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Mission Statement

World Transport Policy & Practice is a quarterly journal which provides a high quality medium for original and creative work in world transport.

WTPP has a philosophy based on the equal importance of academic rigour and a strong commitment to ideas, policies and practical initiatives that will bring about a reduction in global dependency on cars, lorries and aircraft.

WTPP has a commitment to sustainable transport which embraces the urgent need to cut global emissions of carbon dioxide, to reduce the amount of new infrastructure of all kinds and to highlight the importance of future generations, the poor, those who live in degraded environments and those deprived of human rights by planning systems that put a higher importance on economic objectives than on the environment and social justice.

WTPP embraces a different approach to science and through science to publishing. This view is based on an honest evaluation of the track record of transport planning, engineering and economics. All too often, these interrelated disciplines have embraced quantitative, elitist or mechanistic views of society, space and infrastructure and have eliminated people from the analysis.

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Children's perceptions of transport*Simon Kingham & Sarah Donohoe*

The aim of this project was to find out at what age children become aware of cars and transport problems, especially environmental aspects. Eighty interviews were undertaken asking questions about cars, transport issues and attitudes to these. It was found that brand, speed and value awareness increases with age. Children as young as four years of age are aware of the makes and types of car. Results suggest an awareness of accident risk at age five, but no environmental awareness till age ten.

Keywords

Children, environmental awareness, transport perception

How does a family car matter? Leisure, travel & attitudes of adolescents in inner city Stockholm*Karin Sandqvist*

Adolescents' leisure activities, travel experiences and attitudes toward car-ownership were studied in inner-city Stockholm. 37 of the 71 participating adolescents lived in car-free households. In this setting, a family car made no difference for their leisure activities as both categories enjoyed extensive independent mobility by walking and public transport. The majority had experienced international recreational travels by air. Car-ownership influenced attitudes about the importance of a family car for children, as both adolescent categories endorsed their own situation.

Keywords

Adolescents, car dependency, city living, families with children, car-ownership, long-distance travel, transport sustainability, car culture attitudes

Investigating perceptions of personal security on the Valley Lines rail network in South Wales*Paul M. Cozens, Richard H. Neale, Jeremy Whitaker & David Hillier*

The government's goal of producing an Integrated Transport Policy places increasing emphasis upon the railways. As congestion in Britain's cities continues to impact detrimentally upon health, economic vitality and urban futures, the railways offer a mode of transport that can help to resolve such issues. Furthermore, public transport has a crucial role to play in helping to alleviate social exclusion – since not all of society can afford to or wish to operate a motor vehicle. It has been demonstrated that a significant factor in determining mode of transport is personal safety/security concerns of potential users – their perceptions will influence levels of patronage. Crime and nuisance on public transport and, more specifically, the railways has therefore emerged as a relatively recent focus for investigation. This paper investigates

station design and management, why people feel 'unsafe' and presents the findings from a preliminary study of crime and nuisance on the Valley Lines network in South Wales. It argues that a station-specific approach is necessary to more fully engage with the highly complex relationship that exists between perceptions of crime and nuisance and station design.

Keywords

Crime, Crime Prevention Through Environmental Design, Economy, Environment, Health, Integrated Transport Policy, Public Transport, Railways, Safety, Situational Crime Prevention

More about 'twisted logic' ... the position of 'soft people' from an upside-down world of 'road safety' ideology*Michael Yeates*

Recent articles (in Volume 7, Numbers 1 & 2) have addressed issues 'about' road safety as it is currently constructed rather than 'for' road safety as it might be constructed to reduce road danger and encourage sustainable transport. By reference to these previous articles, this article raises issues which it is argued are part of the 'road safety' ideology which effectively prevents safety of non-motorised road users being valued by 'road safety' authorities. The article seeks to examine why current 'road safety' cannot provide the setting required for a 'safe' transport system without both safety and convenience for all road users.

Keywords

Speed, safety, management, responsibility, non-motorised road users, urban planning

Road traffic congestion: The extent of the problem*Francois Schneider, Axel Nordmann & Friedrich Hinterberger*

This paper considers a variety of data on the problem of congestion in Europe. Definitions, measures with time loss and different critics, and alternative analysis are presented so that a differentiated picture may be derived. The paper also explores the existing dynamics between congestion relative to road use and general traffic effects.

Congestion is a serious problem, localised in specific places and times, especially in cities at peak hours. However, the reality appears otherwise when we consider the problem on a larger scale and when we deal with the dynamics of road use. In general, congestion is considered to be less costly than it was thought previously and its impact is relatively negligible when compared with other transport consequences.

Keywords

Congestion, costs, externalities, internalities, traffic

Why rural areas in Britain will not benefit from lower transport fuel duty*Dominic Stead*

At the end of 2000, the U.K. Government put forward its new policies for transport in rural areas. Two of the main areas of policy were reducing transport fuel duty and increasing the level of support for public transport. In this paper, I argue that these are two incompatible strategies and that substantial increases in fuel duty, rather than decreases, may have more benefit to rural areas. I show that accessibility in most rural areas in Britain has been in decline for years and argue that reducing transport fuel duty is only likely to increase problems of social exclusion and environmental damage in these areas. I begin this paper by outlining current government policy on transport in rural areas. I present some of the recent trends in accessibility, showing that many local services in rural areas are in decline. I then examine the implications of these trends for transport and identify how increases in fuel duty may benefit rural areas in terms of accessibility, social inclusion and environmental quality.

Keywords

rural transport, fuel duty, government policy, critique

Strategic Environmental Assessment: a new paradigm for the EU?*Steve Dawe*

Environmental policy in Europe can be considered to exist in a neo-liberal context. Strategic Environmental Assessment may constitute a challenge to the prevailing neo-liberal ethos of the European Union and have implications for those states within it that are most enamoured of competitiveness, deregulation and a declining role for the State, notably Britain. The troubled gestation of Strategic Environmental Assessment poses fundamental questions about both transport and environmental policy in the EU and whether fundamental challenges to neo-liberalism might be needed to fully integrate environmental policy into other policy areas.

Keywords

Strategic environmental assessment, environmental policy, European union, public policy

Recent weeks have seen a very welcome emphasis on the subject of children and transport. A conference in Copenhagen in May 2002 heard repeated demands from Danish, Swedish, Norwegian, UK and Italian delegates for the voices of children to be heard and for children to be put at the centre of new ways of thinking about transport. The current system certainly does not respect children. 9000 children each year are killed in the European region of the World Health Organization and the measures that are needed to reduce this appalling tragedy are still not being taken. Interestingly the main argument against taking these measures is the freedom of choice principle, i.e. the freedom of motorists to do what they want at the expense of children.

Children have a great deal to say about transport and are a source of real insight into the mess created by adults. Simon Kingham and Sarah Donohoe take up the theme of what children have to say in the first article in this issue. Slightly older children are also the subject of the second paper by Karen Sandqvist in Stockholm. The Copenhagen Conference papers also pursue this theme and can be accessed on <http://www.flux.teksam.ruc.dk>

An emphasis on children allows us to take a fresh look at the whole problem of transport and to drop for a moment the usual categories and divisions of cars versus public transport, privatisation versus state control and environment versus economy. What impact does the current arrangement of transport planning, investment and design have on children? What do children think about it and how would they wish to rearrange matters if they were ever considered as real people?

These questions are very challenging. They would have helped out in a recent discussion with a US organisation seeking a speaker at a major conference who would give a visionary, radical and thought provoking address. The discussion went quite well until the organisation made it clear that they wanted to emphasise the importance of hydrogen powered vehicles. From a child's viewpoint faced with fast moving traffic and drivers who show no respect to children the question of hydrogen/fossil/hybrid is irrelevant. To a parent of any one of the 9000 dead children the question is obscene and yet to the US organisation it was of the greatest importance. All contact on the possibility of speaking at this conference has now been terminated by the US organisation. A visionary and radical view of transport cannot be

allowed to encompass fewer cars, much slower cars and much less driving. This is a sad reflection on our scaling of priorities and on the search for the holy grail of a technological solution to the whole nexus of space-time compression, mobility richness and the environmental and social consequences of autodependency.

The paper by Cozens and his colleagues takes up the theme of personal security which is still cited by many as a reason for not using public transport (it is too dangerous). The perception and reality of danger and violence is central to an understanding of children and transport since their activity patterns are mediated by parents who increasingly worry about a fearful and dangerous world that can only be made bearable by a very safe, secure car. If we design a transport system with children's voices given the fullest possible roles then we will be on our way to the reality of a safe and secure environment in every sense. The absence of children's voices allows us to maintain the pretence that a privatised, isolated world of car use is a worthy vision of 21st century civilisation.

Michael Yeates takes up a similar theme in his discussion of road safety. As we have seen in previous issues, road safety ideology really does define who is valued and who is not valued in our transport culture.

Schneider and his colleagues question the significance of congestion in Europe and lay down new challenges for decision makers whilst Dominic Stead similarly challenges conventional wisdom on rural transport in the U.K. At a larger geographical scale and in a bigger policy context Steve Dawe shows how strategic environmental appraisal in the EU exposes the deeper seated problems of a neo-liberal political ideology and its commitment to ever increasing mobility.

Dawe indirectly returns us to children. We really do have to make a choice in Europe. We can have a hypermobile society with all its superficial gloss and pretence of economic prosperity and progress or we can have a child-friendly Europe which stops the obscenity of 9000 dead children and creates lively, healthy vibrant rural and urban communities. We can't have both at the same time and in the meantime the default option on our transport system is set on autodependency. This is bad news for children.

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Editor

World Transport Policy & Practice

Children's perceptions of transport

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Abstract

The aim of this project was to find out at what age children become aware of cars and transport problems, especially environmental aspects. Eighty interviews were undertaken asking questions about cars, transport issues and attitudes to these. It was found that brand, speed and value awareness increases with age. Children as young as four years of age are aware of the makes and types of car. Results suggest an awareness of accident risk at age five, but no environmental awareness till age ten.

Keywords

Children, environmental awareness, transport perception

Introduction

The growth in road traffic, especially private motor vehicles, has led to a variety of widely reported environmental and health problems. A possible way to reduce future problems is to educate the drivers of the future – young children. A precursor to this is the need to identify at what age children become aware of motor vehicles, and their environmental and health impacts. This paper presents some research findings that will attempt to answer some of these questions.

Background

There is evidence that children who are driven around become dependent on cars at an early age, will find it harder as adults to use cars responsibly and will have fewer opportunities to develop the road sense they need as pedestrians or cyclists (DETR, 1998). Parents feel that they must restrict children's play to where it can be seen, for example, in the playground or the nursery. This may be due to a fear for their safety from traffic, but unsupervised play is important in allowing children to adjust to their own peer group without interference (Bannon & Costello, 1997). These restrictions may affect them negatively during their childhood or their adult lives. There are other health problems in children associated with traffic. Parents feel the need to restrict their children from playing outdoors or from walking or cycling unaccompanied to school, due to fear of an accident. In 1971, nine out of

eleven British 7-8 year olds travelled to school by themselves, by 1990 this had decreased to one in eleven (Hillman *et al.*, 1990). It is also shown that while 80% of children asked owned a bicycle, only 2% felt confident to travel to school this way, and that few children cycled beyond half a mile from home either on or off road (Joshi *et al.*, 1997).

This decline in exercise for adults and children is bad for health, because exercise is essential for the prevention and management of weight problems and obesity, and helps protect against coronary heart disease (RCEP, 1994). Parents, who take little exercise, also pass this habit onto their children, who need exercise for appropriate physical development (Bannon & Costello, 1997).

Children are the drivers of tomorrow and since the problems of increased traffic and car ownership are predicted to keep escalating into the next century (RCEP, 1994), it is future generations who will have to deal with the repercussions of today's traffic problems. There have been many studies on the attitudes of adults towards transport and related issues, but few have been conducted with children.

Through the U.K. Government's National Curriculum children in Key Stage 1 (five-to-seven years of age) are taught to express views on how the environment is changing, for example through increasing traffic (DoE, 1998). They also learn how the quality of their environment can be sustained and improved, for example, by creating cycle lanes or excluding cars from certain areas.

Children in Key Stage 2 (aged 7-11) are taught how people affect the environment, for example, the development of motorways. They are also taught how changing various services in different areas can affect car owners compared to non-car owners. In summary, the National Curriculum indicates that children should have a knowledge of transport's environmental issues, at ages as young as five (DoE, 1998).

The Lex Report surveyed children aged 13-16, and found that they are just as dependent on cars as their parents are, with teenage girls feeling more dependent than boys do although boys are more interested in cars

than girls (Lex, 1995). The report also found that teenagers in households that have a car, believe that they will have their own car before their nineteenth birthday. A subsequent Lex survey found increased interest in cars among children, and that cars ranked higher in transport preference than trains and buses (Lex, 1999). This survey also reports that a majority of teenagers viewed a car as more essential to their lifestyles than televisions, hi-fis or computers (*ibid*).

Ciaburro *et al.* (1994) took part in discussion groups with school children aged 7-11, and found that they were a little more aware of environmental issues than adults, but they did not seem to have linked traffic issues with these. Children were able to identify traffic congestion as a problem. Younger children were much more concerned than older children who were approaching the legal driving age. Most children in this study agreed that cars were an essential part of life (Ciaburro *et al.*, 1994).

There is evidence that children learn from their parents' behaviour that cars are something to be admired (Stokes and Hallett, 1992). Meaton and Kingham (1998) carried out a study of children's perceptions of transport in 1996, and found that children are hooked on cars at a very early age. They suggest that there is a certain amount of brand awareness between car models, as young as age five. Their results indicate that image association between different modes of transport is evident in the minds of children as young as seven. This suggests that the origins of the car culture so evident in their parents' society, is nurtured in the very early stages of a child's development. They concluded that it is quite likely that the next generation will be even more wedded to their cars than previous generations (Meaton and Kingham, 1998).

Travel awareness campaigns have a vital role to play in raising concern about the issues surrounding the use of private transport, and these can be useful in educating adults and children. Travel awareness campaigns aim to teach young school children about traffic problems through the media, advertising, road-shows, school awards, cycling proficiency and health and leisure (Ciaburro, 1994). Some of these campaigns have been 'Look Left, Right and Left again' and 'One false move' by the UK Department of Transport (Bannon & Costello, 1997).

