



# **REVIEW OF RESEARCH ON SCHOOL TRAVEL**

**Derek Halden Consultancy**

**Scottish Executive Central Research Unit  
2002**

Further copies of this report are available priced **£5.00**. Cheques should be made payable to The Stationery Office Ltd and addressed to:

The Stationery Office Bookshop  
71 Lothian Road  
Edinburgh  
EH3 9AZ

Tel: 0870 606 5566

Fax: 0870 606 5588

**The views expressed in this report are those of the researchers and do not necessarily represent those of the Department or Scottish Ministers.**

© Crown Copyright 2002

Limited extracts from the text may be produced provided the source is acknowledged. For more extensive reproduction, please write to the Chief Research Officer at the Central Research Unit, 3rd Floor West Rear, St Andrew's House, Edinburgh EH1 3DG

# CONTENTS

<b>EXECUTIVE SUMMARY</b>	<b>I</b>
<b>CHAPTER ONE INTRODUCTION</b>	<b>1</b>
BACKGROUND	1
APPROACH TO THE PROJECT	1
THE POLICY CONTEXT	2
<b>CHAPTER TWO FACTORS AFFECTING SCHOOL TRAVEL</b>	<b>4</b>
TRENDS IN SCHOOL TRAVEL	4
EMPLOYMENT, HOUSEHOLD AND CAR OWNERSHIP FACTORS	5
SOCIAL AND COMMUNITY FACTORS	6
EDUCATIONAL FACTORS	7
HEALTH AND ENVIRONMENTAL FACTORS	7
EFFECTS OF WIDER TRANSPORT FACTORS	7
REAL AND PERCEIVED SAFETY AND RISK FACTORS	9
COST, TIME AND EFFICIENCY FOR MANAGEMENT OF SCHOOL TRANSPORT	9
THE NEED TO CARRY EQUIPMENT	10
<b>CHAPTER THREE IMPACTS OF SCHOOL TRAVEL</b>	<b>11</b>
GENERAL IMPACTS	11
IMPACTS ON CHILDRENS' COGNITIVE DEVELOPMENT	11
IMPACTS ON CHILDRENS' SOCIAL DEVELOPMENT	12
IMPACTS ON CHILDRENS' PHYSICAL HEALTH	13
<b>CHAPTER FOUR EFFECTS OF INITIATIVES</b>	<b>14</b>
GENERAL	14
PUBLIC TRANSPORT INITIATIVES	15
SUPPORT FOR WALKING AND CYCLING	16
EDUCATION AND PUBLICITY	16
INFRASTRUCTURE AND ENFORCEMENT	16
PLANNING EFFICIENT SCHOOL TRAVEL	16
<b>CHAPTER FIVE CONCLUSIONS AND RECOMMENDATIONS</b>	<b>18</b>
FURTHER RESEARCH NEEDS	19
<b>REFERENCES</b>	<b>20</b>
<b>APPENDIX A SCOTTISH SCHOOL TRANSPORT SUPPORT BY LOCAL AUTHORITY</b>	<b>26</b>

## EXECUTIVE SUMMARY

1. The proportion of children in Scotland being driven to school by car is increasing rapidly and reached 20% of journeys to school in 2000. This trend is having a negative effect on many transport, health, safety, and environmental factors, and is impacting on the wider economy through growing road congestion particularly in the morning peak period.
2. Transport, health and education policies therefore all seek improvements in school travel, identifying community planning approaches to deliver integrated action and best value. This review considers in a Scottish context the lessons from UK and international research on: the factors affecting school travel; the influence of school travel on childrens' development; and the effects of initiatives to improve school travel safety and efficiency.
3. Although levels of car based travel to school are lower in Scotland than in England, they are growing strongly. Trends in school travel are affected by: organisational changes within education, planning policy factors, and social, economic, demographic trends. The growth in car travel to school mirrors substantial growth in car ownership, particularly the number of two car households.
4. Children in the UK are open minded about transport, and are generally aware of the impacts of travel decisions on themselves and their environment. Whilst they would like to walk and cycle more, the balance between car travel and other modes still appears to favour the speed and convenience of car travel for an increasing number of trips. Perceptions of safety and risk often do not match actual risk, so influencing attitudes to risk is an important element in changing travel behaviour.
5. For many school trips in Scotland bus travel is the only practical alternative to car travel and the poor image and travel experiences of children on buses is a major concern. Greater respect for buses as a mode needs to build on the greater social and independence opportunities provided by bus travel when compared with car travel. However delivering the required change in image will require significant changes in the ways that services are provided and operated.
6. Social factors have a strong influence on travel to school decisions, and where trade-offs need to be made between transport, health, environmental, and social factors the social issues tend to dominate. However travel choice is very complex involving such a large range of factors that reliable analysis would require very large studies of behaviour.
7. Non-car travel can have some positive influences on childrens' development. The school journey offers the opportunity for developing social relationships with adults, and with other children from within and outwith normal peer groups. Greater independence helps with the development of spatial skills and may improve organisational skills including time and money management. Regular exercise walking or cycling to and from school also has a positive influence on health.
8. Success in implementing initiatives to improve school travel is sensitive to the local context, making generalised conclusions on the impacts of different types of initiative difficult. Nevertheless, there is a large menu of types of initiatives that have proved

successful and these can be used to develop detailed plans with local communities. When generic solutions are imposed on communities there is a risk of reducing safety or efficiency.

9. Given the success of community based schemes it is of concern that only about 2% of schools have school travel plans. If the majority of schools in Scotland adopted community based safer routes to school approaches then there would be many positive economic, social and environmental benefits. Further research is recommended to identify how to galvanise wider support for effective safer routes to school planning, and on how to target action locally through school centred plans.

# **CHAPTER ONE            INTRODUCTION**

## **BACKGROUND**

1.1     The Scottish School Travel Advisory Group (Scottish STAG) was established by the Scottish Executive in August 2000 with the objective of increasing the proportion of non-car based travel to school. The group seeks to identify practical means of increasing choices and influencing behaviour, and to develop a coherent approach to the management and administration of school travel. To ensure that their recommendations are based on state of the art knowledge, the group need, a concise summary of evidence on school travel drawn from UK and international research.

1.2     The aims of this project are to review UK and international research on travel to school published since 1995 including the research on factors affecting school travel and the effectiveness of school travel initiatives designed to address obstacles to efficient school travel.

## **APPROACH TO THE PROJECT**

1.3     The review has been tackled in three stages:

- Scoping of national policies on school travel
- A broad map of available literature based on published bibliographies and two major recent literature reviews for UK STAG, supplemented by web and library based searches.
- A detailed review of selected literature drawing mainly from the sources identified above but supplemented by additional references identified within particular papers.

1.4     The broad mapping of the literature considered a total of over 550 references from recent travel to school literature reviews and bibliographies and from library and internet searches. The work was greatly assisted by a recent review for DTLR (EPPI 2001) which identified 335 papers as relevant to school travel from a detailed search of over 3000 potential papers. Although the DTLR project undertook a detailed review of only 39 of these papers, relevant to childrens' cognitive and social development, the broad search provides a fairly comprehensive bibliography on school travel issues. Other useful school travel bibliographies included those published by the School of the Built Environment at Nottingham University and the Victoria Transport Policy Institute in Canada.

1.5     The detailed review of selected literature built from the broad map of literature and considered the findings of over 50 papers as shown in chapter 6.

1.6     Although the focus has been on research published since 1995, in some cases the recent literature reviews have confirmed that earlier papers remain the authoritative texts on particular subjects. The literature review has therefore sourced and studied a number of older texts to allow as comprehensive coverage as possible of the relevant issues.

## THE POLICY CONTEXT

1.7 Policies including social justice, economic efficiency and sustainability define the context for action on school travel. Within this framework, individual policies are developed by national and local government and other agencies, with school travel aims featuring strongly in transport, education and health policy.

