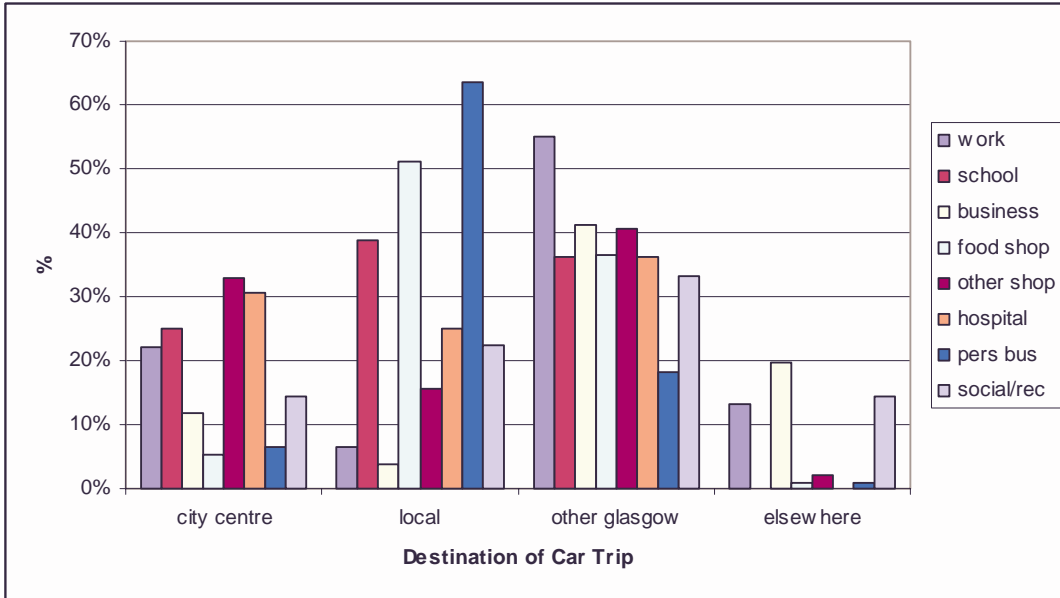


Figure E6 – Bus Destination Choice by Purpose

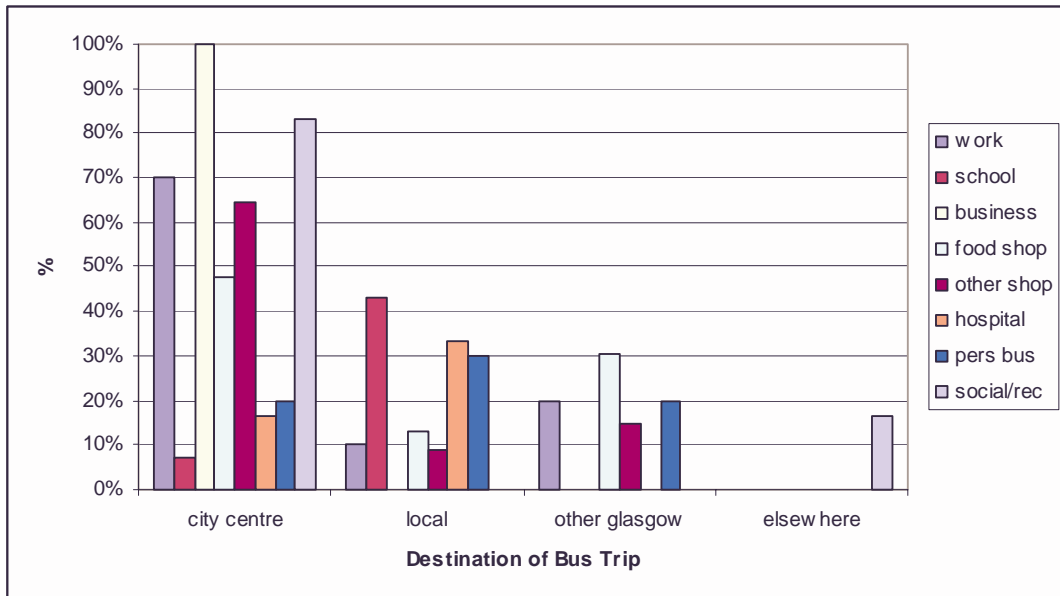


Figure E7 – Train Destination Choice by Purpose

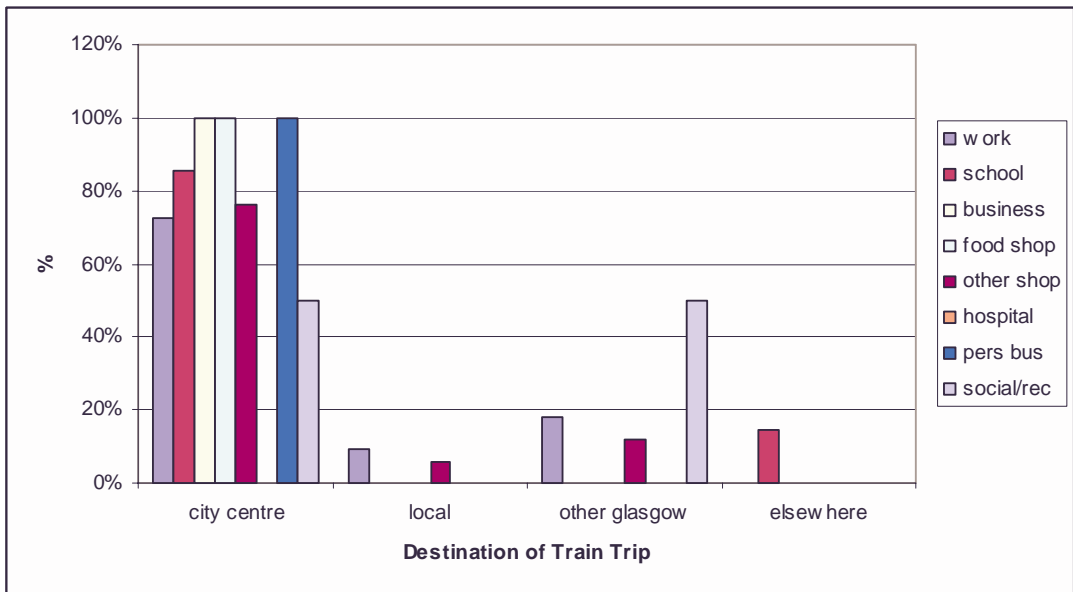
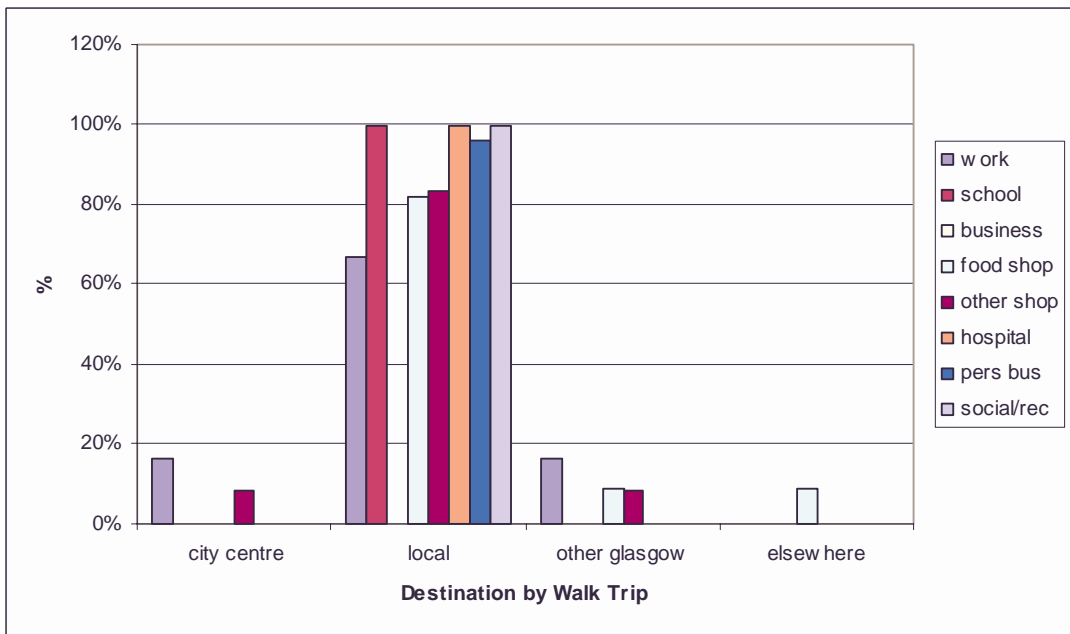


Figure E8 – Walk Destination Choice by Purpose



E.12 Figure E9 summarises the modal split for trips to the city centre. Although car is still the dominant mode, train and bus achieve very substantial mode shares. A total of 4% for walking and cycling trips is also significant given that most of the trips will exceed 5 km.

E.13 Car achieves the highest mode share for trips to hospital, which echoes other research which shows that many people prefer to undertake these trips by car. Most people undertake personal business locally, resulting in only 9 personal business trips to the city centre, so bias within the limited data is likely to be the reason for the domination of car travel for these trips. The trip purposes with the greatest scope for achieving modal shift are therefore work, business, shopping and leisure.

Figure E9 – Modal Split to Glasgow City Centre



E.14 The questionnaire asked people about their experiences of travelling to central Glasgow by each mode. It was necessary to consider travel within a single corridor, so that the context within which these specific travel decisions were being made could be compared with perceptions and behaviour.

E.15 Table E1 shows the percentage of respondents identifying characteristics as not relevant to them. If recognising problems and taking responsibility for them are key first steps towards behaviour change, then perceptions of relevance can be a useful indicator. These figures include the views of all respondents rather than simply those who reported that they already used the particular mode.

E.16 The not relevant responses may have been made for several reasons: the mode may not be available; use of it may be of no interest; or the specific travel characteristic may be perceived as not relevant to the respondent's travel behaviour. Since there is generally good accessibility by car and public transport in the area it is expected that actual lack of availability of the mode will be quite limited. The not relevant response should therefore be a reasonable proxy for current perceptions.

E.17 The factor considered to be most relevant amongst the respondents was the environmental impacts of car use. However, even for this characteristic 12.5% of respondents did not consider that it was relevant to them. The factor considered to be least relevant was workplace showers and lockers for which 66.5% of respondents stated that it was not a factor relevant to them.