Method

A total of 80 children were interviewed, forty in each of two state schools in Hertfordshire in January and March 1999. The children were all between the ages of 4 and 11, stratified by age and gender. Each interview took approximately five minutes to complete. The interviews consisted of questions asking children's perceptions on cars and transport issues, such

as safety and traffic congestion. Pictures were used to represent some of the questions, to make it fun for the children, to help them understand and to prevent them from becoming bored or uninterested; the pictures also help to make the interviews feel like play. As play provides stimulation, interest, concentration and motivation it provokes better responses from children through active participation (Moyle, 1989). Show cards and pictures have been used in previous studies with children and have been found useful in extracting information from them (KMC, 1995). The children were asked:

- about their favourite way of travelling (car, bus, walking or cycling);
- whether they like cars;
- whether their parents have a car, and if so, what type;
- how much they thought cars cost;
- which way of travelling is best for the environment;
- whether they had any toy cars at home; and
- whether they wanted a car when they got older.

In addition they were shown pictures of a cyclist wearing a mask and helmet and asked if they knew why, and finally shown pictures of congestion and asked whether this was good or bad.

Results

Seventy-eight of the eighty (97%) children came from car-owning families and the majority (53) from 'two-car families'. 70% of the subjects said they had toy cars at home, 38 males and 18 females. The results were significant for gender ($p < 0.01$), but there were no differences by age group ($p = 0.34$).

Children's preferred modes of travel were cycling (35%), car (27%) and walking and bus (19% each). There were no age ($p = 0.89$) or gender ($p = 0.93$) differences. 91% of children liked cars with no significant differences by age ($p = 0.63$) or gender ($p = 0.69$). Seventy-four of the subjects (92.5%) said they would like a car when older, with no age or gender differences.

Children's response when asked what type of car their parents owned is shown in Figure 1, by age. There is a noticeable increase in detail in response with age. At younger ages many children don't know what type of car their parents have. As they get older they are able to provide more detail including in most cases for children 6 years and older, the actual make and model of car. This age gradient is statistically significant ($p < 0.01$). While boys are better than girls at identifying their parents' cars, the differences are not statistically significant ($p = 0.68$).

The ability of children to identify the reason cyclists wear helmets and masks is presented, by age,

in Figure 2. There are statistically significant associations by age, with a steady increase with age in correct answers for the helmet ($p=0.05$), and a steeper increase for the mask ($p<0.01$). By age 4-5 most children were aware what the helmet was for, but for the mask it is not until ages 10-11 that most children were aware of the reason for its use. Figure 3 presents the results by gender. There are no differences for the helmet, but boys are more aware of the use of the mask than girls ($p=0.03$).

The results for which mode was the best for the environment (options given were car, bus, walking or cycling) are presented in Figure 4 (presented as motorised or non-motorised modes, by age). There is a statistically significant increase in correctness of response with age ($p<0.01$). There is a step in correct responses from 4-5 year olds to 6-7 year olds. There is no difference between boys and girls ($p=0.2$).

Nearly all children indicated that the photo of congestion was bad (95%). All the children who thought it was good were aged 4-5 years, two were girls, and one was a boy. The small number of cases means that statistical significance cannot be tested.

Discussion

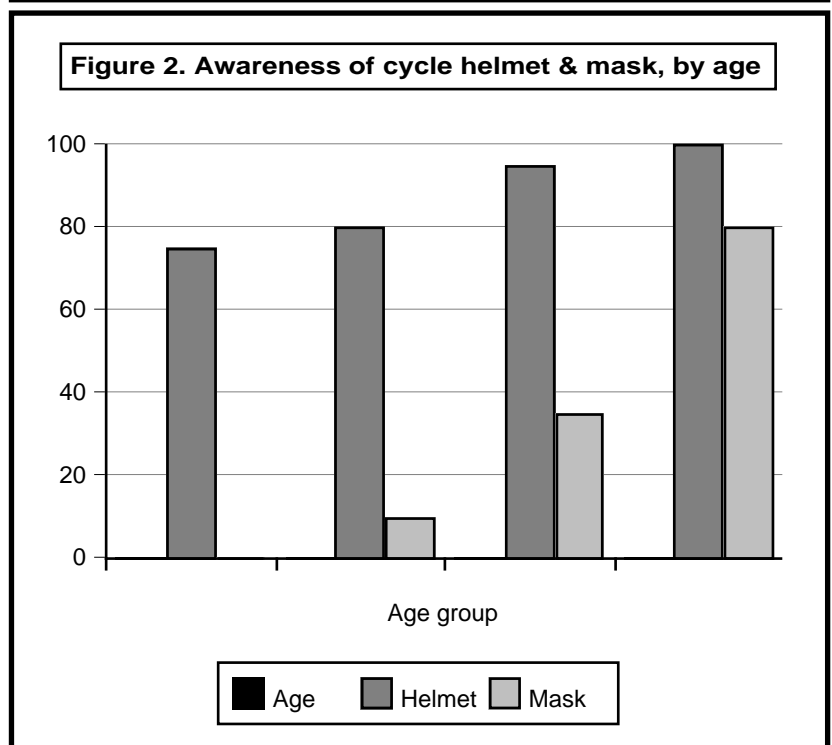
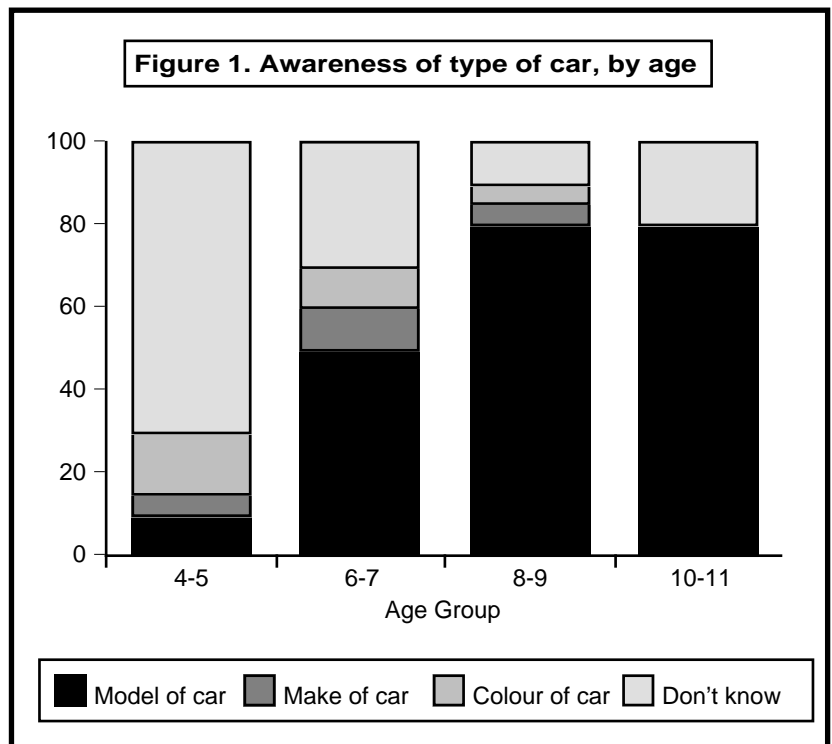
Contact

An overwhelming proportion of the children interviewed came from families with at least one car, which shows that they have contact with cars through their parents. Children learn from their parents that cars are something to be admired (Meaton & Kingham, 1998), which suggests that a high proportion of the children that were interviewed will themselves own or want a car when they are older. The majority of the children in this study had toy cars at home, which is another form of contact. As more of the boys had toy cars than girls, this suggests that boys have more contact and may lead to gender differences in their attitudes and perceptions to cars. Through play with toy cars, children may think of cars as fun and harmless.

The children's favourite mode of transport was cycling. This is different to the Meaton and Kingham (1998) survey which found that cycling was a lower choice than motorbike and car. The car is ranked second favourite, which would suggest that many children do enjoy travelling by car. The bus was found to be

joint third with walking, confirming other findings that children favoured public transport the least when compared to private transport (Meaton and Kingham, 1998; Lex, 1999). The majority of children liked cars, supporting other studies (Lex, 1995), although no gender differences were identified. There were gender differences between car type awareness. Children are very aware of car types by age eight, with half aware of make and model by age 6-7.

This study found no gender difference in desire to have a car when older, which other research on older children has suggested (Lex, 1999). This may indicate



that gender differences become apparent with increasing age or alternatively that the gap between the sexes is not as defined as previous studies have suggested. This study seems to confirm the findings of Meaton and Kingham (1998) that children are 'hooked' on cars as young as four years of age.

Safety & environment

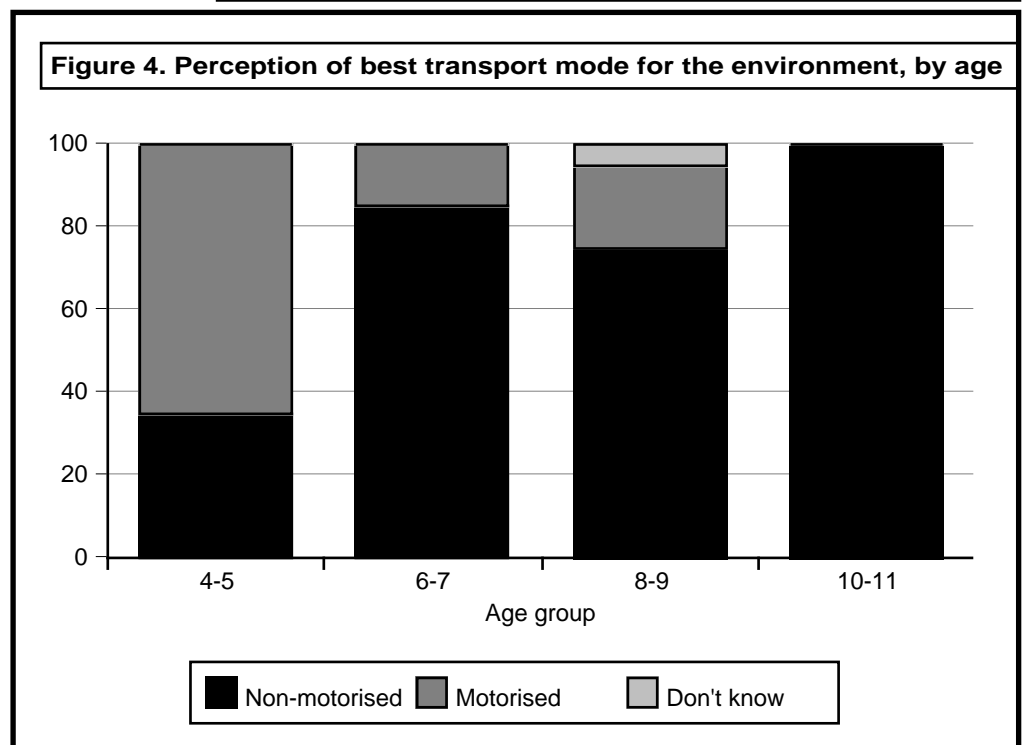
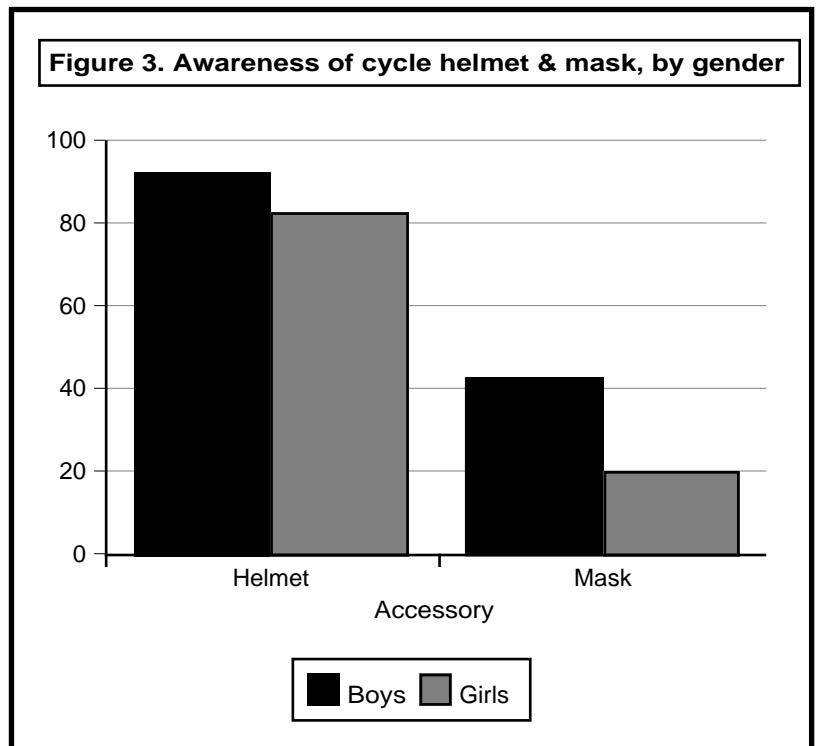
The children overall had a good knowledge of the cycle helmet's purpose (Figure 2). This knowledge increased with age, although even at younger ages, the majority of children answered correctly. The knowledge of awareness of the cycle mask was less. It increased with age, with none of the youngest children answering correctly (Figure 2). Boys are better at answering the question correctly (Figure 3), which was possibly not expected as more girls chose cycling as their favourite mode of transport than boys.

The older children were better able to identify environmentally friendlier modes of transport (Figure 4), although 7 out of the 20 subjects in the youngest age group answered correctly. This shows that children as young as 4 have some knowledge of what is good and bad for the environment. The National Curriculum states that children in their first Key Stage are taught about the environment (DoE, 1998). Environmental awareness does not show any difference between genders.

When asked about traffic congestion, the majority of children identified it as 'bad'. This research agrees with a study by Ciaburro *et al.* (1994), which found that, in general, children can identify traffic congestion as a problem. The majority of the wrong answers occurred in the 4-5 age group, which would suggest that environmental awareness increases with age. By age 6 over half the children identify non-motorised modes as better for the environment. This suggests that this form of environmental awareness takes place around this age.

When asked to identify the type of car that their parents had, definite brand awareness was clearly

evident by age eight, and most likely at the age of six or seven. Most of the 4-5 year olds answer by colour than any other age group suggesting that they identify material objects by colour before they learn names or makes. This study shows that boys are better at identifying car makes than girls. This may be because 'boys are more interested in cars' (Lex, 1995). Many of the boys were able to name all of the five types of cars used without any help from the interviewer, whereas many of the girls were less certain and asked the names, and some girls didn't seem to want to know.