1.8 National policies include:

- Transport - Particular attention is placed within road safety policy on reducing child casualties and addressing the specific problems faced by children in disadvantaged areas, so school travel is a priority area in safety policy. A key action is to “develop the safer routes to school policy”. This policy recognises the critical relationship between education and transport and identifies the health, and reduction in congestion and pollution, benefits of encouraging children to walk or cycle to school or to use public transport through the development of individual school transport (travel) plans.
- Education – In addition to statutory education transport requirements, new community schools have been established across Scotland. These seek to develop more community ownership of the local education process including for travel to school managed through a safer routes to school process. There are however some tensions between community schooling and policies to allow parents choice in the selection of school. HM Inspectorate reports also highlight school travel problems at an individual school level.
- Health – In addition to general injury prevention, and treatment aims associated with road safety on the school journey, health policy includes initiatives to encourage healthier lifestyles. Healthy Living Centres under the New Opportunities Fund are including safer routes to school schemes; school travel aims are included in the physical activity task force plans and HEBS promotional activities to encourage more active commuting; and multi-disciplinary action is co-ordinated through health improvement programmes.

1.9 These national policies are being promoted recognising the strong community leadership role played by local authorities in Scotland. The development of community planning to help “modernise government” seeks to encourage joint approaches to problems between agencies (Cabinet Office 1997). The multi-disciplinary nature of action needed on school travel means that school travel planning demonstrates a wide range of the challenges and opportunities associated with the modernisation agenda.

1.10 For all transport and travel issues including school travel, local authorities in Scotland have more autonomy in the way they administer services than their English counterparts (SE 1998, DTLR 1998). This difference of approach has been seen since 1999 with the administration of school travel planning. In England, DTLR funds officers within authorities to administer school travel planning but in Scotland funding for school travel planning is less ring fenced for particular activities or initiatives.

1.11 However, with the Scottish Parliament, the politics of Scotland is changing and the relationship between the Scottish Executive and local authorities is evolving (CLGSP 1999). The values governing public administration have been identified as accountability,

accessibility, openness, responsiveness, participation, and equal opportunity. The approach to managing and delivering any activity will in the future be guided by how best to ensure that these values are reinforced.

1.12 Delivering Best Value in school transport provision also introduces new pressures on authorities. There is currently a very wide range of provision of free school transport throughout the country and expenditure on school transport per head of population (Appendix A). Benchmarking of service provision will require authorities to question more closely how the service provision being offered relates to local needs.

1.13 It cannot be assumed that approaches which have been successful in England will be successful in Scotland. On average Scots are more egalitarian in outlook and are far more likely to accept community based action particularly on matters of social and economic inequity (Jowell et al 1989, 2000). Social classes in Scotland also tend to live in distinct neighbourhoods to a greater extent than in England and Wales. Individualist philosophy has more of a hold in the south of England than it does in Scotland, and Scots are more likely to look to government for action to resolve problems. These factors suggest that community based action is more likely to be successful in Scotland than in England, provided community leaders can be found.

1.14 Overall, successful school travel planning needs to work within this changing social, administrative and political framework recognising that new and existing mechanisms can be used to achieve improved safety and efficiency for diverse local communities throughout the country.

## CHAPTER TWO FACTORS AFFECTING SCHOOL TRAVEL

2.1 Both transport and non-transport factors affect school travel behaviour. This section discusses the impacts of non-transport factors such as: employment, social, educational, environmental and health issues before looking at specific transport issues such as: safety, cost, time, attitudes, and management.

### TRENDS IN SCHOOL TRAVEL

2.2 In the past 10 years in the UK the proportion of school journeys made by car has nearly doubled, from 16% to 29%, so that now one in five cars on urban roads at 8:50 during term time is taking children to school. (SDG 2001). Reliable statistics at a Scottish level have been enhanced in recent years and, although more data are required to demonstrate travel trends, the percentage of car travel to school has risen from 14% in 1997 to 20% in 2000. This suggests that the UK and Scottish trends are similar, even though the absolute levels in Scotland are lower (SE 2001). The National Travel Survey also shows that there has not only been a change in mode choice to school but also journey length, with increases throughout the UK of 18% for children aged 5-10 and 35% for children aged 11 to 16. Mean distances travelled for each mode have remained fairly constant but modal shares have changed radically with a shift towards modes associated with longer distances.

2.3 Cause and effect for these observed changes are not clear. Greater car use may be associated with a need to travel further, or the ability to travel by car may be allowing longer trips. In practice the change is likely to be a combination of both factors. Although the literature does not allow the quantification of the various factors responsible for these trends, it does permit a systematic examination of the likely causal factors.

2.4 Some of the main non-transport factors affecting school travel behaviour are summarised in Table 1 (Cross 1998, Bradshaw 2000, SDG 2001).

**Table 1 – Non-transport factors affecting school travel trends**

<b>Factor</b>	<b>Effect</b>
<i>Organisational</i>	
School closures	Although the rate of rural school closures and mergers has declined it still makes an impact on school travel.
Special educational needs	Although the number of children with identified special needs has increased this has been balanced by increasingly meeting educational needs through mainstream education.
Development of specialist schools	Language, arts and technology specialist schools may require children to travel further.
School rules	Issues such as pupils not being allowed to take bikes to school or being barred from waiting within school buildings to fit in with public transport schedules are likely to favour car travel.
School admissions and parental preference	Non-travel factors have more influence on choice of school than travel factors leading to less than optimal travel solutions being accepted.

<b>Factor</b>	<b>Effect</b>
<b><i>Social</i></b>	
Working mothers	Employment amongst mothers has been rising more rapidly than for any other group but working mothers have many constraints on their time which can lead to conflicts with efficient school travel.
Childcare practices	If childcare factors affect choice of school then travel may be adversely influenced to take account of these needs.
Changing perceptions	Expectations of safer behaviour by parents are growing, bringing pressure to be seen to be protecting children.
Trip chaining	If parents are driving to work they are likely to choose a school to which they can escort their children <i>en route</i> to work.
Cultural trends	People have become more accustomed to looking for services and facilities such as schools further from home.
<b><i>Economic</i></b>	
Changes in disposable income and car ownership	Higher income households travel further to school. Increased disposable income has led to more multi-car owning households which has had a large impact on school travel.
Lack of flexibility in housing markets	People are making long term locational choices to be able to access a range of jobs and services including schools.
<b><i>Planning</i></b>	
Growth in car dependent housing and business locations	Although planning policy has now changed, many of the housing and business developments still being built were planned prior to the new national planning guidance. The location, layout and design of the built environment is still increasing car dependency for all trip purposes.
<b><i>Demographic</i></b>	
Movement out of towns	There is a trend for people to move out of larger towns and cities to rural areas and small towns.

## **EMPLOYMENT, HOUSEHOLD AND CAR OWNERSHIP FACTORS**

2.5 The percentage of households in Scotland with regular use of a car increased from 56% in 1989 to 66% in 1999 (SE 2001). During this period the number of single car households remained fairly static but the number of households with two or more cars increased from 14% to 23%. In the major Scottish cities car ownership levels were lower, with just over half of households having a car. Only a third of households with income levels up to £10,000 had a car.

2.6 Bradshaw (1995, 2000) identified that the changes in travel to school patterns of children shadowed the travel to work patterns of parents. Particularly where a second parent enters employment in a multi-car owning household, parents were likely to drop off their children at school on the way to work. The research found that:

- Fewer parents collected their children in the afternoon than dropped them off in the morning.
- Over 60% of parents driving secondary school children to school continued on to another location including work, shopping, or visiting.
- If parents changed their own travel patterns and travelled to work by public transport then they did not expect to drive their children to school before leaving for work.

- Parents drove their children to school so that they could have quality social time to talk to their children.

## **SOCIAL AND COMMUNITY FACTORS**

2.7 Travel to school is an important part of childrens' social experience and solutions are only perceived as successful if they increase a child's sense of belonging. A DTLR survey showed that meeting and talking to friends was by far the most important positive factor in walking to school and that not meeting classmates was the fourth most important reason for not liking car travel to school (DTLR 2000).

2.8 A shared sense of responsibility was a key element in tackling Denmark's very poor child casualty problem and giving it one of the best records in Europe (Odense 1989). A much stricter legislative regime was introduced for both pedestrians and vehicle drivers helping to emphasise that safe travel depended on changed behaviour by all road users.