Table E1 - % of Not Relevant Responses

Car	%	Walk/Cycle	%
A1 – Parking	25.0	C1 – Safe commuting	54.3
A2 – Stress	42.6	C2 – Safe non commuting	43.8
A3 – Travel time	40.3	C3 – Showers and Lockers	66.5
A4 – Speed cameras	14.5	C4 – Exposure to pollution	39.8
A5 – Cost	17.9	Bus	%
A6 – Environment	12.5	D1 – Commuting time	51.5
Train	%	D2 – Non commuting time	32.1
B1 – Personal security	26.2	D3 – Information at stops	22.5
B2 – Lack of a seat	40.0	D4 – Other information	39.2
B3 – Reliability	32.7	D5 – Exact fare on entry	33.8
B4 – Transport links	31.8	D6 – Personal security	25.4
B5 – Walk access	33.5	D7 – Waiting when commuting	51.5
B6 – Parking	29.9	D8 – Waiting non commuting	26.5
B7 - Cost	35.8	D9 – Maintenance	22.0

E.18 For bus travel, the commuting related characteristics are regarded as not relevant by more than half of the respondents compared with about 40% for the car commuting characteristics. Some people noted in their responses that their shift patterns did not suit bus times of operation.

E.19 It can be seen that a high proportion did not consider that walking or cycling were practical options given the distance of over 5km to the city centre.

E.20 The train travel characteristics were regarded as being of more similar relevance than for the other modes, ranging from 26.2% not relevant responses for personal security to 40% for lack of a seat for commuting trips. For characteristics regarded as relevant, respondents stated the importance they attached to the issues and how satisfied they were with the characteristic. The attributes included for each mode were drawn from the issues raised at the focus groups as discussed in Chapter 5.

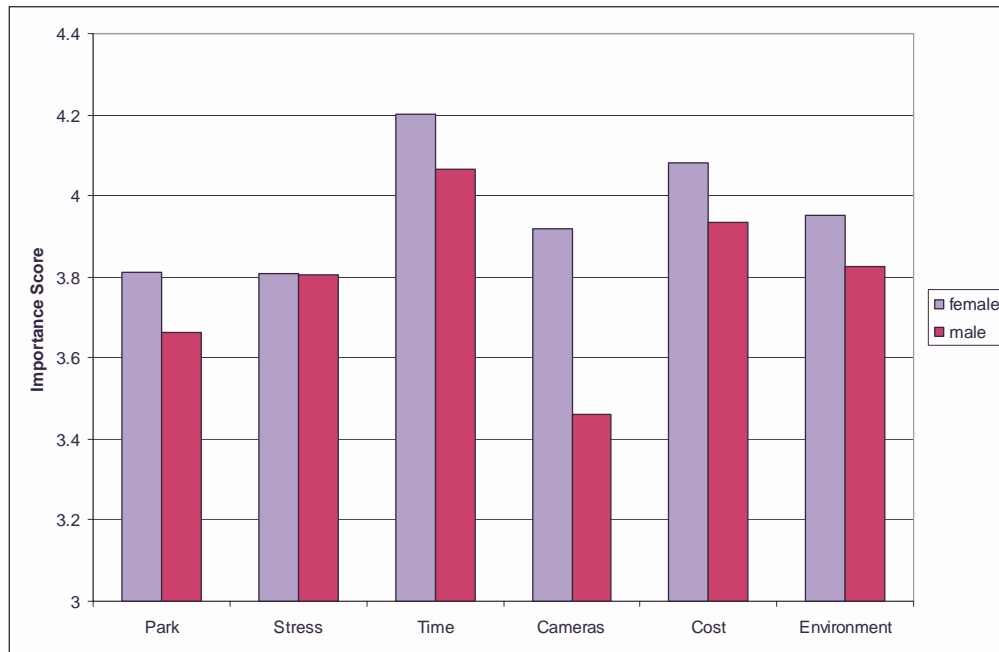
Car Travel Experiences

E.21 Six characteristics were identified for car travel in the questionnaire:

- The availability and cost of parking for trips to Glasgow City Centre
- Levels of stress whilst driving to work or education in congestion
- Travel time to work or education taking account of congestion
- The use of speed cameras to reduce accidents
- Cost of car ownership and use
- Environmental impacts

E.22 As can be seen from Figure E10, the importance which people attach to each of these issues varies by people group, but the ranking of the issues is broadly the same for all groups. The importance scores shown are the mean scores for the selected people group on a scale from 1 to 5.

Figure E10 – Importance Scores for Car Travel



E.23 The highest importance scores are for travel time and the cost of car ownership and use. Women rate all factors as more important than their male counterparts. This is particularly so for speed cameras. Speed cameras may be considered important because they reduce accidents which would be a positive effect or because drivers are anxious in case they get caught which would be a negative factor. The positive satisfaction scores discussed in paragraph E.28 suggest that accident reduction is of greater importance to respondents.