Conclusions

The use of cars has grown significantly over the years. Most car owners believe that the car is essential to their lives (Cullinane, 1992; Lex, 1995). For some people this may be true, but for a high number of people it is a sign of status, a luxury which can make their lives easier and more pleasant. But the motor car for all its success has been a significant public health and environmental hazard. Because of the huge increase in traffic, parents keep their children indoors for safety. Far from promoting personal freedom, private transport may have had the opposite effect (Maddison *et al.*, 1996). Children need to play outdoors and exercise for optimal development and growth, and also to learn many safety issues, without which they may be affected in later life.

Children are aware of makes and types of car from as young as four years of age; they see their parents with cars and learn from them that cars are to be admired. Children as young as four are able to evaluate some cars as 'better' or 'more expensive' than others and therefore can judge a car driver's class or status by the type of car they drive. This perception increases with age and by the time children have reached the legal driving age, all they want to do is get behind the wheel of a car and drive. The majority of young children want a car themselves when they are old enough to drive, even though this is only going to add to the already escalating traffic problems faced by society today. In order to prevent this 'love' of cars, children need to be educated at a very early age of the negative effects of the car; the age at where it may be too late is approximately six years of age.

To be most effective, environmental education needs to take place from birth until five or six years of age, before children are left to form their own views, which will be influenced by their parents, the media and their toys. The problem is that the attitudes of children cannot be changed without changing the attitudes of their parents, and this cannot happen until society's values change. The results from this study support the work of Meaton and Kingham (1998) that children need to be educated away from the car culture at a very early age. Motoring should be taught to children as an anti-social activity (Maddison *et al.*, 1996). Government policies should help to reduce the need for children to be driven to schools, by providing walking and cycling proficiency tests, safe routes to school, and off road cycle paths; and public transport should be given priority.

At all levels of society, the individual needs to be made aware of the relationship of their personal car use and the associated impacts on the environment (Ciaburro *et al.*, 1994). The individual should be offered incentives – cash would work best – to

minimise the use of the car. This can be done by the government or individual businesses. If society implemented this as a whole, traffic could be greatly reduced.

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How does a family car matter? Leisure, travel & attitudes of adolescents in inner city Stockholm

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Abstract

Adolescents' leisure activities, travel experiences and attitudes toward car-ownership were studied in inner-city Stockholm. 37 of the 71 participating adolescents lived in car-free households. In this setting, a family car made no difference for their leisure activities as both categories enjoyed extensive independent mobility by walking and public transport. The majority had experienced international recreational travels by air. Car-ownership influenced attitudes about the importance of a family car for children, as both adolescent categories endorsed their own situation.

Keywords

Adolescents, car dependency, city living, families with children, car-ownership, long-distance travel, transport sustainability, car culture attitudes

Introduction

In Sweden, the political rhetoric on transportation regularly invokes families with children. For example, they are claimed to suffer unduly if petrol taxes would be increased. Often, the high rate of car-ownership among 'families with children' (about 95%) is taken as proof that they really need a car, or even two cars, for everyday routines and for enriching experiences. The fact that this percentage only refers to two-parent families is often overlooked. For single mothers, the car-owning rate is 60%, which is much lower than for childless couples (where it ranges from 76% to 95% depending on age. Statistics Sweden, 1997). Even if it were correct to argue 'car-need' simply by an observed high percentage of car-ownership, the low rate of car-ownership among single mother families would disprove the idea that households with children *must* have cars. Whatever the issue of *need*, the situation in regard to what *difference* it makes for children to grow up with or without a car needs to be investigated. During the last decades, about 10% of Swedish children have lived in car-free households.

At the same time as household car-ownership has become the norm, long-distance air-travel for vacations has become a normal part of the yearly routine which, like mass-motoring, is an unsustainable life-style (Nielsen, 2001; Carlsson-Kanyama, 1999). In

so far as regularly escaping the dreary Nordic climate comes to be regarded as a 'necessity' by the coming generations, sustainable development becomes harder to achieve.

Young people & sustainable transport

In an international study of young people, it was found that the awareness of the potential seriousness of environmental degradation is high in many countries, including Sweden (Sandqvist & Jonsson, 1997). Despite this awareness, the travel pattern of young Swedes is clearly unsustainable (Carlsson-Kanyama, 1999). Yet there are also indications that young adults have become somewhat disenchanted with cars: they do not obtain driver's licences and buy cars to the same extent as a decade ago (Krantz, 1999), a trend which also has improved the accident statistics (Murray, 2001). For children, the information is scant, and therefore a small ethnological study of suburban car-free families is interesting (Grahm, 1995). The interviewed children seemed not really to miss having a car, except that one 11 year-old girl felt painfully 'different' in school, and pretended that her family had a car.

Generally, the younger generations are of special interest in regard to sustainability. They *are* the future people who will be affected, and their readiness to deal with new resource restraints and opportunities can be crucial for humanity. Turning more specifically to the consequences today of not having a car in the family, adolescents (age 12–16) are a particularly interesting group to study because, unlike adults, they do not decide themselves if their family should have a car. Comparing adults 'with' and 'without' a car in their household, there is always the issue of self-selection. Thus, if we find that car-free adults get along very well without a car, the natural explanation is that this is the very reason why they do not have it. Because adolescents are dependent on someone else's decision, in regard to them it becomes more interesting to ask: what difference (if any) does a family car make for attitudes and experiences?

The present study

The present study aimed to investigate the impact of a family car for:

1. Adolescents' experiences which demand mobility (leisure activities, kin contact, long journeys); and
2. The attitudes of adolescents and their parents regarding car-use and car-ownership

The means of data-collection were interviews and questionnaires. In this article, main results of the completed first stage are presented (Sandqvist & Kriström, 2001). This was conducted in inner city Stockholm, a high status area, where car ownership is much lower than elsewhere in Sweden. Parking is expensive or difficult, but public transport is good. In Södermalm, the site of the study, there are buses, subways, commuter trains to the more distant suburbs, and convenient connections to the Central Station and Arlanda airport.

Since public transport is as good as or better than anywhere in Sweden, the study can *not* be considered representative for 'Swedish adolescents', but instead a particular test-case: if it is not possible for adolescents and their families to get along well without a car here, it will hardly be possible anywhere else either. For the inner city as a whole, this situation applies to 8000 adolescents aged 12–16 years, which amounts to 1.5% of the Swedish population of this age.

The sample

In order not to confound car-ownership, family type and gender of the child in the study, it was necessary to recruit a sample which included all combinations of these. Table 1 shows the composition of the sample.

The families were contacted through the largest school at Södermalm. Most of the adolescents were 13–15 years at the time of the interview. In fourteen families, there were two children in the age-span 12–16 years, in which case both were included. Thus, our sample contains 71 children in 57 families.

Education is an important background variable, because educated people usually have higher income, and because education often is correlated with values and attitudes. About half of the parents had a university qualification, but in the subgroup 'car-free single parents' only a third had a university education. Even in this generally high status area, there were blue-collar workers among the parents, e.g. assistant nurses, janitor, taxi driver and house painter. Even when car-owning and car-free parents' occupational level was equal, car-owners more often had jobs which could require them to transport things in their car. Therefore, some of their car-related expenses were usually covered by their employers or their businesses.

The interview

The purpose of the interview was to collect factual data on the adolescents' out-of-home experiences. Mostly, the children were

interviewed in their homes. The interview with the adolescents covered:

- the journey to school, distance and travel mode;
- organised leisure activities, type and how they travelled there;
- their activities during the last week-ends and school holidays, particularly in terms of travelling;
- the longest journey they had ever made, since the age of 7, and the three longest journeys during the last year; and
- contact with relatives during the last year.

Where the family car did not matter

The interview results gave a great detail of information, which was analysed both qualitatively and quantitatively. Informally, often we also received information about the parents' choice of car-ownership. While a few parents (mainly single mothers) expressed a strong wish for a car that they could not afford, more commonly car-free parents said that keeping a car was not worth the cost.

In most of the studied aspects, it turned out that having or not having a family car made no appreciable difference for the adolescents' out-of-home experiences.

Leisure activities. The adolescents engaged in a wide variety of leisure activities and enjoyed extensive independent mobility during their daily and weekly activities. Regardless of car-ownership, most adolescents partook in one organised leisure activity. They were rarely dependent on car-rides for leisure activities (and visiting relatives), but instead walked or used public transport to their varied destinations.

Independent mobility. Parents with cars played a role in chauffeuring their own and other children to team sport matches, often in suburbs. However, car-free team members often went by public transport. Yet, when all types of independent mobility (i.e. mobility without parents) was considered, there were no differences between adolescents with or without a family car.

Parents' attitudes to mobility. Contrary to expectations, car-owning and car-free parents did not differ in their attitudes toward adolescents'

Table 1. Composition of sample. Number of children by combination of family type, car-ownership & gender

Family type	One-parent		Two-parent		Total
	boys	girls	boys	girls	
0	9	9	10	9	37
1	4	5	10	10	29
2	0	0	2	3	5

independent use of the public transport system in Stockholm. Yet the parents' attitudes made a difference: if they were more than average in favour of adolescents' independent mobility, their children experienced more independent mobility.

Furthermore, in regard to *contact with relatives*, there was little difference between car-owning and car-free adolescents, whether the comparison concerned total number of kin households, the number of households with frequent contact, or the number of kin households outside Stockholm county.

Where the family car mattered: long journeys

Car-ownership turned out to matter in regard to long journeys, their destinations and travel modes. Since we asked about the longest trip the child had ever made since age 7, and the three longest trips during the last year, for each adolescent we had data on four 'long journeys'. Obviously, the distances of these long journeys could vary. In Table 2 and Table 3, the destinations of the longest and shortest of the four long journeys are presented. The destinations of the other two long journeys were obviously intermediate.

In Table 2, we find that 20 of the 71 adolescents had travelled to other continents. The most common of such destinations were Thailand and Malaysia, which recently have emerged as tourist resorts. Also the destinations classified as 'Within Europe' usually were Mediterranean resorts or the Canary Islands. As we can see, the car-owner children seemed to have travelled more widely, but overwhelmingly to destinations usually reached by air. Only one adolescent had never been outside Sweden, but two more had only been to Åland (Finnish islands close to Stockholm).

Table 3 displays the destinations of the third longest trip within last year. This was often a week-end trip, and it is quite reasonable that the average destination for such a trip is within 500 km. For destinations of these types, there are many possible travel modes: Car, rail, bus and boat. (Due to the many islands around Stockholm, week-end trips by boat are fairly common.) Unlike the 'very longest trip', where air travel was dominant, here there seems to be less differences between the car-owning and car-free adolescents in terms of travel distances.

In respect to sustainability, travel mode is important. Air travel is generally the least sustainable mode, and trips are distant.

Rail is the most energy efficient and least polluting. In Sweden, trains generally run on electricity, from hydro or nuclear power. Car travel is intermediate in terms of sustainability. In the 'four long journeys', in the present study, the destinations of both train trips and car trips varied from the vicinity of Stockholm to middle Europe. Other travel modes (e.g. bus and boat) were comparatively rare.

For each adolescent, we can ask: How many of the four 'long journeys' were made by air? How many by car? How many by rail? In Table 4 the children are distributed after number of journeys by a particular

Table 2. The longest journey since age 7

Destination	Number of children by journey destination	
	Car-free	Car-owners
(1-3) Within Stockholm County	0	0
(4) Within 500 km in Sweden	0	0
(5) Within 500-1000 km in Sweden	1	0
(6) Within Scandinavia	7	0
(7) Within Europe	23	19
(8) Turkey, Middle east, North Africa	1	0
(9) Other continents	5	15
Total	37	34

Table 3. The third longest journey last year

Destination	Number of children by journey destination	
	Car-free	Car-owners
(1) Within inner city Stockholm	0	0
(2) To a suburb of Stockholm	4	0
(3) Stockholm county	13	6
(4) Within 500 km in Sweden	15	19
(5) Within 500-1000 km in Sweden	0	7
(6) Within Scandinavia	4	1
(7) Within Europe	1	1
(8-9) Outside Europe	0	0
Total	37	34

Table 4. Number of children, by number of journeys per mode & car-ownership

Long journeys	By car		By rail		By air	
	Car owners	Car-free	Car owners	Car-free	Car owners	Car-free
0	7	17	18	5	2	9
0.5 – 1	15	15	14	18	8	19
1.5 – 2	12	3	2	11	15	5
2.5 – 3	0	2	0	3	8	4
3.5 – 4	0	0	0	0	1	0
Total	34	37	34	37	34	37

mode. Obviously, four journeys by a particular mode is the maximum number possible. A minor complication was that some adolescents had occasionally used a mixed travel mode, e.g. going away by rail, coming home by car, resulting in half a journey by each mode. (If a short car-ride was used for getting to or from the train or airport, the trip was classified 'rail' or 'air').

In Table 4, we can note that seven of the car-owning and 17 of the car-free had not made any of their 'long journeys' by car. Only two children, both car-free, had made as much as three of their four long journey by car. Rail travel was equally common as car travel, which illustrates the unusualness of the sample, because nationwide, car travel is very dominant (Statistics Sweden, 1998). These adolescents live within a few subway stops of Stockholm Central Station, which is the hub of the Swedish railroad system. Some of the shorter 'long journeys' were made by local trains or subway. However, the most common travel mode for long journeys was by air. One adolescent had made all of the four long journeys by air, and 12 (eight car-owners, four car-free) had made three journeys by air. Eleven children (two car-owners and nine car-free) had not made any of these journeys by air, which might mean that they had never travelled by aeroplane.

A multivariate analysis

Inspecting Table 4, we certainly get the impression that car-owners go by car and by air more often than the car-free who instead go by rail more often for their long trips. While it is entirely reasonable and expected that the car-free go more by rail, the finding that car-owners travel more by air was not expected.

In noting these differences we must ask if they are statistically significant, and also to what extent car-ownership *itself* is the determining factor, and to what extent *other* family characteristics (one or two parents, education, attitudes) determine travel modes. To answer this question, a two-step hierarchical regression analysis was performed for car, train and air travel respectively, in which the dependent variable was the number of long trips by car, by rail and by air.

Although 71 adolescents took part in the study, they belonged to only 57 different families. Since the statistical analysis demands that each unit is sampled independently, it was not correct to disregard a possible bias due to a 'sibling effect', particularly since long trips tend to be family affairs. Therefore, we only used one sibling from each family, and always the one which

was interviewed first.