2.9 Community ownership is therefore needed for successful solutions (Bradshaw 2000) and is seen in a variety of ways:

- The clearly defined codes and regulation associated with school buses in the United States have engendered some sense of community ownership of school buses (NSTA 2001). Increased status for bus travel in the community is also helped by: requiring other drivers to recognise the special nature of school buses and give them greater priority; enforcing strict school bus vehicle standards; and ensuring that children follow a code of practice for using the buses.
- Social interaction whilst travelling to school differs significantly between modes. Car travel provides the least opportunities for social interaction but many parents appreciate the quality time with their children when travelling together, either from giving lifts to school or when accompanying walking trips (EPPI 2001).
- Bus drivers can also provide positive social experiences for children (Edwards and Johnston 1977) but bus travel can be a threatening experience for many. The attitude of transport staff is described as one of the main reasons for children to feel alienated and poorly served by public transport. Satisfaction with bus drivers declines as children get older, with only 10% of 15 and 16 year olds describing staff as "usually helpful". (Crime Concern 1999)
- Children will choose longer, slower or more expensive modes to allow them to travel to school with friends (King 1973).
- Car pools where parents take turns to provide lifts offer rich social experiences (Adler 1984).

2.10 There are other practical issues associated with community ownership of schemes. Good consultation appears to be a key factor in governing acceptance and effectiveness of solutions. Objective measurements of the impacts of schemes confirm residents' perceptions, demonstrating the importance of involving local people in planning and monitoring schemes (Ross Silcock 1999).

## **EDUCATIONAL FACTORS**

2.11 Although parental choice of school has been suggested as a factor likely to lead to increasing distance to school (SDG 2001) there has been limited research on the actual impacts. Such work as has been carried out has been inconclusive. Stead (1998) did not find any significant increase in the length of education journeys in their small sample of children, and Bowe (1994) noted that choice is very complex involving such a large range of factors that only a very large study could provide reliable findings. Therefore, whilst it seems inevitable that current trends within education, increasing specialisation and allowing more parental choice, will lead to longer trips which are more likely to be made by car, research evidence for this is weak.

## **HEALTH AND ENVIRONMENTAL FACTORS**

2.12 Children are often aware of health promotion messages that walking and cycling are healthy but feel that they are unable to act on these messages in everyday life (Mackett 2001). Other constraints such as perceived traffic danger, personal security, and restrictions placed on children by adults often prove to be more important. (Davis 1996).

2.13 Focus group results have suggested that poor weather influences travel decisions (EPPI 2001). Concern about being wet and cold and the impacts that this may have on performance in the classroom may influence children to avoid walking or cycling or waiting for buses.

2.14 Exposure to traffic noise reduces the mental efficiency of children. (Simenova G 1980).

## **EFFECTS OF WIDER TRANSPORT FACTORS**

2.15 There has been a general increase in the mobility of the population from increasing car ownership and decreases in the cost of car travel, but this has resulted in a decrease in the availability of bus services and increasing bus fares (Cross 1998). Although this has improved access to school for some people, growing congestion and pollution around schools in Scotland is now perceived as a growing problem by school staff, parents and children (Halden 1999).

2.16 Yet frustration with these problems has not yet led to widespread action to change travel behaviour. Although Councils have been able to increase budgets for some aspects of school travel, such as Safer Routes to School, overall spending on school transport is falling and initiatives are still fragmentary (Spokes 2001).

2.17 Although children of school age are generally open minded about transport (Pilling 1998), their attitudes towards bus travel are much less flexible than for other modes, with over half of surveyed young people having strong positive or strong negative perceptions of the mode. Research (Cross 1998) on the impact of travel awareness initiatives showed that it was easier to change attitudes to rail, tram, walking and cycling than it was to change attitudes to bus use, with attitudes remaining largely unchanged and quite negative. Children from higher socio-economic groups rate environmental factors, safety and comfort higher,

and children from lower socio-economic backgrounds rate cost, convenience and image higher.

2.18 Given these negative perceptions of bus travel, and the reality that most motorised trips to school will be made by either car or bus, UK STAG undertook detailed research on the factors affecting bus use in England, Wales and Northern Ireland (Atkins 2000). This found that:

- Children who always travel to school by car tend to have negative perceptions of non-car modes but once they try bus travel they are more likely to have positive attitudes towards buses. The factors children value most about bus travel relative to car travel are the opportunity to interact with friends and greater independence.
- There are inaccurate perceptions of car and bus travel partly resulting from people sub-consciously seeking to validate their current behaviour and partly due to lack of knowledge. Lack of knowledge is particularly apparent for health impacts, bus routes, and bus timetables.
- Buses are (often correctly) perceived to be of poor quality, dirty, and in a poor state of repair particularly amongst older children. Waiting for the bus and walking to bus stops are considered to be major deterrents particularly where lighting is poor, or when personal security is an issue, and when no bus shelter is provided.
- Parents feel that it is cheaper to drive children to school than pay bus fares, particularly if they have two or more children or are able to drop their children off on their way to work.
- Buses are perceived to be unreliable and pupils are fearful of being late and being punished, but they are also unwilling to allow more time to catch an earlier bus.
- Declining local authority budgets for school transport have resulted in discretionary school transport provision being cut. The research notes that the current statutory distances of two miles for children under eight and three miles for older children are unrealistic since few children are prepared to walk more than about a mile to school. In surveys of local authorities and users in England, Wales and Northern Ireland as part of the study, some respondents stated that many people switched to car travel when free bus travel was cut.

2.19 Competitive markets for buses are resulting in quality improvements for some commercial services but, in many cases, older and poorer quality vehicles have been retained by bus companies, partly for the dedicated school transport services. There is also a shortage of bus drivers in some areas, forcing companies to rely on staff who display a lack of professionalism. These factors lower children's respect for drivers and fuel parents concerns about safety and security (Crime Concern 1999). Increasingly school buses are being registered, allowing operators to supplement the guaranteed income based on minimum seat provision for pupils with income from fare paying passengers. However, some parents are concerned about the risk of allowing adults on to buses which are predominantly used by children. (Atkins 2000).

2.20 Negative attitudes to car travel and positive attitudes to walking and cycling were demonstrated in a survey of children aged 7 to 11 (DTLR 2000). This showed that 38% of children who were driven to school would rather walk or cycle. The main negative factors associated with car travel (congestion, pollution, lack of exercise and lack of social contact) and the positive factors associated with walking (socialising with friends and escorts, exercise, shopping *en route*, and fresh air) need to be balanced with the positive factors associated with car travel (quicker/ more convenient, *en route* to work, no choice, weather, safer) (Mackett 2001). There therefore appears to be wide public understanding of the key transport policy issues, and the challenge is to make walking, cycling and public transport relatively more attractive than they are now when compared with car travel.

## **REAL AND PERCEIVED SAFETY AND RISK FACTORS**

2.21 Available statistics do not lend themselves to an analysis of the relative risk of modes of travel, since bus and some car trips still require children to cross roads on foot (Bradshaw 2000). If risk is to be minimised then safer routes to school approaches need to be adopted to allow a systematic analysis of risk factors for each child's journey.

2.22 Parents are concerned about their childrens' safety walking to and from bus stops and on-board buses (Atkins 2000). However, when ranking risk on the school journey, Lee (1994) showed that there was no relationship between experience of risk by children, perception of risk by children and worries about risk by parents. The only common high risk factor across these three measures of risk was found to be bullying.

2.23 Some parents were aware that the risk of a road accident was greater than personal safety factors but even some of these parents were still more concerned about stranger danger issues (Bradshaw 2000). Scottish parents in this survey were concerned about both factors, so obstacles to walking and cycling could only be tackled by overcoming concerns about both stranger danger and road safety obstacles.

2.24 Perceived negative perceptions of safe behaviour by children can encourage unsafe behaviour. Children fear derision if they wear cycle helmets yet respect those who do wear helmets and willingness to wear a helmet does not appear to be related to experience of injury (Ressler 1997). Helmet wearers are considered to be smart and safety conscious so those children who perceive "smart" and "safety conscious" as being positive attributes wear helmets themselves.

2.25 Children who walk to school demonstrate awareness and understanding of road danger earlier than children less experienced with traffic (Lewis 1998). However there is a high variation in levels of skill related to personality and experience. Generalised conclusions about safe ages for unsupervised exposure are therefore problematical (Whitbread D 1998).

## **COST, TIME AND EFFICIENCY FOR MANAGEMENT OF SCHOOL TRANSPORT**

2.26 Expenditure on school transport in the UK exceeds £500 million per year but budgets are falling (Atkins 2000). This is creating pressures within local authorities to find efficiency savings in their budgets by:

- Co-ordinating the procurement of education services with public bus services and social work services to maximise the benefits of bulk purchasing and reduce administration for the authority and the bus company.
- Staggering school session times to allow multiple journeys by buses in the school bus fleet. A share of the savings needs to be made available to the school to overcome school and parent resistance to such approaches.
- Reducing the number of children who are offered free bus travel and reducing the subsidy on supported journeys.