Table E2 – Mean Importance Scores for Car Travel

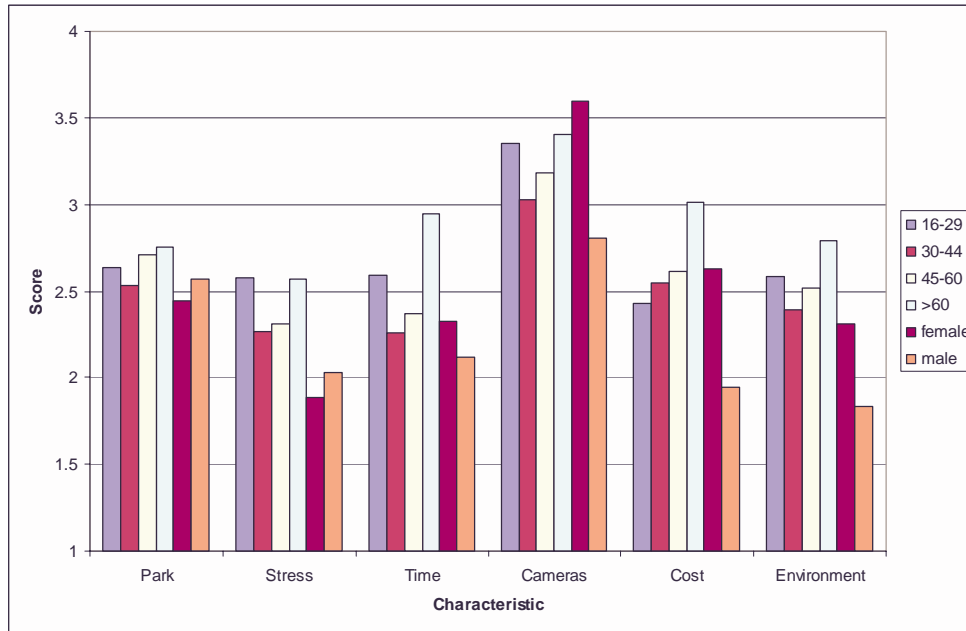
	Park	Stress	Time	Cameras	Cost	Environment
Age						
16-29	3.96	2.22	2.52	3.75	3.24	3.64
30-44	3.83	3.93	4.17	3.61	4.02	3.79
45-60	3.60	3.83	4.32	3.53	3.92	3.87
>60	3.77	3.09	3.00	3.85	4.01	4.06
Income						
10-20	3.97	3.68	3.23	3.23	3.27	3.13
20-30	3.94	3.84	3.11	3.11	4.08	3.98
30-40	3.65	3.66	3.31	3.31	3.78	3.74
>40	3.61	4.01	4.22	4.22	3.91	3.73

E.24 Higher income groups rate all factors other than the availability and cost of parking as more important than their counterparts from lower income groups. Younger age groups are relatively more concerned about the availability of parking, and the 30 to 60 age group are relatively more concerned about stress when driving and travel time.

E.25 People were also asked to state their level of satisfaction with each criterion. Satisfaction was considered for each of the age and income groups and for both women and men. Taking people who rated the relevant factor as very important (importance scores of 4 and 5), Figure E11 compares satisfaction scores for the four age groups and for men and women.

E.26 It can be seen that men are much less satisfied than women with speed cameras, costs of car ownership and use, and the impact on the environment. The over 60s and under 30s also appear to be generally more satisfied than the 30 to 60 age group. Higher income groups (>£30k) are generally less satisfied than lower income groups (<£30k) with the exception of stress when driving where the lower income groups are less satisfied.

Figure E11 – Satisfaction with Car Travel



E.27 Further analysis suggests regular car commuters into central Glasgow have stronger views than the sample population as a whole, but that their ranking of the different factors is similar. It is not surprising that regular car drivers should have stronger views than occasional car users or people who mainly use public transport.

E.28 On this five point scale, with 3 as the mid point, only the cameras attribute is viewed more positively than negatively overall for most of the user groups. However Figure E10 showed that it was also the least important of the factors affecting people's perception of car travel identified on the questionnaire.

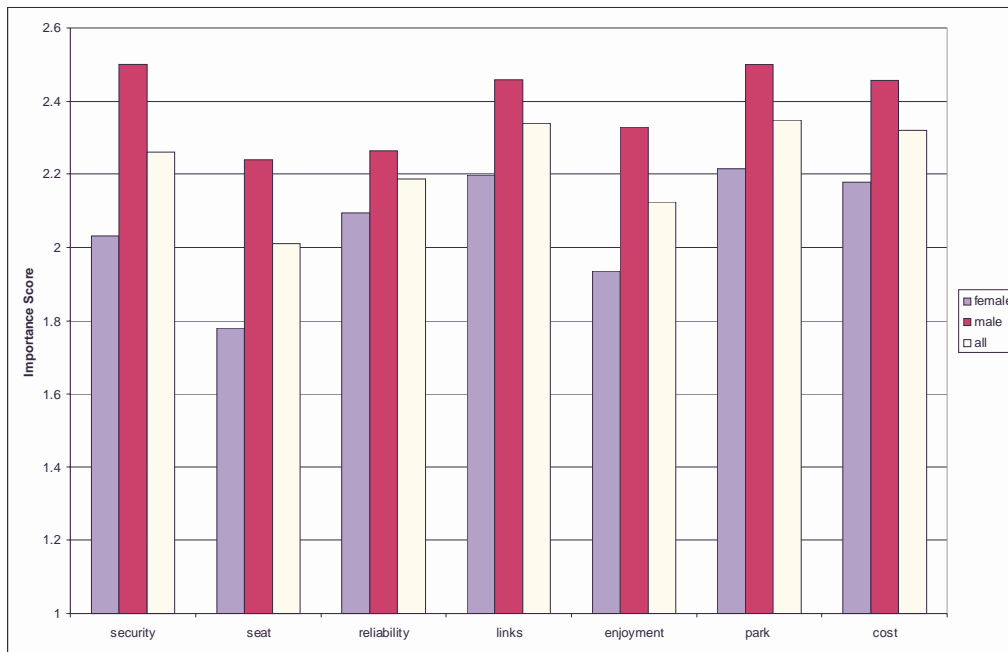
Train and Underground Travel Experiences

E.29 People were asked about seven aspects of train and underground travel:

- Personal security waiting at stations
- Lack of a seat for journeys to work and education trips
- Reliability of services in peak periods
- Links with other transport – physical interchanges, timing of services, and ticketing options
- Enjoyment of walk to station
- For non commuting trips space to park in station car parks
- The cost of non commuting trips when travelling with others

E.30 Figure E12 shows the importance which people attach to each of these issues.