In the first step (Model 1), travel mode was analysed as a function of the two stratification variables used in selecting the sample, namely number of cars (0,1 or 2) and family type (i.e. one or two parents). In the second step (Model 2), two more family variables were added to the regression equation, namely the 'Parents' Education' and the 'Parents' Appreciation of Car Vacations'. If there were two parents in the household, the means of their education and attitudes was used. The measure 'Parents' Appreciation of Car Vacations' was constructed from the positive items #32, 34, 36, 37, 44 and the negative items #33 and 35, (see Box 1).

Table 5 shows the results concerning the number of long car trips. Rather unexpectedly, the number of cars in the family had no significant effect on the number of long car trips the adolescent had experienced, and neither had family type. The most important predictor was 'Parents' Appreciation of Car Vacations'. Thus, according to this, if parents

Table 5. Standardised regression co-efficients of the independent variables explaining number of long trips by car, R2 & adjusted R2 for each model. (N=57)

Variable	Standardised regression co-efficients	
	Model 1	Model 2
Number of cars	0.254 a	0.084
Family type	0.09	0.077
Parents' Education		0.219 a
Parents' Appreciation of Car Vacations		0.388 c
R2	0.088	0.215
Adjusted R2	0.054	0.155 b

Notes:– a: $p < .10$; b: $p < .05$; c: $p < .01$

Table 6. Standardised regression co-efficients of the independent variables explaining number of long trips by air, and R2 and adjusted R2 for each model. (N=57)

Variable	Standardised regression co-efficients	
	Model 1	Model 2
Number of cars	0.329 b	0.402 c
Family type	0.04	0.033
Parents' Education		-0.042
Parents' Appreciation of Car Vacations		-0.173
R2	0.118	0.142
Adjusted R2	0.086 b	0.076 a

Notes:– a: $p < .10$; b: $p < .05$; c: $p < .01$

appreciated car vacations as an enriching experience for children, their children in fact had experienced more long car journeys, whether the parent owned a car or not. Some car-free families rented a car, others made a car trip with a relative, and quite a few children made a car journey with a friend or non-residential parent.

In Table 6, the number of long trips by air has been analysed by the same method. Here, the only significant predictor variable turns out to be number of cars. More cars in the family means more air travel. It is quite notable that neither family type nor 'Parents' Education' has an impact, which in turn disproves the otherwise reasonable explanation that family economics would be important in determining the number of long trips by air.

In Table 7, the same analysis is performed for train travel. Again, the number of cars turned out to be a significant predictor, but in the opposite direction. No car in the family meant more long journeys by rail for the adolescent. This, of course, was an expected finding.

To summarise the finding in this section: car-free adolescents made more long journeys by rail, fewer by air, but almost the same number by car, as car-owning adolescents. Thus, the car-free adolescents had a more sustainable travel pattern in their long trips as well as in daily life.

The questionnaire

The questionnaire was designed to investigate the attitudes of the adolescents and their parents. Parents and children individually filled out identical forms. Mainly, the items consisted of statements for which the respondent should check one of the alternatives 'not true at all', 'partly true', 'precisely true', which were coded 1, 2, & 3 respectively. Pro-car and car-critical items alternated. Indices of attitude dimensions were constructed based on the content of the items, simply by adding pro-car item scores and subtracting car-critical item scores. Thus, all dimension indices were constructed to make a high score indicate a pro-car attitude and a low score a car-critical attitude. The dimension names were selected to express a pro-car attitude.

Attitude findings

Item analysis

The questionnaire responses were first analysed for individual items, in which the means for the major respondent categories 'car-owning parents', 'car-free parents', 'car-owning children' and 'car-free children' give an indication of the general attitudes. A few examples:

Box 1: Attitude Dimensions Questionnaire

Sample items of five Attitude Dimensions are listed. The numbers refer to the item numbers in the questionnaire, and the + and – to whether the scores were added or subtracted when creating the index.

Cars for enhancing quality of life (8 items)

3. If you neither have a car nor a driving licence, you really are stuck (+)
4. To rent a car when you need to is just as good as owning a car (–)
7. If you live in inner-city Stockholm you don't need a car (–)
8. Without a car of one's own, life is very dull (+)
11. If you can manage without a car, this is the best way to live (–)

Cars as OK for the environment (9 items)

12. The more car traffic, the less pleasant a neighbourhood will be (–)
14. One must accept that there are lots of cars and traffic in modern towns (+)
18. Car traffic must be reduced to avoid perilous climate change (–)
20. The environmental problems of car traffic are most often exaggerated (+)
21. Today's traffic system with many cars will leave a poorer world to future generations (–)

Pro-car traffic policy (10 items)

22. Car owners are overtaxed; taxes on gasoline, etc. are far too high (+)
24. There should be more car-free zones in cities (–)
25. Everybody ought to have the right to free parking at home (+)
29. Car-free people and their needs are too often neglected (–)

The family car as an asset for children (11 items)

32. If the family does not have a car, the children miss out on many fine experiences (+)
33. Long car trips (over 6 hours) are very boring for children (–)
34. Car vacations strengthen family cohesiveness (+)
35. The best vacations are those without car travel (–)
37. When you go on a ski vacation, a car is necessary (+)
38. It is important that school children can get rides to different activities (+)

39. If there is no car in the family, children learn better to get around by themselves (–)

40. There is a risk that modern children will get lazy and out of shape because they so often get rides (–)

44. If the family does not have a car, it becomes much more difficult to keep in contact with relatives (+)

Car-owning as a social status provider (3 items)

10. If you don't have a car, you are respected as a model to follow in regard to the environment (–)
43. If the family does not own a car, it is embarrassing for the children since everyone else has a car (+)

'Without a car of one's own, life is very dull' gave mean responses from 1.2 to 1.5, which means that 'not true at all' (coded '1') was the most common answer in all four categories.

'Today's traffic system with many cars will leave a poorer world to future generations' yielded means from 2.2 to 2.7, i.e. between 'partly true' and 'precisely true'.

'Everybody ought to have the right to free parking at home' yielded response means from 1.9 to 2.5. Here the adolescents (both car-free and car-owning) agreed more than their parents.

'Long car trips (over 6 hours) are very boring for children' yielded response means from 2.1 to 2.6, with car-free parents agreeing the most, car-owning parents the least, and the adolescents in between.

'If the family does not own a car, it is embarrassing for the children since everyone else has a car' yielded means from 1.1 to 1.2, which shows that 'not true at all' was by far the most common answer, in all categories.

All in all then, the answers of the selected items above show that the respondents as a rule did not think life would be very dull without a car, or that it would be embarrassing for the children to not have a car. Most also believed that long car trips were boring for children, and that today's traffic system would leave a poorer world to the future. Still, most of the respondents were inclined to regard free parking at home as a right.

Dimension analysis.

Table 8 shows the absolute minimum and maximum (theoretical range) of the dimension scores, as well as the actually obtained highest and lowest scores (utilised range), and the mean scores for the major respondent categories (parents and children with and without cars).

The utilised ranges are almost as wide as the theoretical ranges. Thus, a few respondents consistently answered in a very pro-car manner, others in a very car-critical manner. Compared to such extreme scores, the mean responses are rather similar across the four respondent categories. For the most part, the means are far from the highest possible score, indicating that most of the respondents maintain relatively critical attitudes to cars.

Still, there are meaningful mean differences between the respondent categories. In the dimension 'Cars for enhancing the quality of life', the car-owning parents receive the highest scores (-5.1). Their children score considerable lower (-7.1), but not as low as the car-free parents and children (-8.8). It is hardly surprising that the car-free and car-owning parents respond differently, as their different attitudes toward the attraction of car-ownership quite reasonably influence whether they own a car or not. It is more interesting that the car-owning children score lower than their parents, and the car-free children score just as low as their parents. On the whole then, the younger generation find car-ownership somewhat less appealing than their parents do.

Table 7. Standardised regression co-efficients of the independent variables explaining number of long trips by train, and R2 and adjusted R2 for each model. (N=57)

Variable	Standardised regression coefficients	
	Model 1	Model 2
Number of cars	-0.432 c	-0.339 b
Family type	-0.031	-0.083
Parents' Education		0.124
Parents' Appreciation of Car Vacations		-0.243 a
R2	0.197	0.277
Adjusted R2	0.167 c	0.222 c

Notes:– a: $p < .10$; b: $p < .05$; c: $p < .01$

Table 8. Ranges of the dimension scores and mean scores by respondent categories

Attitude dimension	Theoretical range	Utilised range	Mean, car-owning parents (N=51)	Mean, car-free parents (N=42)	Mean, car-owning children (N=34)	Mean, car-free children (N=37)
Cars for enhancing the quality of life	-12 to + 4	-12 to + 3	- 5.1	- 8.8	- 7.1	- 8.8
Cars as OK for the environment	-15 to + 3	-15 to + 1	- 6.5	- 10.0	- 6.8	- 7.6
Pro-car policies	-14 to + 6	-13 to + 6	- 4.4	- 7.4	- 4.1	- 5.2
The family car as an asset for children	-5 to + 17	-5 to + 15	4.8	1.8	5.3	1
Car-owning as a status provider	-1 to + 5	-1 to + 4	0.8	0.9	0.6	0.4

The dimension 'The family car as an asset for children' is similar to 'Cars for enhancing the quality of life', as it deals with the positive experiences of car-ownership, but in this case in relation to children. Here, we find the widest differences between the two child categories (5.3 and 1.0), and each seem to endorse the situation they have experienced themselves: Even less than their parents, adolescents who have experienced a car-free childhood think a family car is an asset for children, while the adolescents who have grown up with a car endorse a family car for the children even more than their parents.

The dimension 'Car-owning as a status provider' again shows that the car-free children seem to get along quite well without cars, as they attribute even less positive status value to car-ownership than the other respondent categories. In other words, there is no evidence that these adolescents are embarrassed by not having a family car.

In contrast to the dimensions discussed above, the dimensions 'Cars as OK for the environment' and 'Pro-car policies' deal with cars in general, not with cars in relation to oneself. In both cases, the strongest contrast is between car-owning and car-free parents, in the predictable direction that the car-free parents are more critical of cars. Here, the car-free adolescents express a less critical attitude than their parents do, while the car-owning children have quite similar attitudes as their parents.

All in all then, if we consider the matter from the point of 'car-deprived' children, we find that they seem not to be troubled by this condition. No more than their parents (who have made a choice in the matter) do they think car-ownership will enhance their quality of life, or be an asset for children, or improve one's social status.

Correlates of the adolescents' car-related attitudes

Table 9 shows the correlations between some characteristics of the adolescents and their attitudes. For the variable 'number of cars', we find generally positive correlations. Thus, car-owning adolescents generally have more pro-car attitudes than the car-

free, which is another way of expressing the differences in mean scores described above.

Accordingly, Table 9 shows that the correlation with 'number of cars' is particularly strong for 'The family car as an asset for children', followed by 'Cars for enhancing the quality of life'.

The other correlations give new information. The correlations with gender are generally negative, which means that girls generally are more critical of cars, although it is only significant in respect to the environment. The correlations with the children's birth-years are not significant. However, their direction indicates that the older adolescents might be slightly more car-critical than the younger.

The education of the adolescents' parents tell us something about the intellectual standard of the home. With more educated parents, generally children are exposed to more books and newspapers. In Table 9, the correlations with father's and mother's education are shown separately. Because quite a number of the adolescents lived with single parents, we often had information for only one parent. Both educational measures consistently yield negative correlations with children's attitudes toward cars, which means that the adolescents with the more educated parents are more critical to cars. This is true particularly in relation to environment and policy issues. Both of these dimensions deal with the more 'abstract' or 'general' aspects of cars, not with the meaning of car-ownership for the adolescents themselves.

Discussion & conclusions

How does a family car matter for adolescents living in inner-city Stockholm? A first answer is 'not very much'. Regardless of car-ownership, these adolescents enjoyed leisure activities without having to depend on parental driving, had frequent kin contact and extensive independent mobility. The explanation for this benevolent situation is the densely built environment itself, combined with good public transport which their parents allow the 12–16 year-olds to use.

Table 9. Correlations between children's attitudes & number of cars, gender (boy=1, girl=2), birth year & father's & mother's education

Attitude dimension	Number of cars (N=71)	Gender (N=71)	Birth year (N=71)	Father's education (N=49)	Mother's education (N=66)
Quality of life enhancer	0.26 a	-0.23	0.16	-0.25	-0.13
OK for the environment	0.07	-0.34 b	0.21	-0.35 a	-0.26 a
Pro-car policies	0.09	-0.15	0.12	-0.32 a	-0.36 b
Asset for children	0.49 d	-0.06	0.04	-0.3 a	-0.08
Status provider	0.12	-0.23	0.2	-0.21	-0.02

Notes:- a: $p < .05$; b: $p < .01$; c: $p < .001$; d: $p < .0001$

A second answer is paradoxical: a car matters for long distance air travel. The car-owning adolescents had made more long journeys by air and thereby had travelled to more distant places than their car-free peers. A third answer is: it matters for their attitudes to cars, particularly in relation to child-rearing. The car-owning adolescents felt a family car provided valuable experiences for children, while the car-free adolescents disagreed.

What do the findings mean in the context of sustainable development? There are several encouraging aspects. First, we find that the densely built inner-city (with public transport) can provide both extensive opportunities for varied leisure interests and extensive kinship contact for adolescents. Also, such a cityscape with a very accessible rail system can make long-distance train travel as common as long-distance car travel. Second, the attitudes of the adolescents (regardless of car-ownership) indicate that they do not find having a car an essential ingredient to 'the good life' and they do not ascribe status value to car-ownership.

However, somewhat less encouraging findings are that the adolescents who have grown up with a family car view this as an asset for children, which can motivate them to get a car later, even if they do not find it essential for themselves. Furthermore, in terms of policy issues, both car-free and car-owning adolescents seem reluctant to make car-users pay for things like parking and road use, although they are quite aware of the negative environmental impact of cars. Then again, the finding that the adolescents with educated parents maintain more car-critical attitudes, both in regard to the environment and in regard to traffic policy, is encouraging. According to all sociological evidence, it is the children of the more educated parents who are likely to obtain leadership positions when they get older. In so far as women get a stronger voice in policy, the same applies.