2.27 Special needs transport accounts for approximately 60% of the school travel budget in England, Northern Ireland and Wales (DTLR 2001), yet the definition of special needs and the approach to budgeting and management makes comparisons for the purposes of Best Value monitoring impractical. Evaluation of individual travel needs offers a planned approach to managing this budget.

2.28 Increasingly, authorities in England are moving away from an automatic presumption of free transport for children with special needs, and factors such as the ability of parents to accompany children to school, and distance from the school, are being considered. Integrated planning and procurement of transport, for children with special needs and mainstream school transport, is achieved in just over half the authorities in England, Wales and Northern Ireland, but only about 16% of authorities in these areas achieve any degree of integration with tendered public bus services (DTLR 2001).

## **THE NEED TO CARRY EQUIPMENT**

2.29 Armitage (1998) found that the lack of secure lockers at schools contributed to children being forced to carry more. However, he does not present evidence that the need to carry more deters children from walking, cycling or bus travel in practice.

2.30 Focus groups have suggested that children are reluctant to arrive at school “all sweaty”. Clearly there are limits to the exertion which is appropriate on the school journey, so travel decisions will be affected both by the walking or cycling distance and the equipment needs (EPPI 2001).

## CHAPTER THREE      IMPACTS OF SCHOOL TRAVEL

### GENERAL IMPACTS

3.1      In addition to school travel decisions being affected by a range of factors as has been described above, the travel behaviour in turn affects children's physical health, mental health, and cognitive and social development. A review (EPPI 2001) of the impacts on mental health and cognitive and social development was undertaken for DTLR and identified many impacts of school travel including on:

- Cognition
  - Different travel to school experiences led to the development of different skills.
  - Physical activity could have some positive effects on mental performance and self esteem in some situations.
  - Noise and pollution can have negative effects on childrens' learning abilities.
- Social behaviour and relationships
  - Difficult or long journeys could result in stress and problem behaviour.
  - Exercise has some positive effects on behaviour.
  - Each mode supports the development of particular social relationships.
- Society
  - Non car travel allowed more freedom of movement of children.
  - Concern that school bus travel could potentially reinforce segregation within society with bussing from different housing areas transferring any social divisions from the residential areas to the school gate.

### IMPACTS ON CHILDREN'S COGNITIVE DEVELOPMENT

3.2      Despite the journey to school comprising a universal experience for those attending school there is surprisingly little evidence of the contribution which the school journey experience makes to children's development (EPPI 2001). However, based on available research some conclusions can be made:

- Exercise can improve the cognitive performance of children if taken mid-morning or early afternoon (McNaughten 1993), but there is no reliable evidence that walking or cycling at the start of the day as part of a journey to school has a similar effect (Craft 1983). Research is needed in this area to allow more conclusive findings but there is no evidence that exercise in itself can have negative effects.
- Younger children who are wholly or partly responsible for directing their route to school by walking, perform better at tasks in the classroom that require spatial skills. (Foreman 1990).

- Long journeys to school have a negative effect on children's educational performance. Long travel times in an uncomfortable bus or an inability to participate in extra curricular activities reduce academic achievement (EPPI 2001).
- Focus groups suggested that children had improved their organisational skills including time and money management as a result of their independent travel to school (EPPI 2001).

## **IMPACTS ON CHILDREN'S SOCIAL DEVELOPMENT**

3.3 The strong relationship between social factors and school travel has been highlighted above in sections 2.6 to 2.9. School travel decisions have been shown to affect social development as follows:

- Adler (1994) found many positive influences on children's social development as a result of car pooling. This research found that the car pool environment was influenced by school, family, and peer group pressures. Children in the car pools displayed friendship and co-operation across normal boundaries of age and sex and parent drivers interacted with children in a variety of ways, widening social experiences of participants in the car pool. Children also derived status from the use of their family's car. Participants in any car pool often shared similar social values and norms and when these values were threatened the car pool often dissolved.
- In contrast it was suggested that the school bus could have negative influences on self image for children from low income groups (Reid 1994). Factors which reduced children's sense of belonging to a community were shown to be associated with poor academic achievement.
- Participation in non-school social activities was found (O'Brien 1982) to be lower for those with longer travel to school journey times but is still a minor factor compared with perceived abilities and self image. Participation in school based activities was not found to be greatly affected by travel time.
- Exercise was shown by Basile (1995) to be a positive influence in reducing the disruptive influence of children.
- There are strong relationships between children's friends at school and travel to school decisions. This is partly explained by friends outwith school also being friends within school, with many children drawing friends from those who live nearby. However, frequency of contact with friends is important in developing and sustaining friendship and time travelling to school is seen as a key element within this. (King 1973)
- The approach to management and efficient use of school buses in North America introduces a much wider social function for schools. High school cafeterias provide a waiting and social area allowing buses to make several runs at opening and closing time. However this introduces additional supervisory costs to schools (NSTA 2001).

3.4 There was no conclusive evidence on whether mode shift on the school journey was resulting in general social change. Some have identified possible negative consequences of mass car travel (Hillman 1993) and focus groups have suggested a range of possible positive and negative impacts from mass use of particular modes on the atmosphere at the school and the local sense of community (EPPI 2001). This suggests that school travel changes are one of many factors reflecting more general changes in society.

### **IMPACTS ON CHILDREN'S PHYSICAL HEALTH**

3.5 There is an extensive literature on the health benefits of regular exercise (e.g. HEA 1996). Walking and cycling to school can provide this regular exercise and so can offer significant health benefits. A major survey of the health of children in Scotland (SE 1997) showed that low levels of physical activity in children was a cause for concern, falling well below the levels regarded as beneficial to good health. The sharp rise in obesity in children also signals growing health problems for the future, with increasing physical activity amongst children becoming a policy priority (SE 1999).

## CHAPTER FOUR EFFECTS OF INITIATIVES

### GENERAL

4.1 Given the breadth and depth of research looking at the factors affecting school travel, and the role of school travel in children's development, it is perhaps surprising that the impacts of initiatives to change travel behaviour appear to have been poorly researched.

4.2 Two reasons for this are likely to be important. Firstly, Halden (1999) highlights that success in one location cannot imply success in others. Success is defined in many different ways and is perceived differently. Local problems require local solutions and provided there is a dynamic and committed community based approach to planning, a managed approach to success will be achieved.

4.3 Where there are robust research findings, the outcomes have usually been viewed narrowly, e.g. the impact of walking buses on the number of people walking rather than the impacts on car travel. More research is therefore needed, looking more comprehensively at the transport, social, education and health impacts of initiatives.

4.4 To develop robust conclusions about individual types of measure, research would need to include large samples, since good practice in school travel planning usually involves the adoption of packages of initiatives. Good practice guidance on the types of initiatives used to encourage improvements in school travel suggests a large number of activities as summarised in Table 2 (DETR 1999, Halden 1999, Mackett 2000).