Figure E12 – Importance Scores for Train/Underground Travel



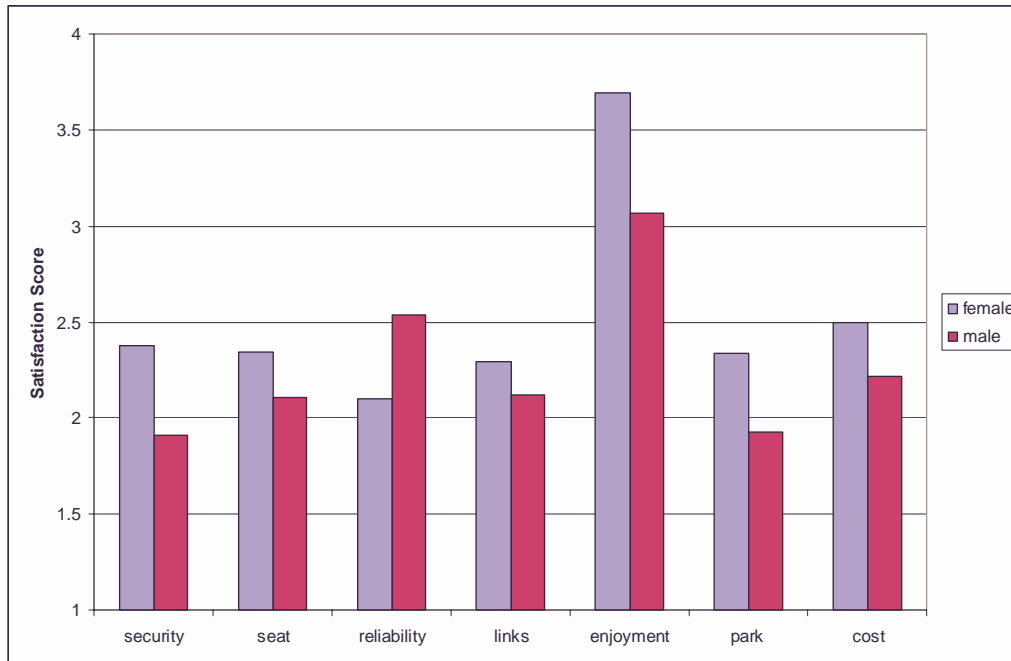
E.31 Men regard all these factors as more important than women and the overall level of importance of these issues is much lower than for the car travel factors. This is in stark contrast to the importance factors for car travel where women rated all the factors as more important.

E.32 The top scoring characteristic is parking at rail stations, followed by links with other transport and security concerns whilst waiting at stations. Only 28% of the respondents use public transport for any trip purpose so it is not surprising that importance scores are lower overall.

E.33 It is likely that many of the car users do not have a sufficiently clear picture of the difficulties of travelling by rail and this accounts for factors such as reliability not being given higher importance scores.

E.34 For all factors with high importance scores (importance scores of 4 and 5) the satisfaction levels are shown in Figure E13.

Figure E13 – Satisfaction Scores for Train/Underground Travel



E.35 Enjoyment of walking to rail stations is the only characteristic with a satisfaction score of greater than 3. With the exception of reliability in peak periods women were more satisfied than men. Otherwise the scores for all characteristics are broadly similar and consistent across the age and income groups.

Walking and Cycling Experiences

E.36 A few respondents commented on the questionnaire returns that walking and cycling were perceived by them in very different ways, and that their responses related to views of walking. If this was a widespread but unstated view then the results may not be relevant to cycling. Although most people completed this section without comment on this issue, many people ticked the not relevant box indicating that they would not consider walking or cycling the 5+km into central Glasgow.