In terms of long-distance travel, we must note that these Scandinavian adolescents are well-travelled. Over half had made a trip to southern Europe or beyond within last year. While such experiences might support an international outlook, the pattern is hardly sustainable. Mainly due to anecdotal evidence, we had expected the car-free adolescents to have had experienced more air travel, which would make their car-free living a mixed blessing in terms of environmental impact. Instead, the evidence showed that the car-owning adolescents made more journeys by air than the car-free. As an ad hoc explanation, we can note that long journeys often serve the purpose of providing a break from everyday life, in which new experiences are sought. For those who lead their everyday lives without cars, a car (or train) journey might serve the purpose, while for those whose

everyday life includes car travel, a trip to distant beaches which leaves the car behind, might seem particularly attractive. If this causal explanation holds up in further studies, it has a great policy implication: if car-free everyday living can be made a more common choice, then the demand for recreational air-travel will be lower.

This is a small study with a non-representative sample, yet certain of the findings are supported by other studies (e.g. a generation gap in the appeal of automobiles and a gender gap in environmental concern). On the other hand, the suggestion of a connection between everyday travel modes and recreational travel modes is not supported by other research, but not contradicted either. The matter seems not to have been investigated.

Next year we hope to be able to present results from a corresponding study in a Stockholm suburb.

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Investigating perceptions of personal security on the Valley Lines rail network in South Wales

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Abstract

The government's goal of producing an Integrated Transport Policy places increasing emphasis upon the railways. As congestion in Britain's cities continues to impact detrimentally upon health, economic vitality and urban futures, the railways offer a mode of transport that can help to resolve such issues. Furthermore, public transport has a crucial role to play in helping to alleviate social exclusion – since not all of society can afford to or wish to operate a motor vehicle. It has been demonstrated that a significant factor in determining mode of transport is personal safety/security concerns of potential users – their perceptions will influence levels of patronage. Crime and nuisance on public transport and, more specifically, the railways has therefore emerged as a relatively recent focus for investigation. This paper investigates station design and management, why people feel 'unsafe' and presents the findings from a preliminary study of crime and nuisance on the Valley Lines network in South Wales. It argues that a station-specific approach is necessary to more fully engage with the highly complex relationship that exists between perceptions of crime and nuisance and station design.

Keywords

Crime, Crime Prevention Through Environmental Design, Economy, Environment, Health, Integrated Transport Policy, Public Transport, Railways, Safety, Situational Crime Prevention

Introduction

The impact of the nineteenth century revolution in transport was profound, altering landscapes, creating towns and cities and establishing new patterns of movement. It offered new possibilities of travel, for business and pleasure and changed permanently the patterns and perceptions of mobility.

The historical importance of the railways is well-known. However, growing environmental and social

concerns focused on increased levels of car-usage have prompted a revival in the quest for an effective public transport network, with the railways representing one cornerstone. Indeed, David Morphet, the Director General of the Rail Passengers Council notes that 'it is essential ... to recognise the substantial benefits which rail can offer in terms of reduced congestion and pollution, improved amenity, and economic stimulus' (quoted in Salveson, 2000, p. 5).

As Europe becomes increasingly integrated in social, political and economic terms, local, regional and national railways become 'gateways; both into rural communities, and gateways to the wider world' (Salveson, 2000, p. 28). Indeed, Uzzell *et al.*, (2001, p. 1) claim that 'there is a general consensus that a thriving railway system within and between countries of Europe is essential for a commercially vibrant, mobile and healthy society'. The CBI estimates that in economic terms, road congestion costs businesses £20 billion annually, and significant environmental (carbon dioxide emissions) and health costs (asthma, stress and road accidents) are also crucial concerns (Flexibility, 2001). The promotion of public transport was arguably inevitable and has particular relevance for rail travel, which utilises its own specific and largely enclosed geographical space that can help to alleviate such congestion. The impact of different travel modes has been highlighted by the government:

'... the way we travel and the continued growth in road traffic is damaging our towns, harming our countryside and contributing to global warming' (DTLR, 2001a, p. 1).

Various government initiatives are in place that seek to provide an effective, safe and thriving public transport network that is essential for employment, education, commerce, industry, recreation/leisure, tourism and shopping. The Ten Year Transport Plan, *Transport 2010* (DETR, 2000a) has set out the government's proposals for the long-term development of the national transport infrastructure and explains

how the proposals address the objectives of the Integrated Transport Policy. The crucial importance of creating and maintaining 'safe' travel for the public is a primary objective:

'We want people to travel safely and to feel secure whether they are on foot or bicycle, in a car, on a train, or bus, at sea or on a plane' (DETR, 2000a, p. 75).

Furthermore, the government's Planning Policy Guidance on Transport (PPG 13) states that;

'Local authorities in partnership with the police should promote designs and layouts which are safe (both in terms of road safety and personal security) and take account of crime prevention and community safety considerations' (DETR, 2001a, p. 8).

In terms of transport mode, the car represents the dominant form of travel with railway travel representing less than 2% of all commuter journeys (see Table 1). It is a stated objective of the government to increase this proportion in order to reduce pollution and congestion.

The Regional Planning Guidance (RPG) includes a Regional Transport Strategy representing a means by which rail travel can be integrated into the planning process. Local authorities are also required to produce full local transport plans (LTPs) which have the potential to promote crime reduction in the way that transport strategies are designed and implemented. 'Integrated Transport' represents the cornerstone of LTPs and a crucial element within this is 'to make it easier and safer to link between different modes of transport' (DETR, 2000b). The government's 'Planning Out Crime' Circular (DOE, 1994) provides guidance on 'designing out crime' and the Crime and Disorder Act (1998) has effectively made crime prevention a joint responsibility between the police and local authorities who must now produce a crime audit in their development plans.

Hamilton and Jenkins (2000) highlight the problems concerned with aggregated travel data, particularly with regard to gender differences, which have only recently been subject to critical inspection. There are differences in both reasons for travelling and when travel is undertaken. Indeed, 'public transport offers something the car can not provide – conviviality, the mixing of people from different social and cultural backgrounds' (Salveson, p. 30).

Perceptions of Crime, Incivility & Nuisance on the Railways

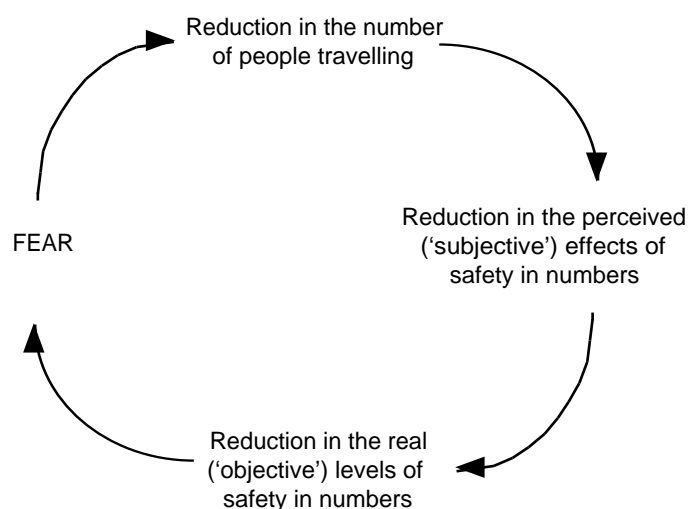
The railways' position within an integrated transport network is crucial. According to Salveson, (2000, p. 15) 'rail is coming back into its own as a safe, attractive and sustainable form of transport'. However, research into the criminogenic capacity of the railways is a relatively recent development, although there was significant concern and moral panic when the railways were initially constructed. The large numbers of 'navigators of the railways', often originating from other areas, were commonly linked to increased incidents of recorded crime. Ireland (1997, p. 71) discusses the development of the railways

Table 1. All land based journeys by mode & distance

Journeys	< 1 Mile (%)	> 1 Mile (%)	All Journeys (%)
Walk	80.5	8	26.3
Bicycle	1.5	1.6	1.6
Private Hire Bus	0	0.7	0.6
Car Driver	10.3	50.2	39.9
Car Passenger	6.5	27.5	22.1
Motorcycle	0	0.4	0.3
Other Private	0	0.1	0.2
Bus in London	0.4	1.7	1.3
Other Local Bus	0.4	5.8	4.4
Non-local Bus	0	0	0.2
LT Underground	0	0.9	0.7
National Rail	0	1.6	1.2
Taxi/minicab	0.4	1.4	1.2
Other Public	0	0.1	0.2
	100	100	100

Source: DTLR (2001) Focus on Personal Travel, pp. 15-16

Figure 1. The Cycle of Fear



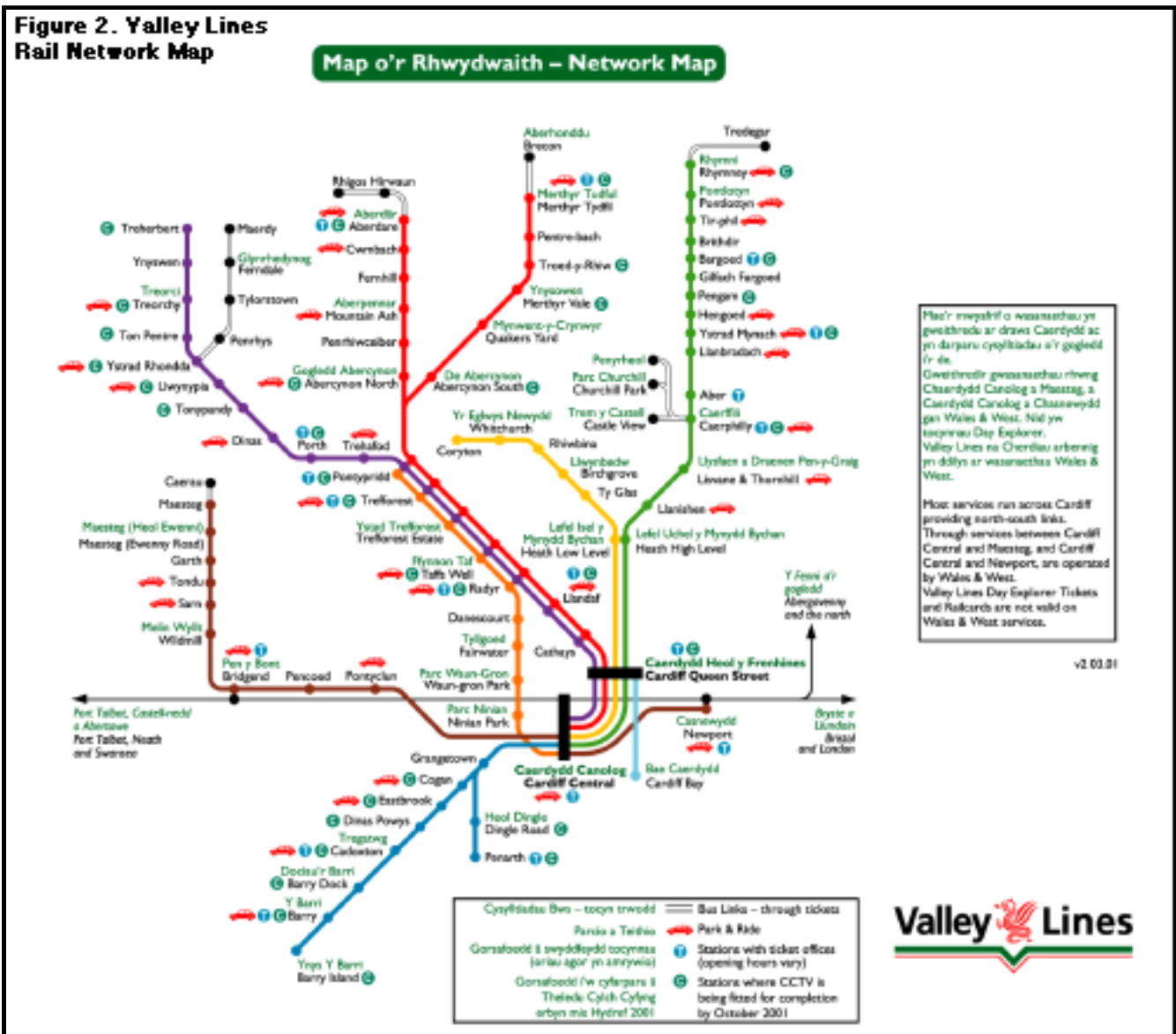
Source: Adapted from Carr & Spring (1993)

and of criminal opportunities arguing that ‘once the railways were in operation their buildings, materials and cargo (including passengers) became objects of crime sufficiently noticeable in the local records to merit attention’. Interestingly, Victorian crime fiction often focused upon the railways as a crime setting.

Much research has attempted to measure the impact of a variety of potential ‘solutions’ designed to reduce recorded crime rates in the railway environment. Studies in Australia have found that situational crime prevention measures can reduce incidents such as fare dodging and vandalism on public transport (Easteal & Wilson, 1991), while enhanced lighting (Grabosky & James, 1995) and reducing the number of train carriages (Urjadko, 1991) can reduce levels of fear. Carr & Spring (1993) studied the ‘Travel Safe’ programme in Victoria (Australia), and found that a broad range of situational measures reduced recorded crime and the fear of crime on public transport. Internationally, ‘good’ design was found to contribute to low crime on Hong Kong’s Mass Transit

System (Gaylord & Galliher, 1991) and in Washington’s Metro system (La Vigne, 1997). More uniformed staff have been found to enhance security awareness (Collins, 1993) although the ‘Guardian Angels’ were not found to reduce recorded crime on the subways in New York (Kenney, 1987) or on the underground in London (Webb & Laycock, 1992). More recently, high visibility foot patrols, in conjunction with Situational Crime Prevention, Crime Prevention Through Environmental Design and maintenance, have been found to be effective in reducing crime rates and fear of crime (Sullivan, 1996). A study by the Parliamentary Travelsafe Committee (1998) in Brisbane, (Australia), recommended a wide-range of measures to reduce crime and the fear of crime; including Crime Prevention Through Environmental Design audits at each station.

However, Eck (1997, p. 16) reviews various studies of public transport (Kenney, 1987; Poyner, 1988; Carr & Spring, 1993; La Vigne, 1997) and claims that despite the studies, little is known about the effectiveness of



such interventions. The variety of crimes, number of different settings in the transport system and the variety of victim types effectively means that; ‘we cannot therefore, identify with reasonable certainty, any specific tactic against specific crimes, that can be said to ‘work’ across similar settings in other cities’.

The impact of fear of crime can be significant and Carr and Spring (1993) provide a useful illustration (Figure 1) by which fear of crime may perpetuate itself.