**Table 2 – School Travel Initiatives**

<b>Initiative</b>	<b>Measure</b>
Public transport initiatives	<ul style="list-style-type: none"> <li>• Changes to school bus provision</li> <li>• Policies and standards for bus users</li> <li>• Subsidised bus fare schemes</li> <li>• Parent escorts on buses</li> <li>• Information and publicity about the use of services</li> </ul>
Walking initiatives	<ul style="list-style-type: none"> <li>• School crossing patrols</li> <li>• Walking buses</li> <li>• Pedestrian training</li> <li>• Personal safety training</li> <li>• Safe route trails</li> <li>• Parent escort training</li> <li>• Walk to school campaigns</li> </ul>
Cycling initiatives	<ul style="list-style-type: none"> <li>• Safe cycle parking</li> <li>• Cycling permits and policies</li> <li>• Cycling awareness campaigns</li> <li>• Cycle training and maintenance</li> </ul>
Education and training including safety issues	<ul style="list-style-type: none"> <li>• Road safety curriculum work</li> <li>• Safe route planning</li> <li>• Events, theatre, projects</li> <li>• Publicity on health benefits</li> </ul>
Road and traffic engineering measures	<ul style="list-style-type: none"> <li>• Road and junction narrowing and layout changes</li> <li>• Parking zones and drop off points for cars and buses</li> <li>• Safe road crossings and routes</li> <li>• Traffic calming, home zones, 20 mph zones</li> </ul>

<b>Initiative</b>	<b>Measure</b>
Enforcement activity	<ul style="list-style-type: none"> <li>• Speed cameras</li> <li>• Parking enforcement</li> </ul>
School management	<ul style="list-style-type: none"> <li>• School travel policy and plans</li> <li>• Junior road safety officers</li> <li>• Staff supervision of access to school</li> <li>• Provision of lockers</li> </ul>
Community planning	<ul style="list-style-type: none"> <li>• Regular newsletters</li> <li>• Car sharing</li> <li>• Family cycle training</li> </ul>

4.5 A UK survey sought views on what could be done to improve walking, cycling or public transport so that parents would be confident about their child using each mode (Bradshaw 2000). Relative to counterparts in England, more Scottish residents thought that walking could be a substitute for car travel, but less thought that public transport and cycling improvements would influence their travel decisions. About half of the parents who currently drive their children to school in Scotland said that nothing could be done to other modes to encourage them to change. Amongst the remainder, safe walking and cycling routes were considered to be the highest priorities, with availability of buses being seen as more of a problem than any quality or cost factors.

## **PUBLIC TRANSPORT INITIATIVES**

4.6 Research involving surveys of local authorities, parents and children (ATCO 1999, Atkins 2000, Edwards 1977, DTLR 2001) has identified some of the factors which could make public transport better and which users would perceive as making bus travel better.

**Table 3 – School Bus Initiatives**

<b>Measure</b>	<b>Action</b>
Optimisation of bus transport costs	Staggering of hours for some pupils allowing better use of the school bus fleet.
	Charging for school transport taking account of the ability to pay in return for a better service.
	Flexible tendering approaches and flexibility in contract specification.
	Quality vehicles designed specifically for school transport needs.
	Joint tendering with public transport and maximisation of packaging of routes.
	Increased use of voluntary sector providers, and links with health and social services provision.
Planning and stakeholder involvement	More bus services with partly subsidised fares on new and some existing services.
	Needs assessments to ensure that appropriate practical services are provided.
	Use of suitable pick up points where practical.
	Manage parental expectations through clear procedures, community planning and joint working
	Annual monitoring of provision.
	Although training of bus drivers not explicitly a Scottish policy issue it is important that bus drivers contribute effectively to community planning of improvements. Systematically planned greetings and farewell comments by bus drivers can significantly improve children's perception of school bus travel

## **SUPPORT FOR WALKING AND CYCLING**

4.7 The lack of facilities at a school can be an obstacle to walking and cycling to school, but simply providing new facilities will not necessarily encourage more walking and cycling (Halden 2001). The facilities most likely to encourage walking and cycling are safe routes, but secure cycle parking and lockers also can have an impact.

4.8 Practical training of children in safe road behaviour can substantially improve their ability to adopt safe road crossing behaviour (Thomson JA 1996, Tolmie AK 1998).

4.9 Despite many positive reports on walking bus schemes, there have been few systematic evaluations of their impacts. Bickerstaff (2000) showed how children's road sense, social development, independence and awareness of the environment improved with participation in the scheme. Although the research lacked clear outcome measures for some of the findings, it suggested that the schemes reduced the chance of being bullied on the way to school.

4.10 Home zones can improve the safety and environment of the streets where people live and therefore significantly improve perceptions and practice for safe walking and cycling to school. In the UK, home zones research is at an early stage (Layfield 2000) but particularly for travel to primary schools, which involve more local journeys, the indications are that they can be successfully used as part of a comprehensive approach to road safety.

## **EDUCATION AND PUBLICITY**

4.11 Including transport issues within the curriculum helps to encourage more efficient school travel choices. Marketing initiatives targeting local issues and particular groups are more effective than general campaigns (DTLR 2000) and focused child centred publicity is amongst the most effective at influencing behaviour. Publicity about things that are working is one of the most important factors influencing parental attitudes to school travel (Halden 1999).

## **INFRASTRUCTURE AND ENFORCEMENT**

4.12 Traffic calming schemes do not always improve safety (Webster 2000). They must be properly signed, well designed and use physical features appropriate for the local environment. Community based planning approaches, such as safer routes to school, can help to plan and deliver appropriate measures at priority locations (TRL 2001).

4.13 Views of car drivers (Lex 1998) on their responses to a doubling of travel time on school runs showed that the most likely mode shift would be to walking or cycling, with 28% of respondents viewing this as their likely response, compared with only 4% viewing a switch to public transport as attractive.

## **PLANNING EFFICIENT SCHOOL TRAVEL**

4.14 A survey in England and Wales (DETR 2000) identified that the government's policy for school travel plans was being implemented in about 2% of schools. An earlier survey in

Scotland (Halden 1999) identified that 3% of schools had started a safer routes to school process but most of these had not reached the stage of a detailed school travel plan.

4.15 Since community based planning of travel is needed to achieve the necessary integration of social, health, education and transport factors, various studies have looked at the factors affecting the take up of travel plans:

- Distance based criteria for determining eligibility for free or subsidised school travel are incompatible with more integrated approaches to school travel planning (Armitage 1998). Broad based planning approaches require community involvement and many factors to be balanced, and within this context distance criteria become more of a problem rather than a help.
- Community ways of working and managing projects need to be recognised. Accountable public administration cannot match the flexibility of community working but joint approaches can work well. Terminology such as “Safer Routes to School”, “School Travel Teams” and “Champions” to describe the school travel planning, committees and managers respectively emphasise that leadership can come from any sector of society (Halden 1999, BAH 1998).
- Competitions with financial incentives have been shown to be one of the most effective ways to increase interest in travel plans (Bradshaw 2001). Competitions can be successfully administered by local authorities (Osborne 1998), national government or voluntary groups (Halden 1999).

4.16 It needs to be recognised that some communities will need more support than others and community acceptance as opposed to community involvement can still deliver positive results in some places. Funders need to set an affordable guideline financial allocation, sufficient to support community interest, but ensuring that aspirations are realistic and manageable (Bradshaw 2001).

4.17 As safer routes to school and school travel plans become more widespread, research on the outcomes of different approaches would be very valuable.

## CHAPTER FIVE CONCLUSIONS AND RECOMMENDATIONS

5.1 Success is defined in many different ways but SSTAG's aim of increasing the proportion of non-car travel to school has many echoes in wider economic, social and environmental objectives. From this review, more can be concluded about how to improve choice, influence behaviour, and manage and administer school travel in Scotland, than on what the overall impacts of these measures will be on car use. Overall, there are a few key issues emerging which, if tackled, will allow positive progress on a broadly based agenda.

5.2 The first key issue is that in the past the importance of social factors has been underestimated in school travel planning. Social relationships between children, parent to child, and between children with other adults including drivers, are key factors affecting travel choices. Knowledge of safe and efficient practices is important, but travel also needs to fit in with family schedules, and be viewed as socially acceptable by the local community for change to be achieved.

5.3 Resolving these issues requires public authorities, schools and communities to jointly plan actions tailored to local circumstances. Despite extensive publicity and promotion in England, only 2% of schools have a school travel plan. Research from 1999 suggests that the figure may be similar for Scotland. Until many more of the remaining 98% of schools introduce school travel plans, the problems highlighted in this review will continue. Community based approaches with safer routes to school initiatives are the most effective ways to ensure successful schemes and to build community ownership for the travel planning process. However, not all communities have the capacity to introduce and manage schemes and it is clear from the countries where mass adoption of these approaches have been achieved, that considerable support from national and local government is needed to encourage community leaders to take action.

5.4 Finally it must be of concern that very few of the positive features of school bus travel identified in the international research are reflected in the way buses are provided in Scotland. Eligibility for free travel is not clearly linked to need, buses and bus drivers do not reinforce positive messages about public transport, and current provision requires very substantial public funding. Bus travel to school needs to be re-invented as something for which children and parents can feel some ownership, rather than simply a transport mode of last resort or a free benefit.