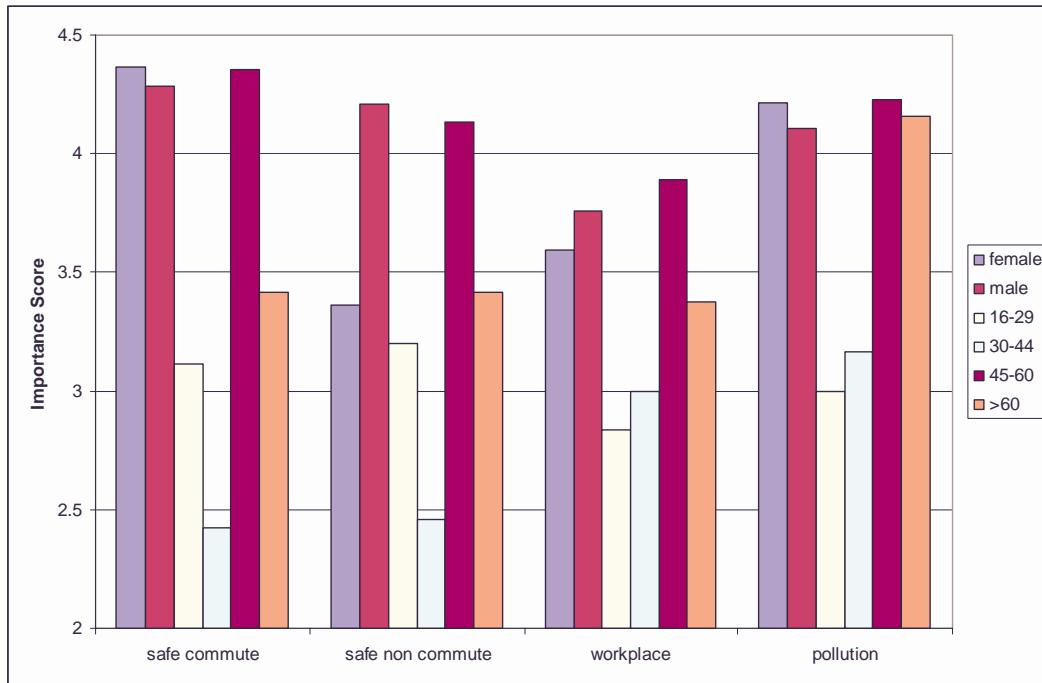
E.37 Four characteristics of walking and cycling were identified:

- Road and personal safety concerns for commuting trips
- Road and personal safety concerns for non commuting trips
- Workplace showers and lockers
- Exposure to air and noise pollution

E.38 It can be seen from Figure E14 that these characteristics of walking and cycling are regarded as being much more important than for the public transport characteristics and as important as the car characteristics to the respondents. Although there were fewer respondents rating walking and cycling issues as relevant, those who did consider them relevant attach a high

importance to the issues. Younger people place much less importance on all these characteristics than the 45+ age group. This perhaps reflects the fact that these characteristics emerged from focus groups where the 45+ age group was much better represented than younger age groups.

Figure E14 – Importance Scores for Walking and Cycling

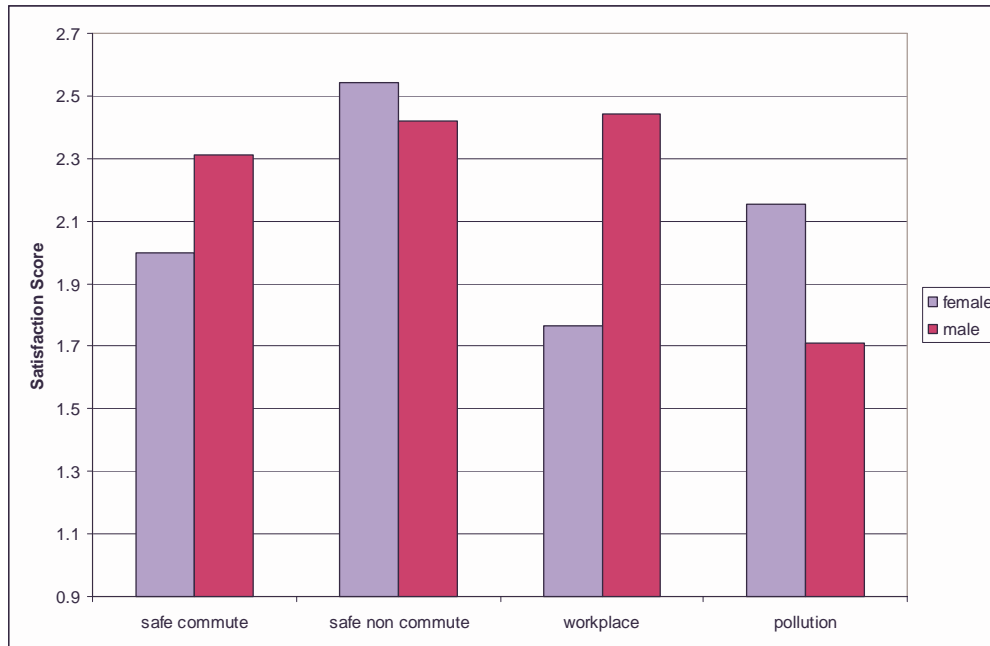


E.39 Surprisingly safety is regarded as a less important issue for non commuting trips by women than by men, but otherwise gender is a less important factor affecting views than for public transport or car travel.

E.40 Further analysis by income group shows that low income groups are equally concerned about pollution as high income groups, but are much less concerned about safety issues and workplace facilities.

E.41 For those characteristics receiving high importance scores (importance scores of 4 and 5) the satisfaction levels are shown in Figure E15.

Figure E15 – Satisfaction Scores for Walking and Cycling



E.42 The respondents are not particularly satisfied with any of these characteristics giving fairly low scores in all categories. Women are slightly less satisfied with workplace showers and lockers than men but are more satisfied with levels of exposure to noise and pollution.