The role of perceptions in understanding Crime Prevention Through Environmental Design is crucial, and has been highlighted with regard to residential housing (Tijerino, 1998; Ham-Rowbottom *et al.*, 1999; Cozens 2000; Cozens *et al.*, 2001). Regarding public transport, perceptions are no less important, as noted by the Legislative Assembly of Queensland (Australia): ‘the public’s perception of crime is an important determinant of people’s usage of public transport’ (Parliamentary Travelsafe Committee, 1998, p. 16).

The Valley Lines rail network is located in South Wales and serves the communities of the Rhondda, Cynon and Taff Valleys, in addition to stations in Cardiff, Barry and Penarth (see Figure 2).

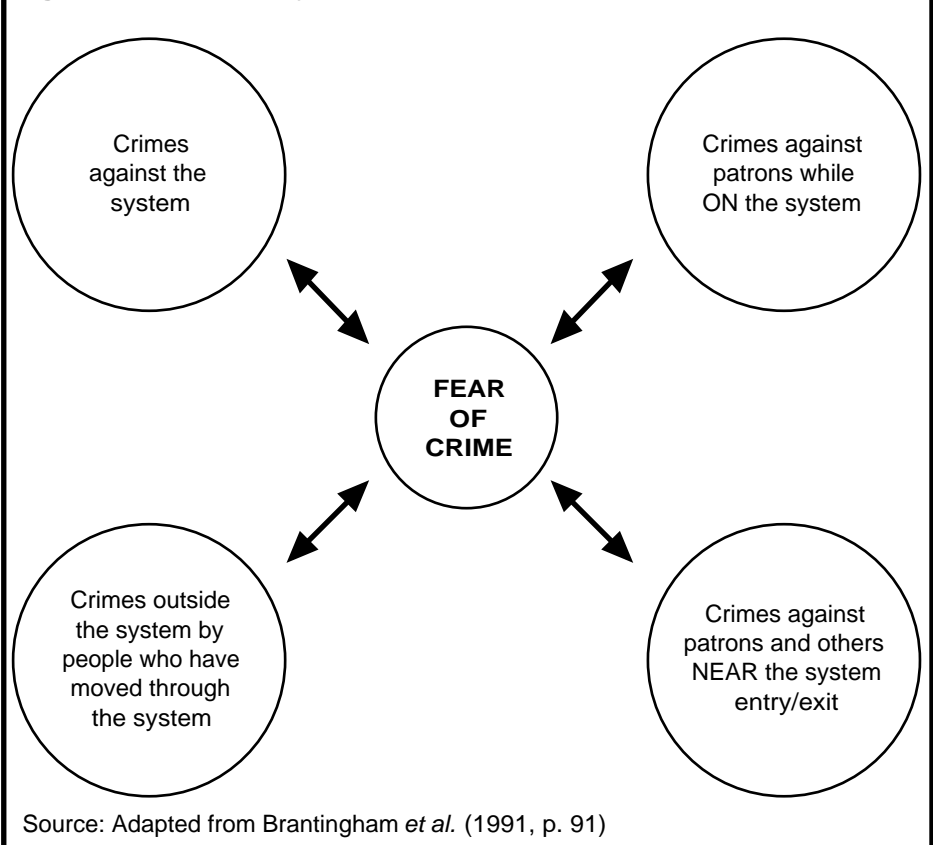
British Transport Police statistics reveal that 459 crimes were recorded on the Valley Lines’ 66 stations which operated 7.3 million journeys annually (2000–2001). These figures do not include crimes that may have occurred on the train itself and equates to 6.26 crimes per 100,000 journeys.

However, recorded crime statistics represent only a fraction of total crime according to the British Crime Survey (Mirlees-Black *et al.*, 1998) with the missing data representing the ‘dark figure of crime’ that may not be witnessed or discovered, or remains either unreported or unrecorded for a variety of complex reasons. The transport environment is no different, and crime probably remains significantly under-reported, an issue recognised by government: ‘a large proportion of crime on public transport is not reported’ (DETR, 1998b). Reluctance to delay one’s journey, a lack of confidence that the offender will be apprehended, the absence of someone to actually report the incident to, and the belief that a

reported incident will not be taken seriously are such examples. Victimisation surveys have developed to attempt to address this eventuality and the study of the fear of crime has recently emerged as an important alternative policy objective. Reported crime on the railways is low, however, the perception of crime has consistently been found to be significantly higher according to rail-users’ customer surveys.

Fear of crime in the residential environment can result in the withdrawal of the community and a reduction of crucial ‘eyes on the street’ that can actively contribute to policing a neighbourhood (Jacobs, 1961; Newman; 1973). Similarly, perceptions of crime on the railways will affect levels of usage. In a study of public transport in Canada, Brantingham *et al.*, (1991, p. 93) concluded that ‘Fear of crime is a matter of substantial concern for public transit authorities because it can deleteriously affect utilisation levels’. Measuring the impact of fear of crime upon non-use of the railways is highly problematic and remains largely unexplored. However, Crime Concern with Transport & Travel Research (1997) found that 43% of women and 18% of men felt that rail travel in the UK was ‘unsafe’ and suggested that there might be as much as a 15% increase in all train journeys if a range of personal security measures were implemented. They argue that ‘there is significant potential to increase the use of public transport by making passengers feel safer’

Figure 3. Transport Systems & Crime



Source: Adapted from Brantingham *et al.* (1991, p. 91)

(Crime Concern and Transport & Travel Research, 1997, p. 22). They also studied locations where passengers expressed higher levels of fear and discovered that 'walking to and from transport infrastructure and time spent waiting are felt to be the most unsafe' (*ibid*, p. 32).

Environmental Criminology

The study of crime on the railways has radically changed from the moral panics of the nineteenth century which concentrated on the criminality of those responsible for its construction. The focus of analysis has also shifted from the study of the offender to the study of the crime site. The relatively recent development of environmental criminology, which focuses upon the geographical dimensions to crime, has resulted in the study of a wide-range of environments. Indeed, the work of Brantingham and Brantingham (1981; 1991) among others, is central to environmental criminology. Brantingham *et al.*, (1991) identify four methods by which transit systems can shape crime problems in the city and argue that studying these will provide a more complete understanding of the relationship between transport systems and crime. Figure 3. Illustrates these ideas.

Brantingham *et al.*, (1991, p. 91) investigated the complex relationship between modes of travel and criminality and opine that 'the ways in which people move around the city should affect where crimes occur, when crimes occur, and, to a certain extent, what crimes occur'. They cite five means by which the mode of transport can affect criminal opportunities:

1. Different transport modes manage people in different ways;
2. Modes of travel shape different travel experiences;
3. Different modes of transport cluster destinations differently;
4. Travel paths are clustered differently; and
5. Different modes of travel shape the type of crime by creating different opportunity sets for offenders.

Different transport modes manage people in different ways

Car travel is predominantly 'private', involves small groups who are insulated and usually acquainted. Public transport involves large numbers of strangers, held together for discrete periods of time. Private car users cluster in socially/demographically similar groups while public transport produces clusters which are more diverse and contrasted. Crime risk on public transport is apparent at point of origin, the journey itself and at the destination, and offenders therefore have greater numbers of potential victims from which to select.

Modes of travel shape different travel experiences

The car is versatile and flexible while public

transport has fixed schedules, clustering people at specific times, with varying densities. This, therefore, presents predictable time frames where risk can be perceived to be higher or lower by both potential offenders and their victims.

Different modes of transport cluster destinations differently

Private car users can move between an infinite number of potential destinations, while public transport users must enter and exit the system at a limited number of origins and destinations. Victims therefore cluster at predictable locations and facilitate selection by potential offenders (Angel, 1968). Indeed, half of all bus-related crime was found to occur at the bus station or whilst in its immediate proximity (Levine & Wachs, 1986).

Travel paths are clustered differently

The private car user can use many travel paths between destinations and thus awareness spaces can be shaped accordingly. Public transport travel paths are defined, and entrance to these pathways are restricted, more so in the case of the 'closed' system of the underground, and to a lesser degree, the railways. Crimes committed by those who use public transport and their victims will therefore be more highly concentrated in space than crimes associated with car users.

Different modes of travel shape the type of crime by creating different opportunity sets for offenders

For car travel, offenders must search for suitable and (preferably) unguarded targets with rewards that are capable of being removed and easily transported or placed in the boot of a car for example (not so readily executed on public transport). However, the car can provide clustered targets in the form of car parks and residential parking areas. Public transport tends to facilitate personal crimes where target density is crucial (e.g. pick-pocketing and mugging) and it generates high volumes of crimes against the system itself (unpaid fares, vandalism and graffiti) 'as a normal by-product of handling very large volumes of people over time' (Brantingham *et al.*, 1991, p. 93). They note that public transport also mixes people of different backgrounds and includes 'demographically high-crime-risk people' such as teenagers, unattached males and low socio-economic status people. They conclude (*ibid.*) that 'transit shapes crime patterns of the city by moving large proportions of high-risk populations around the city along a limited number of paths and depositing them at a limited number of destinations'.

This study is concerned with investigating the first three issues: crimes against the system (e.g. vandalism and graffiti), crimes against people in transit (specifically those waiting on the platform/in the

shelter) and crimes against users and others on the station approaches. The study utilises elements of Situational Crime Prevention and Crime Prevention Through Environmental Design in its approach. These broadly sympathetic theories argue that the physical environment can encourage or discourage opportunities for crime by its design and management. Optimising opportunities for surveillance, clearly defining boundaries (and preferred use within the space) and creating and maintaining a positive image are basic elements to the theory. This argues that a potential offender may be discouraged from offending by the fact that they are more visible to 'law-abiding' others and therefore more at risk of apprehension. Situational Crime Prevention and Crime Prevention Through Environmental Design assume that the motivated opportunistic offender makes a 'rational choice' (Clarke, 1992) in any decision to offend, often within the confines of their daily 'routine activities' (Felson, 1994). In order to reduce criminal opportunities Situational Crime Prevention seeks to;

- reduce the rewards on offer;
- increase the effort required to commit a crime;
- increase the risk involved in offending; and
- reduce the excuses that may be utilised to explain offending.

The government recognises the crucial role of design in facilitating or discouraging criminality. The 'Planning Out Crime' Circular (DOE, 1994), various Planning Policy Guidance notes and the Crime and Disorder Act (1998) illustrate this commitment. Indeed, it has been asserted that 'there is now an established link both between design and crime and

the reduction of fear' (DETR, 1998a).

In the U.K such thinking underpins current government policy in the form of the Secured By Design initiative. This is a police initiative, launched in 1989, which accredits appropriately designed new-build housing developments with the 'Secured By Design' logo. Many insurance companies offer reductions on premiums for such properties, which have been found to significantly reduce recorded crime (Armitage, 1999; Brown, 1999; Pascoe, 1999). The scheme is now obligatory for all new social housing in Wales. Such housing must meet the environmental design criteria of optimising surveillance and territoriality and image, as well as a range of target-hardening mechanisms (accredited according to a range of British Standards and approved suppliers of windows, doors and locks). Further developments include the Secured Car Parks, Secured Caravan Parks and the Secured Stations initiatives.

The Secured Stations Scheme

The Secured Stations scheme (operated jointly by Crime Concern and the British Transport Police) has currently accredited some ninety stations in the U.K and represents:

'... an opportunity for Britain's rail companies to improve security at their stations and display to customers their desire to reduce crime' (DETR, 1998a, p. 1).

It acknowledges that the fabric of many stations is antiquated, decayed and not designed with personal safety in mind and that levels of security can be



Figure 4. Radyr Railway Station

improved through physical design measures, management practices and procedures. Crucially, the monitoring and management of crime and the investigation of perceptions of passengers are central elements to this approach. The design recommendations are not prescriptive, and should be applied according to localised characteristics. To ascertain the appropriate implementation of measures, site-specific surveys are essential. Significantly, the accreditation can only be given to stations that exhibit a threshold level of reported crime as a percentage of levels of passenger throughput – ignoring large numbers of stations with either high crime rates or low throughput levels – or both. Indeed, although the number of accredited stations continues to rise and the government intends to increase this number (DETR, 2000a), these currently represent only 3% of Britain’s 2500 railway stations (Lashmar, 2001). Furthermore, no study has yet evaluated the effectiveness of the scheme in actually reducing recorded crime rates or the occurrence of nuisance activities or incivilities.

Customer Satisfaction Surveys can provide an indication of a general satisfaction in terms of security measures but make only a limited contribution to probing customer perceptions of specific stations and specific design and management measures that might be adopted to improve levels of personal safety. Interestingly, Crime Concern and Transport & Travel Research (1997) carried out an extensive study of safety and crime on public transport. They analysed a range of public transport stations at five locations by escorting respondents through the journey itself and probed what aspects of public transport made them feel unsafe – and what measures might enhance security. They found that a broad range of measures (more staff, improved levels of lighting, CCTV, help points,

reliable and up to date information and a clean station) can enhance perceptions of personal security for a wide variety of public transport settings.

The Study

This paper presents the results from a preliminary study that probed both levels of fear of crime and possible modifications to the physical fabric that were perceived to improve levels of personal safety for stations on the Valley Lines network in South Wales. 1,000 rail users were interviewed on the network during the biannual Customer Satisfaction Survey. However, several questions specifically probed the location of fear of crime in the station environment and the perceived effectiveness of a range of improvements. Figure 4 shows Radyr station, one of those investigated in the preliminary study.

This paper argues that the perception of crime at the railway station and in its immediate vicinity can have a significant impact on levels of patronage and that situational crime prevention measures can be utilised to improve levels of personal security and rail usage. It argues that although some crime prevention measures may be universally applicable in theory, a station-specific investigation is necessary to more effectively investigate the location-specific design characteristics that affect perceptions of crime and the fear of crime among rail users.

Table 2. Feeling ‘Unsafe’ During Daytime (All Stations)

Station location	% of respondents who stated that they felt ‘unsafe’
Approaching the station	4
Waiting inside the platform shelter	7
Waiting on the platform	7
Using the station car park	10

Source: Pengwyn Services, (2001)

Table 3. Feeling ‘Unsafe’ on the Railways

% of respondents who stated that they felt ‘unsafe’	Approaching the station	Waiting inside the platform shelter	Waiting on the platform	Using the station car park
Station				
Bargoed	0	0	0	0
Barry Dock	29	39	36	38
Barry Town	2	6	6	8
Cadoxton	6	25	13	38
Cardiff Queen Street	4	6	5	10
Cathays	11	11	11	7
Coryton	6	11	11	0
Hengoed	0	0	6	6
Llandaff	0	0	0	0
Penarth	0	15	17	0
Pengam	0	4	4	9
Pontypridd	0	0	6	5
Radyr	0	0	0	5
Trefforest	0	0	0	7
Ystrad Mynach	8	12	12	21

Source: Pengwyn Services, (2001)

When the data from these questions is aggregated, perceptions of safety on Valley Lines stations was relatively high, as Table 2 reveals.