5.5 There are opportunities within existing policy frameworks in Scotland for broadly based funding for school travel to deliver education, health, and transport policy aims. The UK and international experience highlighted in this review helps to show the way forward, but success will depend on programmes with a composition and focus reflecting Scottish circumstances. Over a generation, the experiences, expectations, and attitudes towards school travel for children, parents, and schools have changed in a largely unplanned direction. The research suggests that by planning better approaches through local communities, experiences, expectations and attitudes can be changed to make better use of everybody's time and resources.

## **FURTHER RESEARCH NEEDS**

5.6 In reviewing the research there were some obvious knowledge gaps as follows:

- If success relies upon galvanising community support then lessons for school travel planning need to be learned from successful community based schemes in both transport and non-transport sectors in Scotland. If the single most important target for school travel emerging from this review is to increase the number of community based safer routes to school schemes, then research is needed to understand why schemes are not being implemented more widely at present and to identify what needs to be done to change this.
- Further research is needed on the impacts of school travel experiences by each mode on children's development. The available research identifies significant impacts, but many of the studies have weak research designs or are now rather old. Given the distinctive nature of Scottish education, and the fact that many influences on travel to school lie within the control of Education Authorities, it is important that the impacts of school travel factors are understood at least as well as for other extra-curricular school facilitated activities.
- It has been noted that existing data sources do not permit as robust an analysis of outcomes as is needed, even on key issues such as safety and risk. A systematic analysis of where each of the initiatives in Table 3 has been applied in Scotland could provide transferable lessons about success and failure in various types of location, and amongst a variety of population groups.

## REFERENCES

### LITERATURE MAPPING AND POLICY CONTEXT

Cabinet Office (1999) *Modernising government*. White paper.

CLGSP (1999) *Local Government and the Scottish Parliament*. The report of the Commission on Local Government and the Scottish Parliament.

DTLR (1998). *A New Deal for Transport: Better for Everyone*.

EPPI (2001). *Effect of Travel Modes on Children's Cognitive Development. Evidence for Policy and practice*. Institute for Education, University of London.

Jowell R, Brook L, Prior G, Taylor B, (1989). *British Social Attitudes. The 8<sup>th</sup> Report*. Sage Publications.

Jowell R, Curtis J, Park A, Thomson K, Jarvis L (2000). *British Social Attitudes. Focusing on Diversity. The 17<sup>th</sup> Report*. Sage Publications.

Nottingham University (2001). *School Travel Bibliography*. School of the Built Environment.

SDG (2001) *Factors leading to increased school journey length*. Steer Davis Gleave. Final report and literature review for DTLR.

SE (1998). *Travel Choices for Scotland*. Scottish Transport White Paper. Scottish Executive.

Victoria Transport Policy Institute (2001) *Travel demand management resources*. School travel. Vancouver, Canada

### TRENDS IN SCHOOL TRAVEL

Bradshaw and Jones (2000). *The family and the school run – What would make a real difference?* AA Foundation for Road Safety Research, Hampshire.

Cross T and Thornthwaite S (1998) *Travel patterns of young people*. Final report for DTLR.

SDG (2001) *Factors leading to increased school journey length*. Steer Davis Gleave. Final report and literature review for DTLR.

Scottish Executive (2001). *Scottish transport statistics No 20*.

## **EMPLOYMENT, HOUSEHOLD AND CAR OWNERSHIP FACTORS**

Bradshaw R (1995). *Why do parents drive their children to school?* Traffic Engineering and Control. January 2001.

Bradshaw and Jones (2000). *The family and the school run – What would make a real difference?* AA Foundation for Road Safety Research, Hampshire.

Scottish Executive (2001). *Scottish transport statistics No 20*.

## **SOCIAL AND COMMUNITY FACTORS**

Adler PA, Adler P (1984) *The carpool: A socializing adjunct to the educational experience*. Sociology of Education. 57: 200-210.

Bowe R, Ball, Gerwitz (1994) *Captured by discourse? Issues and concerns in researching parental choice*. British Journal of Sociology of Education. Vol. 15, No1.

Bradshaw R (1995). *Why do parents drive their children to school?* Traffic Engineering and Control. January 2001.

Bradshaw and Jones (2000). *The family and the school run – What would make a real difference?* AA Foundation for Road Safety Research, Hampshire.

Crime Concern (1999). *Young People and Crime on Public Transport*. DETR.

DTLR (2000). *Walk, don't drive us to school, kids tell parents*, News release 365, 19 May 2000.

Edwards KA, Johnston R (1977) *Increasing greeting and farewell responses in high school students by a bus driver*. Education and Treatment of Children 1: 9-18.

EPPI (2001). *Effect of Travel Modes on Children's Cognitive Development. Evidence for Policy and practice*. Institute for Education, University of London.

King R, Easthope G (1973) *Social class and friendship choice in school*. Research in Education. 16-24.

NSTA 2001. *School Bus Safety*. National School Transport Association. United States.

Odense Kommune (1989). *Safe routes to school project*. Magistraat 2. Adelfing. Denmark.

Ross Silcock, Social Research Associates (1999). *Community Impact of Traffic Calming Schemes*. Central Research Unit. Scottish Executive.

SDG (2001) *Factors leading to increased school journey length*. Steer Davis Gleave. Final report and literature review for DTLR.

Stead D and Davis A (1998) *Increasing the need to travel? Parental choice and travel to school*. European Transport Conference Seminar C.

## **HEALTH AND ENVIRONMENTAL FACTORS**

Davis A, Jones L (1996) *Environmental constraints on health: listening to children's views*. Health Education Journal. 55: 363-74.

EPPI (2001). *Effect of Travel Modes on Children's Cognitive Development. Evidence for Policy and practice*. Institute for Education, University of London.

Mackett RL (2001). *Reducing Children's Car use: The Health and Potential Car Dependency Impacts*. Centre for Transport Studies University College London, Gower Street, London.

Simeonova G (1980) *A study of the effect of traffic noise at 60 dB(A) equivalent level on certain mental working capacity indicators in various age groups*. Folia Med (Plovdiv). 22: 24-29.

## **EFFECTS OF WIDER TRANSPORT FACTORS**

Atkins WS (2000). *Best Practice for increasing bus use for journeys to school*. DETR.

Cross T and Thornthwaite S (1998) *Travel patterns of young people*. Final report for DTLR.

Crime Concern (1999). *Young People and Crime on Public Transport*. DETR.

DTLR (2000). *Walk, don't drive us to school, kids tell parents*, News release 365, 19 May 2000.

Halden D, McGuigan D (1999). *Review of Safer Routes to School in Scotland*. Central Research Unit. Scottish Executive.

Mackett RL (2001). *Reducing Children's Car use: The Health and Potential Car Dependency Impacts*. Centre for Transport Studies University College London, Gower Street, London.

Pilling A Holloway B and Turner J (1998). *Catching them young – Young people's travel and the scope for influencing their travel behaviour*. Report for DTLR.

Spokes (2001) *Survey of transport expenditure by local authorities in Scotland*.

## **REAL AND PERCEIVED SAFETY AND RISK FACTORS**

Atkins WS (2000). *Best Practice for increasing bus use for journeys to school*. DETR.

Bradshaw and Jones (2000). *The family and the school run – What would make a real difference?* AA Foundation for Road Safety Research, Hampshire.

Lee T, Rowe N (1994) *Parents' and children's perceived risks of the journey to school*. Architecture and Comportement/Architecture and Behaviour. 10: 379-389.

Lewis V, Dunbar G, Hill R (1998) *Children's knowledge of danger, attentional skills and child/ parent communication: relationships with behaviour on the road* - Road Safety Research Report No. 10. 2/14 Minster House: RS4 Publications.

Ressler WH, Toledo E (1997) *A functional perspective on social marketing: insights from Israel's bicycle helmet campaign*. J Health Commun. 2: 145-156.

Whitbread D, Neilson K (1998) *Cognitive and metacognitive processes underlying the development of children's pedestrian skills*. Road Safety Research Report No. 6. Department of the Environment, Transport and the Regions.

## **COST TIME AND EFFICIENCY FOR MANAGEMENT OF SCHOOL TRANSPORT**

Armitage R (1998) *By boot bike and bus*. Surveyor. August.

Atkins WS (2000). *Best Practice for increasing bus use for journeys to school*. DETR.

DETR (2001). *Home to school transport for Children with Special Educational Needs*. Executive Summary.

EPPI (2001). *Effect of Travel Modes on Children's Cognitive Development. Evidence for Policy and practice*. Institute for Education, University of London.