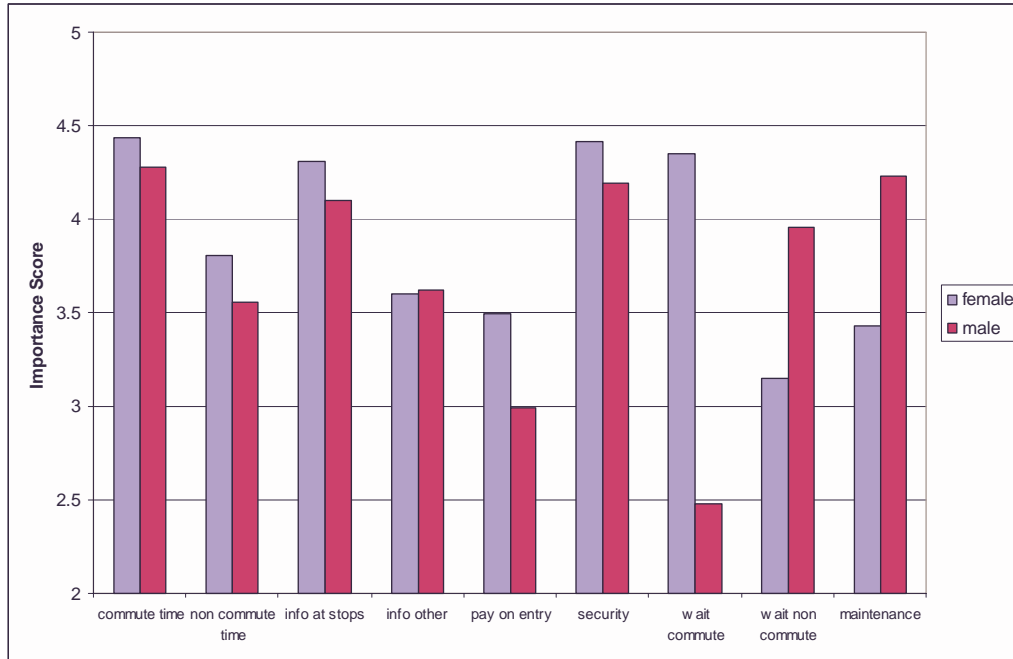
Bus Travel Experiences

E.43 The questionnaire asked about nine aspects of bus travel:

- Travel time for commuting trips
- Travel time for non commuting trips
- Information about bus services at bus stops
- Information about bus services by telephone or on the internet
- Paying exact fares on entry
- Personal security on buses and at bus stops
- Waiting for buses for commuting trips
- Waiting for buses for non commuting trips
- The maintenance condition and cleanliness of bus stops, shelters and buses

E.44 Figure E16 compares the importance scores for each of these factors.

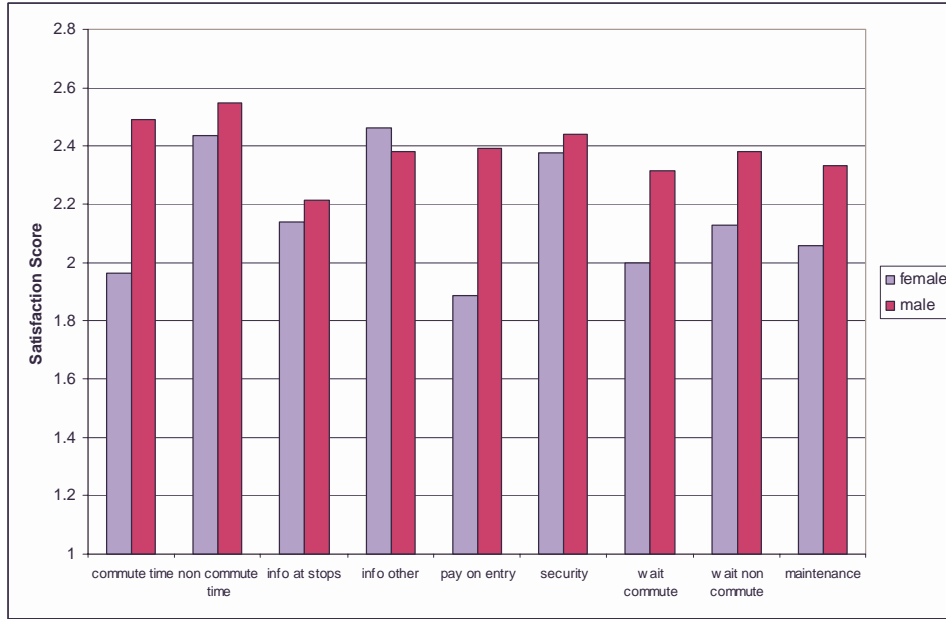
Figure E16 - Importance Scores for Bus Travel



E.45 Travel time when commuting, personal security, and information at bus stops, were given the highest importance scores. Wait times for commuting trips were regarded as being more important by women than men, but men regarded waiting for non commuting trips as a more important issue. Use of buses by men and women for commuting trips amongst the respondents is broadly similar. Given the similar scores for the other characteristics it is not clear why waiting for buses is regarded as a much more important factor by women but perhaps the more limited time budgets for many women commuters is a factor.

E.46 Satisfaction scores for the bus travel issues typically range from 2 to 2.5 with men tending to give marginally higher scores. Women appear to be slightly more concerned about exact fare on entry buses but the ranking of these factors is relatively uniform across all factors.

Figure E17 – Satisfaction Scores for Bus Travel



E.47 Overall, the satisfaction scores for each mode are less informative than the importance scores attached to each characteristic. All the rail characteristics have importance scores less than 3. This reflects the findings of the focus groups that people are generally quite content with the rail services. The main barriers to modal shift to rail are likely to be physical coverage of the rail network rather than the issues identified in the questionnaire.