A location-specific approach therefore reveals some limited variation in perceptions of personal security in and around the railway station environment. However, the disaggregation of the statistics for specific stations demonstrates the value of investigating each station. For example of the respondents who used Bargoed and Llandaff stations, none felt 'unsafe' while 36%, 20% and 13% of respondent felt 'unsafe' when using Barry Dock, Cadoxton and Ystrad Mynach stations respectively. Table 3 presents this data in terms of specific station locations.

In general, it was anticipated that staffed stations with higher-throughput levels, CCTV, clear signage and electronic information (visual and audio) would be consistently regarded as being safer than stations with lower levels of patronage, no CCTV, and limited provision of signage and information.

More specifically, when approaching the station, less than 5% of respondents stated that they would feel 'unsafe' at Barry Town station (2%) and Cardiff Queen Street station (4%) while none at all felt 'unsafe' using stations such as Bargoed, Hengoed, Llandaff, Penarth, Pengam, Pontypridd, Radyr and Trefforest. However, this was not the case at several other stations, where more respondents stated they felt 'unsafe'. These included the stations at Barry Dock (29%) Cathays (11%), Ystrad Mynach (8%), and Cadoxton (6%) and Coryton (6%). Investigating the approach routes to each railway station seems also to represent an area for further study.

When using the station platform, the percentage of respondents who stated that they would feel 'unsafe' was highest for those using stations such as Barry Docks (36%), Penarth (17%), Cadoxton (13%), Ystrad Mynach (12%), Cathays (11%) and Coryton (11%). Feeling 'unsafe' was less pronounced at Barry Town (6%), Hengoed (6%), Pontypridd (6%), Cardiff Queen Street (5%) and Pengam (4%) stations. Furthermore, no respondents stated that they felt 'unsafe' at the stations at Bargoed (0%), Llandaff (0%), Radyr (0%) or Trefforest (0%).

While waiting in the shelter, more respondents felt 'unsafe' using stations such as Barry Docks (39%), Cadoxton (25%), Penarth (15%), Ystrad Mynach (12%), Cathays (11%), Coryton (11%), Barry Town (6%), Cardiff Queen Street (6%) and Pengam (4%). No respondents stated that they would feel 'unsafe' using the platform shelters on the stations at Bargoed (0%), Hengoed (0%), Llandaff

(0%), Pontypridd (0%), Radyr (0%) and Trefforest (0%).

Some respondents felt 'unsafe' when using the car parks, particular at stations such as Barry Dock (38%), Cadoxton (38%) and Ystrad Mynach (21%). However, feeling 'unsafe' was less marked at the following stations: Cardiff Queen Street (10%), Pengam (9%), Barry Town (8%), Cathays (7%), Trefforest, (7%), Hengoed (6%), Pontypridd (5%) and Radyr (5%), and not evident at all at Bargoed (0%), Coryton (0%), Llandaff (0%) or Penarth (0%) stations. If passengers feel 'unsafe' using the car park – they may choose to stay in the relative safety of their cars and discontinue patronage on the railways.

Identifying and mapping the intricacies of the station environment can contribute to understanding perceptions of crime, anxiety and fear of crime is a crucial issue. Explaining why these particular locations at specific stations are perceived to be more 'unsafe' than others is an infinitely more complex task – but one that may yield major dividends.

The respondents were also asked to evaluate the perceived effectiveness of a range of improvements. Table 4 presents the percentage of respondents who stated that they would feel safer if specific measures were undertaken to improve the station and presents the average data for all sixty-six Valley Line stations.

Crucially, these perceptions will vary across stations, and fifteen stations were selected for further analysis. These were chosen on the basis of a minimum number of respondents using each station in order to maintain the integrity of the data. All respondents (100%) felt that more rail staff would improve safety at Barry Dock and Barry Town stations, while this was less so at the stations at Coryton (77%) and Pengam (74%). The effectiveness of more passengers ranged from 63% and 65% at Cadoxton and Llandaff stations to 91% at Trefforest, 92% at Barry Dock and 93% at Cathays stations. Improved visibility was seen to be particularly effective at stations such as Barry Town (100%), Hengoed (100%), Cadoxton (94%), Pengam (93%), Trefforest (92%), Barry Dock (92%) and Radyr (90%) though to a lesser degree at Llandaff (71%) and Coryton and Pontypridd stations (78%).

Table 4. Perceived effectiveness of improvements (all stations)

Improvement	% of respondents who stated that they would feel safer
Improved visibility (cctv, lighting, transparent shelters)	87
More rail staff in attendance	87
Reliable information system	81
More passengers on the station	77
A cleaner environment	63

Source: Pengwyn Services, (2001)

In terms of a cleaner environment, respondents using Hengoed and Coryton stations perceived a particular benefit from this improvement (75%). This measure was seen to be less beneficial by those using the stations at both Cathays (50%) and Pontypridd (48%). Finally, more reliable train information was perceived to improve feelings of safety in particular, by users of stations at Barry Dock (92%), Cathays and Llandaff (89%) Ystrad Mynach (87%), Barry Town (87%) and Pengam (86%) and to a lesser extent by users of stations such as Penarth (69%), Radyr (70%) and Bargoed and Pontypridd (73%).

It was anticipated that staffed stations that are well-used, integrated or overlooked by other activities and which operate CCTV and real-time, electronic information (audio and visual) would be regarded as being 'safer' in general terms, and this is confirmed. However, both fear of crime and the effectiveness of potential improvements varied considerably from station to station and within the territory of each station itself. In an attempt to probe the impact of a range of situational measures, each of the 15 stations was scored according to whether certain design elements were present or absent. A simple binary system of scoring was used whereby the presence of a designated measure would receive a score of '1', while the absence of such a measure would score '0'. This created a Situational Index (SI) for each station, whereby a score of 10 would represent a 'safe' image, while a score of 0 indicates an 'unsafe' image. The situational measures employed are listed in Box 1.

This exercise was carried out with the assistance of a British Transport Police Crime Prevention Officer. Table 5 illustrates this Situational Index for fifteen stations. There appears to be a complex relationship between feelings of safety and the SI score for each station. Locations with higher SI scores were perceived to be predominantly 'safer' than those stations with a low SI score.

Those stations perceived to be particularly 'unsafe' include Barry Docks, Cadoxton, Cathays and Ystrad Mynach and all had relatively low SI scores. Recorded crime data for each station, however, did not appear to correlate with the Situational Index. Furthermore, stations with higher SI scores (Bargoed, Barry Town, Cardiff Queen Street, Pontypridd, Trefforest and Radyr) were perceived to be less 'unsafe'. Significantly, Coryton and Hengoed

stations both scored low in terms of the SI, but were not perceived to be particularly 'unsafe'. It is evident that the responses can be divided into three categories – those stations perceived as relatively highly 'unsafe' (scores of 20% or above), those that have medium scores (10-19%), and stations where lack of safety was perceived to be relatively low (0-9%).

Conclusion

This study suggests that although general principles underpinning Crime Prevention Through Environmental Design and Situational Crime Prevention can contribute significantly to crime reduction on the railways, there appears to be considerable value in studying the unique characteristics of individual stations to ascertain what specific concerns exist and how best to assess and implement appropriate measures.

Furthermore, the perception of discrete user groups (such as males, females, the elderly, rail staff/British Transport Police) may well provide contrasting perspectives in relation to how the railway environment is decoded. Indeed, offenders may well be

Box 1. Situational measurement of station 'safety'

- A staffed ticket office
- Overlooking activities (observation)
- CCTV
- Help point
- Public address
- Electronic/real-time information
- High throughput levels (100,000)
- Lack of visual obstruction by extreme embankment or siding
- Positive Image (lack of signs of long-term vandalism)
- Access control

Table 5. The Situational Index (SI) & Recorded Crime at 15 selected stations on the Valley Lines network

Station	SI	% Respondents stating that they felt 'Unsafe'	BTP recorded Crimes per 100,000 journeys
Bargoed	9	0	4.6
Barry Dock	4	36	0.8
Barry Town	8	6	2.1
Cadoxton	6	20	4.9
Cardiff Queen Street	9	6	1.7
Cathays	4	10	2.7
Coryton	3	7	2.5
Hengoed	2	3	9.6
Llandaff	6	0	2.8
Penarth	6	0	2.3
Pengam	6	4	1.4
Pontypridd	8	3	2.8
Radyr	9	1	13.3
Trefforest	7	2	0.5
Ystrad Mynach	5	13	8.7

Source: Pengwyn Services, (2001)

able to uniquely predict, interpret and capitalise upon such anxiety. In consideration of the limitations inherent within recorded crime statistics, the 'objective' approach does not adequately reflect either crime or the fear of crime. Although perceptions may be diverse, difficult to access and to rationally aggregate, they are nonetheless 'real' and will contribute towards broadening our understanding of crime and the fear of crime in the railway environment.

A more extensive and location-specific study of a variety of stations, broadly representative of those found on the Valley Lines, is currently being undertaken at the University of Glamorgan's Suzy Lamplugh Trust Research Institute. This seeks to further explore perceptions of crime and nuisance on a range of characteristic Valley Lines stations and their immediate access routes. It is an objective to produce a methodology that can usefully be transferred to any station environment to measure, monitor and potentially reduce perceptions of crime and nuisance. This may then be utilised alongside existing strategies that respond to 'objective' crime statistics and contemporary assumptions related to crime on 'the umbilical cord of the railways'. Indeed, failure to consider the perceptual dimension to crime and design may result in the adoption of policies that continue to operate in a partial vacuum.

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More about 'twisted logic' ... the position of 'soft people' from an upside-down world of 'road safety' ideology

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Abstract

Recent articles (in Volume 7, Numbers 1 & 2) have addressed issues 'about' road safety as it is currently constructed rather than 'for' road safety as it might be constructed to reduce road danger and encourage sustainable transport. By reference to these previous articles, this article raises issues which it is argued are part of the 'road safety' ideology which effectively prevents safety of non-motorised road users being valued by 'road safety' authorities. The article seeks to examine why current 'road safety' cannot provide the setting required for a 'safe' transport system without both safety and convenience for all road users.

Keywords

Speed, safety, management, responsibility, non-motorised road users, urban planning

Introduction

In the Editorial to Volume 7, Number 2, it is suggested that 'solving transport problems depends on political will and a strong sense of what is in the public interest'. While not disputing these, perhaps the most difficult barrier to overcome is resistance to challenge, let alone change, established norms, even when policy supports change (Kinnersly, 2001). Seemingly long ago, Jonathon Porritt argued that '... they worry about all the changes that are needed. They know we can't go on in the same way, but they don't know what to do about it' (Porritt, 1991, 46).

While Porritt was talking about parents and the changing view of the environment, the same could be said about those responsible for road safety and management of the roads. There is one exception and that is that 'we' and 'they' do know what to do about it. The problem is perhaps that there are too many solutions. If that is the problem, then endless policy debates will not help. As the Dutch appear to have recognised and pioneered, actual trials on a large and long scale appear to assist in learning and confirming what to do and especially so when there are many potential solutions. As we already have access to many previous trials in many different contexts, the challenge is 'doing it'. However, the policy settings of such projects must be very clear and it is here where

the 'twisted logic' (Davis, 2001) is so damaging. If there is a problem, it is whether those responsible for managing the urban road environment are willing to pursue a 'zero road toll' ... that is the challenge (Yeates, 2001a).

Defining the problem

Davis (2001) provides a wide range of examples in which to set the 'road safety' debate. Taking the example of school escort journeys, and the outcomes of the perception and perhaps the reality of the safety of driving children to school (Hillman, 2001), how can this 'twisted logic' be overcome, in fact reversed, as it becomes more clear that driving may in fact be more dangerous than walking or cycling? Do those who defend the status quo then raise the issue of 'stranger danger' only to be confronted with increasing evidence that primarily the real threat is not so much from strangers as from acquaintances? Arguably, the 'safe routes to school' approach 'trials' and made widely known from the experience in Denmark has been shown to work by recent projects in the UK including those by Sustrans. The recent Swedish Vision Zero strategy, which aims to achieve a zero road toll addresses, in particular, the vulnerable road users, i.e. the 'soft people' in urban areas (Yeates, 2001a).

However, in Australia, the 'twisted logic' of road safety still results in reluctance to reduce the required 60 km/h urban speed limit past the main entry of schools in continued deference to the supposed need for consistency for and dominance by motorists. 'Safe routes to schools' has had an upside-down change in ideology such that in Queensland for example, projects result in safer parking areas for escorts and bus stops for children using school buses, not increased walking and cycling. Of course, 'road safety' ideology could support a changed road and speed environment consistently applied around school road environments to promote walking and cycling and reduce use of cars or buses with success measured by increased walking and cycling exposure with reduced serious injury and death (Yeates, 2001b).

It is clear then, at least as far as children and their healthy development is concerned, that 'Homo Motorist' (Davis, 2001) is a problem, and children the

victims. However, another of the problems of 'road safety' ideology is the tendency to resort to big numbers when citing success (e.g. we only kill 1600 people per annum in Australia) but then treat individual groups as problems (e.g. cyclists not wearing helmets). Arguably an urban environment which provides equity of health, access and safety must be safe for all. Those with access disabilities, whether through young or old age, temporary, permanent or other specific disability, must be included. Interestingly, a city that is 'safe + convenient' (Yeates, 2000) for people of all ages and abilities walking or using mobility aids is safe for cycling (Yeates, 1999). Graz in Austria, the first city in the world with a 30 km/h (default) speed limit, provides a useful exemplar.

However, while precincts in many places display these characteristics locally, why are they not more widespread? The answer appears to be that road function hierarchies devised to optimise motorised traffic require high speed (50–60 km/h) roads far more closely spaced than the comfortable 'easy' walking (400 m – 600 m) and cycling (1000 m – 3000 m) distances thereby creating mandated barriers to walking and cycling while ensuring priority for through traffic.