## **THE NEED TO CARRY EQUIPMENT**

Armitage R (1998) *By boot bike and bus*. Surveyor. August.

EPPI (2001). *Effect of Travel Modes on Children's Cognitive Development. Evidence for Policy and practice*. Institute for Education, University of London.

## **IMPACTS OF SCHOOL TRAVEL**

Adler PA, Adler P (1984) *The carpool: A socializing adjunct to the educational experience*. Sociology of Education. 57: 200-210.

Basile VC, Motta RW, Allison DB (1995) *Antecedent exercise as a treatment for disruptive behavior: Testing hypothesized mechanisms of action*. Behavioral Interventions. 10:119-40.

Craft DH (1983) *Effect of prior exercise on cognitive performance tasks by hyperactive and normal young boys*. Perceptual and Motor Skills. 56:979-82.

EPPI (2001). *Effect of Travel Modes on Children's Cognitive Development. Evidence for Policy and practice*. Institute for Education, University of London.

Foreman N, Foreman D, Cummings A, Owens S (1990) *Locomotion, active choice, and spatial memory in children*. Journal of General Psychology. 117:215-33.

HEA (1996). *Young People's Physical Activity. A Literature Review*. Health Education Authority. London.

Hillman M E, Rosenbaum M (1993). *Children, Transport and the Quality of Life. Independent Mobility and Children's rights*. Policy Studies Institute. London.

King R, Easthope G (1973) *Social class and friendship choice in school*. Research in Education. 16-24.

McNaughten D, Gabbard C (1993) *Physical exertion and immediate mental performance of sixth-grade children*. Percept Mot Skills. 77: 1155-1159.

NSTA 2001. *School Bus Safety*. National School Transport Association. United States.

O'Brien JE (1982) *School consolidation, school size, travel time, student self-concept, and student achievement and their relationship to student participation and student satisfaction*. Dissertation Abstracts International. 42:2955-2956.

Reid R A (1994). *The Journey to School: The Young Commuter*. Dissertation Abstracts International. Humanities and Social Sciences.

SE (1997). *Scottish Health Survey*.

SE (1999) *Towards a Healthier Scotland*. White Paper on Health. Scottish Executive.

## **EFFECTS OF INITIATIVES**

Armitage R (2001) *Green wave – Safe routes to school projects and traffic engineers*. Surveyor. February.

Atkins WS (2000). *Best Practice for increasing bus use for journeys to school*. DETR.

ATCO 1999. *Local authority Bus Contracts. Price, Expenditure and Competition Survey*.

Bickerstaff K and Shaw S (2000) *An evaluation of the walking bus at Pirehall School*. Staffordshire University.

BAH (1998) *Evaluation of safer routes to school*. Report by Booz, Allen and Hamilton for the new South Wales State Roads Authority. Sydney. Australia.

Bradshaw and Jones (2000). *The family and the school run – What would make a real difference?* AA Foundation for Road Safety Research, Hampshire.

Bradshaw R (2001). *Encouraging schools and employers to adopt travel plans*. Traffic Engineering and Control. Vol 145.

DTLR (1999). *School Travel Strategies and Plans. A Best Practice Guide for Local Authorities*.

DTLR (2000). *Research into levels of activity relating to school travel initiatives. Executive Summary*.

DTLR (2001). *Home to school transport for Children with Special Educational Needs. Executive Summary*.

Edwards KA, Johnston R (1977) *Increasing greeting and farewell responses in high school students by a bus driver*. Education and Treatment of Children 1: 9-18.

Halden D, McGuigan D (1999). *Review of Safer Routes to School. How to Plan a Successful Safer Routes to School Scheme*. Scottish Executive.

Halden D, McGuigan D and Toy J (2001) *Evaluation of the Scottish Cycle Challenge Initiative*. Central Research Unit. Scottish Executive.

Layfield R (2000). *Home zones: monitoring the DTLR pilot programme. Proceedings of Conference on Reducing Traffic Impacts on Local Communities*. Aston University. PA2626-00. TRL Limited, Crowthorne.

Lex 1998. *The Lex Report on Motoring. Driving for the Future*. Lex Service PLC.

Mackett RL (2000). *How to reduce the number of short trips by car*. European Transport Conference. Cambridge. Vol. P438.

Osborne P. (1998) *Safe routes versus the school run*. Surveyor. January.

Thomson JA, Whelan KM (1997) *A community approach to road safety education using practical training methods*. The Drumchapel Project. - Road Safety Research Report No. 3. Department of Transport.

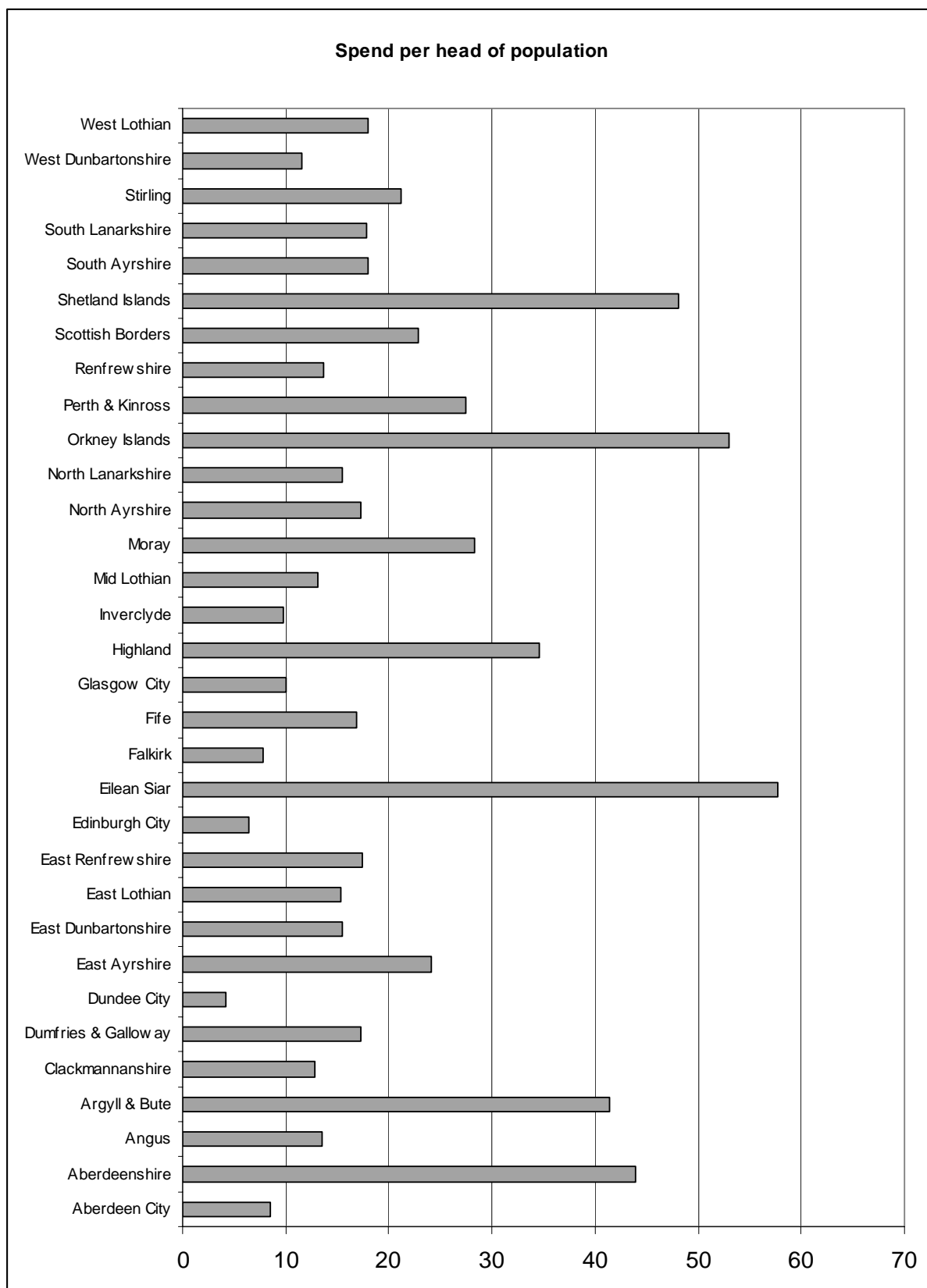
Tolmie AK, Thomson JA, Foot HC, McLaren B, Whelan KM (1998) *Problems of attention and visual search in the context of child pedestrian behaviour*. London: Department of Transport.