E.48 For the other modes, 6 of the 26 factors are identified as very important with mean scores of 4 and above as follows:

Car

- Travel time to work or education taking account of congestion

Walk/Cycle

- Road and personal safety concerns for commuting trips
- Exposure to air and noise pollution

Bus

- Travel time for commuting trips
- Information about bus services at bus stops
- Personal security on buses and at bus stops

Improving Public Transport

E.49 For 16 potential ways to improve public transport people were asked to state whether the improvements were not needed, welcome, or a high priority.

E.50 Table E3 shows how each of the 16 options was ranked, giving a score of 1 if the option was a welcome change and 2 if it was a high priority. Rail security achieved the highest scores echoing the findings from the focus groups that security issues were a top priority. The percentage of respondents supporting each change is also shown in the Table.

E.51 Improved maintenance of buses and bus stops was the top improvement for buses followed by real time information at bus stops and better published timetable information.

Table E3 – Ranking of Improvement Options

Option	Welcome or high priority response	
	Average Score	%
Better maintenance of trains and stations particularly where there has been vandalism	1.58	98.5
CCTV on trains and at rail stations	1.54	95.8
Better maintenance of buses and bus stops particularly where there has been vandalism.	1.49	95.1
Electronic information at bus stops telling you if buses are on time	1.41	92.3
Published bus timetables including paper information at bus stops telling you the scheduled times of buses.	1.40	93.0
Trained security staff on trains and at rail stations	1.27	89.7
CCTV on buses and at bus stops	1.24	85.5
Reduce bus journey times by 20%	1.22	86.2
More space to park in station car parks	1.22	82.5
Reducing the stopping time at bus stops with bus conductors or “smart card” ticketing	1.17	85.5
More flexible payment methods covering all bus and rail operators.	1.14	80.6
More flexible payment methods covering all bus and rail operators	1.08	79.3
Reduce bus fares by 20%	1.07	77.3
Electronic information on buses telling you where you are so that you can get off at the right stop	1.00	77.5
Trained security staff on buses.	0.97	74.2
Reduce cost of tickets when travelling with others by 20%	0.91	68.8

E.52 Looking separately at rail and bus to assess the potential for modal shift, people were asked how likely they would be to change mode if all the options rated as high priorities were implemented. Table E4 shows that a

huge percentage of respondents would be prepared to use public transport. Only 7% of respondents indicated that they would not use rail or bus for any trip purpose. 74% of respondents, indicating that they would be prepared to use buses for commuting or non commuting purposes if all their stated high priority changes were implemented, is a huge percentage of the sample when compared with the low numbers who currently use buses.

Table E4 - % Likely to Use Public Transport if High Priorities Implemented

<i>Trip Purpose</i>	<i>Train</i>	<i>Bus</i>
Commuting, education and work journeys	28	31
Other trip purposes	73	73
Total	75	74

E.53 Table E5 shows the rail priorities of those who indicate that they are likely or very likely to use rail for commuting, education and work journeys if all their stated high priorities were implemented. The ranking is identical to that for the whole sample. The overall level of the scores is higher since those people who are prepared to shift mode have been more likely to score the options as high priorities.

E.54 The ranking and scores for non commuting trips by train are very similar to those in Table E5.

Table E5 – Ranking of Rail Improvement Options by Respondents Likely to Shift Mode for Commuting

Option	Score for welcome or high priority responses
Better maintenance of trains and stations particularly where there has been vandalism	1.61
CCTV on trains and at rail stations	1.59
More space to park in station car parks	1.34
Trained security staff on trains and at rail stations	1.29
More flexible payment methods covering all bus and rail operators	1.18
Reduce cost of tickets when travelling with others by 20%	1.01

E.55 A similar analysis was undertaken for those who indicated that they were likely to use buses for commuting, education and work journeys if all their high priorities were implemented.

E.56 It can be seen from Table E6 that (unlike rail) the scores and ranking of factors are different for commuters and non commuters. The main differences are that commuters are more concerned about travel time, and non commuters are more concerned about security related issues.

E.57 The common high priority factors relate to electronic and published information.

Table E6 – Ranking of Bus Improvement Options by Respondents Likely to Shift Mode

Option	Score for welcome or high priority responses	
	Commute	Other (rank)
Reduce bus journey times by 20%	1.52	1.29(4)
Electronic information at bus stops telling you if buses are on time	1.51	1.44(2)
Better maintenance of buses and bus stops particularly where there has been vandalism.	1.50	1.53(1)
Published bus timetables including paper information at bus stops telling you the scheduled times of buses.	1.42	1.44(3)
Reducing the stopping time at bus stops with bus conductors or “smart card” ticketing	1.25	1.20(7)
More flexible payment methods covering all bus and rail operators.	1.24	1.20(6)
CCTV on buses and at bus stops	1.24	1.28(5)
Reduce bus fares by 20%	1.21	1.14(8)
Electronic information on buses telling you where you are so that you can get off at the right stop	1.02	1.02(10)
Trained security staff on buses.	0.95	1.03(9)

E.58 For six of the highest priority bus and rail improvements it can be seen from Figure E18 that the largest disparity of views is for bus journey times, where the over 60 age group view this as a low priority but the under 30 age group rate it as amongst their highest priorities. Younger people also prioritise real time information at bus stops more highly than older groups.

Figure E18 – Priorities for Improving Public Transport by Age and Gender