TRL 2001. *A road safety good practice guide*. TRL for DTLR.

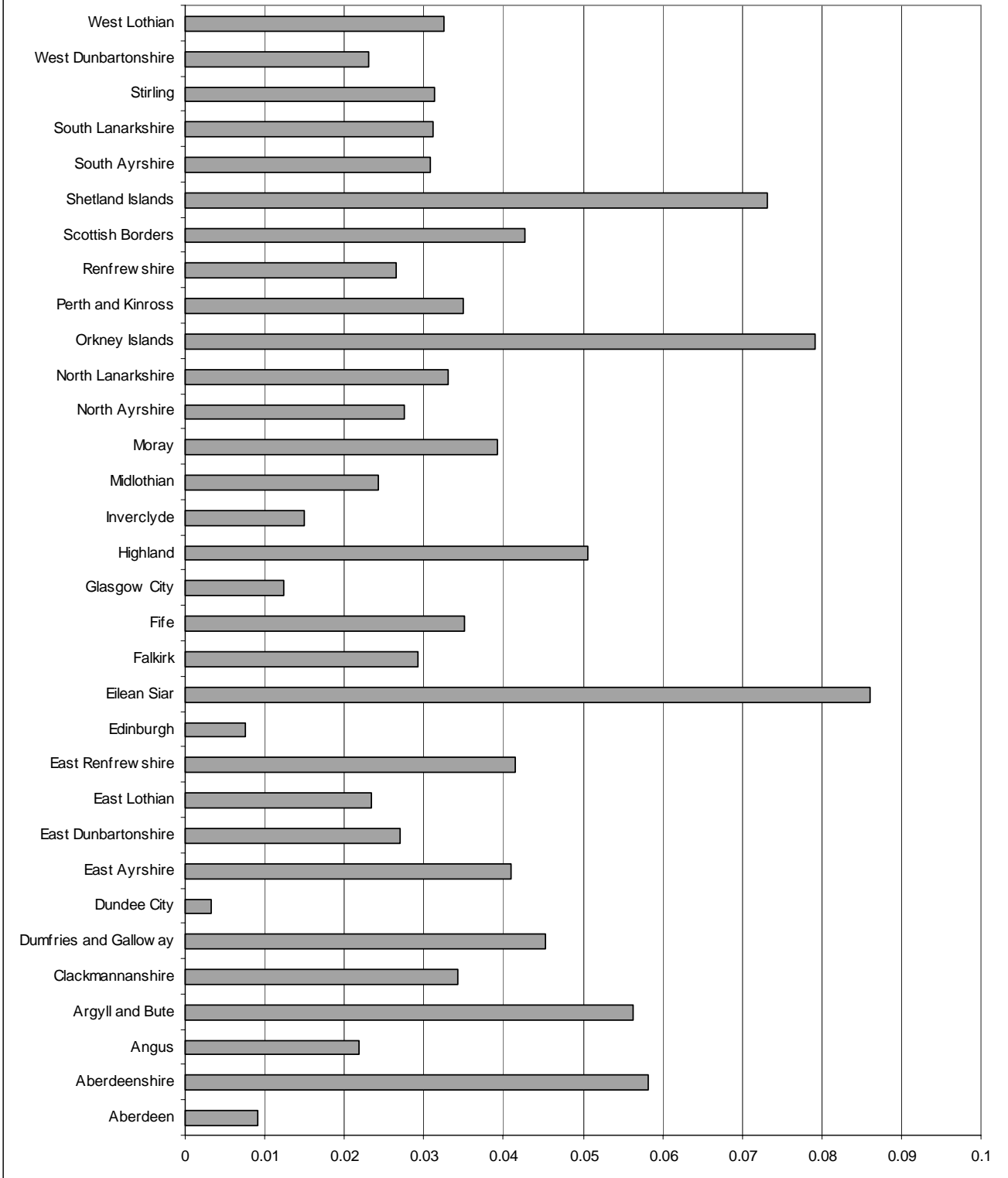
Webster DC (2000) *Traffic calming – a literature search on the design and performance of traffic calming measures*. TRL 439 Crowthorne.

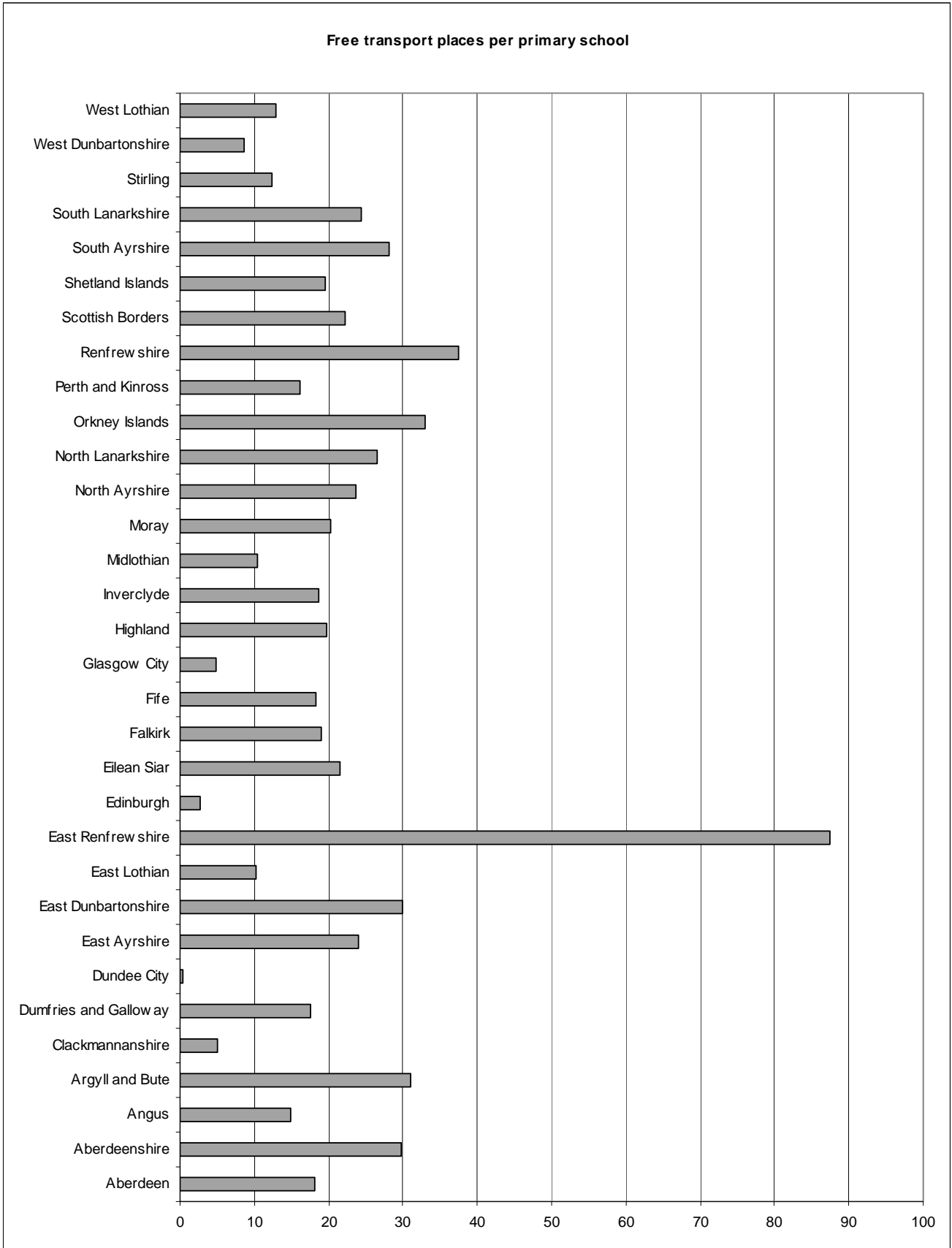
**APPENDIX A**

**SCOTTISH SCHOOL TRANSPORT SUPPORT  
BY LOCAL AUTHORITY**



Free transport places per head of population





### Free transport places per secondary school