Analysis of Western Australia's Liveable Neighbourhoods (Jones, 2001) from this perspective shows the 'twisted logic' of road safety ideology has permeated this otherwise exemplary housing policy in an Australian context. While the concept of encouraging walking and cycling is to be strongly supported, comparison with Houten (an exemplary walking and cycling friendly new town in the Netherlands) shows the Australian model, whilst exemplary in other respects, fails to address both the priority given to high speed (50–60 km/h or higher) traffic within desirable 'easy' walking and cycling distances and high speed limits on cycling streets (p. 42). The 'twisted logic' can easily be transferred, in this case down under, allowing an implicit claim that Liveable Neighbourhoods is substantially different from '(t)he spatial layout of the (1960s) suburbs (which) was very responsive to ... modern transport engineering principles to cater for a rapid increase in car ownership and usages' (Jones, 2001).

The undeniable utility of bicycles in all their various forms and including those for people with disabilities and those who use wheelchairs is rarely compared to walking as a mode of transport and this is a failing of Liveable Neighbourhoods. The comparable distances or times travelled by bicycle would result in a typical bus stop being spaced at up to a kilometre or more apart, clearly far too far for walkability and disabled accessibility, but an obvious challenge to the provision of such frequent main road barriers. Rather than then 'adjusting' the urban model to include for both walking and cycling, urban models such as Liveable Neighbourhoods tend to be adjusted

for walking, bus and high speed driving. The only 'safe' space for cycling then becomes the walking areas whereas in Graz with its 30 km/h streets or Houten with its cycling and pedestrian priority provided by physical layout, space is deliberately provided for – and at the scale of cycling as well as walking. Not surprisingly, these examples demonstrate high rates of use of walking, cycling and disabled access including to public transport. Therefore it can be argued old cities (Graz) or new ones (Houten) can be re-adapted for walking and cycling ... that is the challenge (Yeates, 2001a).

At face value, the problem remains how to convert old and new cities for walking and cycling priority when in fact that is relatively easy. The problem is to reduce the dominance and priority of cars such that roads are safe for cyclists to use and also safe for pedestrians to cross, i.e. convenient for them, not for motorists. The example of walking in Adelaide (Allan, 2001) provides an Australian central city example where again, the 'barriers' of mandated 60 km/h speed limits result in high speed traffic management. Such institutional 'barriers' encourage and provide priority for motorised traffic, ensuring 'pedestrian and cyclist friendly' management strategies, however desirable, cannot be utilised unless speed is reduced. The fact is that cities have not changed in a physical or spatial sense so much as they have been changed by how they are managed.

Management can be changed. The low traffic speed limit in Basle in Switzerland, for example, allows pedestrian call buttons at inner city traffic lights which seem to give pedestrians priority, second only to trams. If cars are coming and a pedestrian presses the button, the lights change and the cars wait. In the case of Adelaide for walking, it is the unchallenged priority given to motorised traffic which makes walking both slow, with long waits for traffic lights, and dangerous, if people choose to take direct routes rather than the proffered crossings. In this context, the priority of the walker has almost been removed. Yet with little or no change to the environment, that can be changed, incrementally over time, to re-adapt the environment to one where it is safe to cross anywhere and also safe to cycle on the roads with cars, as in Basle.

Adelaide by historical fate and design is without doubt the most logical site for Australia's first 'pedestrian friendly' or 'pedestrian priority' capital city utilising primarily speed reduction supported by physical speed control where necessary. Accordingly, it is the number one target for implementation of a 40 km/h or 30 km/h speed limit for the whole square mile. Interestingly, given that such slow traffic is almost inevitable in major centres, two questions arise:

1. why are speed limits so high when the usual speed is so much slower, and
2. why do advocates for safer walking and cycling appear increasingly marginalised? (Gaffron, 2001).

Answers to the first include the supposed legal risk of inappropriately low speed limits giving pedestrians and cyclists a false sense of safety and security yet that implies, if not confirms, that road authorities know the higher speed limits are dangerous and are not prepared to address that issue. The second is illustrated by the problem that occurs when it is assumed that the needs of cyclists and pedestrians can be addressed by provision of separated facilities e.g. bike lanes or wide kerb lanes for cyclists in higher speed road environments (Jones, 2001, 42) or shared facilities where, because the road is too dangerous, cyclists and pedestrians are forced into conflict with each other (CTC, 2000; Gaffron, 2001).

Whether in Adelaide's CBD or in the new Liveable Neighbourhoods, traffic engineering requires that certain 'road safety' principles be applied. Foremost amongst these is the concept that fast traffic must be kept moving smoothly as crash risk rises dramatically with unexpected stoppages. Whether it is a logical outcome of high speed travel which has become 'road safety' ideology is debatable but it is an ideology which excludes 'soft people' as road users.

The idea that, while still maintaining high speed (50–60 km/h) urban traffic, walkability can be improved for example by instant response traffic lights (Allan, 2001, 50) or cycling safely can be provided by means of bike lanes (Jones, 2001, 42), is a direct outcome of 'road safety' ideology which supports fast car travel, without consideration of the 'road safety' of people walking or cycling. This 'support' is implicit while in debate but is very explicit when constructed. In the case of responsive traffic lights, the outcome is well assessed by the cycle or waiting time and the actual 'green' time given to pedestrians resulting in vast differences in 'convenience' provided for elderly pedestrians, as illustrated by Seifried's fast and patient grandmothers (Whitelegg, 1993, 84). The 'twisted logic' of uncritically accepted 'road safety' ideology can too easily result in good intentions concealing increased road danger and reduced convenience.

Separation or integration?

Clearly, while this is an old question, it remains unresolved, and arguably, one of the reasons it remains unresolved is the failure of those who manage the road systems to manage them to include the 'safety + convenience' of pedestrians and cyclists. Again, the 'twisted logic' of 'road safety' ideology can be seen at work, when it is argued that including pedestrians and cyclists would make the road system unsafe and that

slowing the traffic to make the roads safer for pedestrians and cyclists is therefore unacceptable. Policies and projects which, either implicitly (by not addressing this issue) or explicitly (by implying or suggesting it is not a problem) not only support continued car dominance and priority, also create a false expectation that walking, cycling and fast driving can continue to co-exist. While this may be true for fit, experienced 'road warrior' cyclists and their walking equivalents, 'road safety' education programmes (the marketing of the ideology) emphasise how dangerous such roads are for vulnerable road users. Meanwhile, road designers and urban planners fail to provide for walking and cycling, thus failing to provide a high level of 'safety + convenience' for all people.

The result is that many facilities that are provided on roads, of which narrow bike lanes in threatening conditions on high volume, high speed (50–60 km/h or higher) urban arterial roads are a good example, are unlikely to encourage new cyclists and very unlikely to allow parents to encourage their children to use such facilities as 'safe routes to school'. Little wonder then that the 'separation or integration' question remains problematic and 'safe routes to school' rarely if ever use such facilities, yet another example of the 'twisted logic'. Arguably 'road safety' concerns are one of the major reasons why targets for increased cycling and walking appear unachievable in those jurisdictions where road authorities require roads and road speeds to be managed to suit motorists ... but not the vulnerable, 'soft' road users.

Given such road environments, it is not surprising that cyclists take refuge on footpaths and footways, seemingly, and too easily assumed to be, in support of not cycling on roads. Little wonder then that, despite the desirability of, and preference for, cycling on suitable roads rather than sharing with pedestrians (Yeates, 1999; CTC, 2000), road authorities continue to provide high speed urban roads and promote expensive off-road or separated facilities such as bike lanes and shared bike-pedestrian paths rather than reduce speed limits on the roads.

Clearly, if any increase in walking and cycling is to occur and be useful, it must involve new cyclists and new pedestrians who use their cars less, and if there are more people using their cars less, there is capacity on the roads to slow the remaining traffic, effectively sharing the road, as occurs in congested areas in many of the cities with high cycling use. It is of great concern that increased interest in walking and cycling appears to be resulting in increased conflict between users of these modes (CTC, 2000; Gaffron, 2001). Arguably this is an inevitable outcome while road authorities and urban planners will not recognise the need to manage, and where then found necessary, modify or design road

environments more for 'soft people' and less for fast traffic (Yeates, 2001c). Their success in so doing is assessable against national targets to increase walking and cycling and reduce car use while reducing all road injuries.

From this perspective, it seems, and arguably is, imperative that cycling facilities utilise road space that is presently dominated by cars. This will mean in many cases that 'sharing the road' with buses or trams using existing road space is also desirable as has been demonstrated in many places (e.g. Edinburgh, Amsterdam, Graz, Basle, Freiburg) where the experience and knowledge of both providers and users has been applied. As demonstrated by the rapid spread of 30 km/h speed limits in German, Dutch and other cities and towns and as best demonstrated by the citywide speed limit in Graz, these outcomes can most easily be achieved by endorsing increased use of cycling and walking on existing roads that then require little change as motorists increasingly choose walking and cycling as beneficial to them.

Conclusion

While the 'twisted logic' of 'road safety' ideology remains unchallenged, many new proposals can be viewed as uncritically supportive of continued and therefore increased car dominance of urban areas. Thus, while arguably deserving of strong support for other reasons, these proposals must be challenged as unhelpful, if not contrary to current policies and targets which seek increased walking and cycling and less car use. While there will always be utility in both on and off road facilities to suit specific circumstances, the only useful means of increasing cycling and walking and reducing motoring without increasing conflict between pedestrians and cyclists is to allow, encourage and endorse cyclists use of the roads. As this requires lower speed traffic which in itself is an incentive to walking and cycling and a disincentive to motorised transport, yet requires little expenditure on infrastructure compared with separated facilities, campaigns such as the Slower Speed Initiative in the UK and the 'Safe Urban Speedlimit' in Australia (BFA, 1996) must be supported, not motorists continued dominance and priority.

Unfortunately, the 'twisted logic' of 'road safety' ideology, if unchallenged, will continue to result in tempting separate facilities while the roads remain unsafe for all. As an example of this problem, Australian road safety and road management authorities promote 'Share the Road' campaigns while all urban roads have 60 – 70 km/h or higher speed limits and in Victoria, the recently reduced residential street speed limit of 50 km/h is promoted with the slogan 'Think safe. Think 50', an interesting contrast to the '50 is too fast' campaigns in the Netherlands over 20 years ago which contributed to

widespread adoption of 30 km/h in residential and other 'soft people' places both there and elsewhere in Europe. Interesting too to contemplate the campaign '20 for London' (20 mph = 30 km/h) when advocates for walking in Adelaide make no mention of the need to reduce the current 60 km/h speed limits to 30 or at most, 40 km/h. If the issue of car dominance supported by priority necessitated by high speed limits is not addressed, ideas of integrated transport policies achieving the desired targets in urban areas citywide are in general doomed to failure, if for no other reason than that people will continue to use their cars because cars will have priority ... not 'soft people'.

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Road Traffic Congestion: The extent of the problem

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Abstract

This paper considers a variety of data on the problem of congestion in Europe. Definitions, measures with time loss and different critics, and alternative analysis are presented so that a differentiated picture may be derived. The paper also explores the existing dynamics between congestion relative to road use and general traffic effects.

Congestion is a serious problem, localised in specific places and times, especially in cities at peak hours. However, the reality appears otherwise when we consider the problem on a larger scale and when we deal with the dynamics of road use. In general, congestion is considered to be less costly than it was thought previously and its impact is relatively negligible when compared with other transport consequences.

Keywords

Congestion, costs, externalities, internalities, traffic

Introduction

Apocalyptic visions of traffic congestion have been predicted on many occasions: nightmares of constant stop-go traffic, traffic jams and gridlock making travel impossible. While this vision has not become reality, congestion is generally perceived as an alarming problem, as traffic jams are reported daily from 'the eye in the sky' and it is claimed that the costs of congestion are enormous (AHUA, 1999). Faller reports, for example, speeds of 15 km/h for 2 hours, 200 days per year on the A23 highway in Vienna. Generalised for the whole Austrian road network, the Austrian drivers' association claims that congestion costs 15% of Austrian GDP, and that there are severe stress, pollution, accident and economic consequences (Faller, 2000). This assessment is due to the high cost placed on lost time, as well as generalisations from the particular of a very congested route to the country as a whole.

On the other hand, it appears that large sections of the European road network has no congestion problem. In the three countries considered to be the most congested in Europe, Germany, Netherlands and the

U.K., 90% of all inhabitants do not experience any congestion during all trips (ECMT, 1999a, p. 222) – but this depends on how congestion is defined, as minor speed reductions would be more widespread. From the same source, only 2% of motorists experience congestion in Netherlands on an average day. However, the perception of the problem is generally acute as time spent in traffic jams is generally three times over-estimated by car users (ECMT, 1999a, p. 222). Furthermore, many recent studies report congestion costs as low as 0.1% – 0.5% of GDP and congestion having only slight effect on pollution and road safety (ECMT, 1999a, Prud'homme, 1999). With a factor of 150(!) between the highest and the lowest evaluation of congestion costs reviewed in European countries, the subject is highly controversial. What is actually the extent of road congestion in Europe? This is an important question that concerns all of us, as in some cases the congestion costs are passed on to other consumers through price mechanisms.

Road traffic is acknowledged as the main cause of congestion in Europe, it being responsible for as much as 97% of the problem (CEC, 1995, p. 14). Although there are frequent reports about the increasing and significant costs of air traffic congestion ('crowded skies'), our analysis will be restricted to road traffic.

Definition

In the search for a universally recognised definition of traffic congestion, the European Conference of Ministers of Transport (ECMT, 1999a) adopted the following:

'congestion is the impedance vehicles impose on each other, due to the speed-flow relationship, in conditions where the use of a transport system approaches its capacity'.

Congestion is the 'resistance' slowing traffic as the number of vehicles increases towards saturation. Lower speeds, sometimes (but not always) with stop-go traffic, is the result of congestion. From this definition, roads are almost always congested, but the level of congestion can vary from slight to gridlock.

For personal cars, congestion is caused primarily by increased car dependency among Europeans through past modifications of social structures and urban design

(Bovy & Salomon, 1999). A vicious cycle is fuelled by the general perception that cars are easier to use, thus contradicting the common interest to use space-efficient modes of transport (Goodwin, 1997). Road transport uses a large amount of space per passenger or tonne transported as the driver's autonomy produces constantly varying speeds (Verhoef *et al.*, 1999; ECMT, 1999a).

Congestion from increases in lorry traffic reflects the decreased use of trains for freight transport, and the increased consumption and long distance transport of goods. This shift has amplified changing production patterns which have increased the geographical complexity of manufacture, thus making a return to spatially less flexible rail transport more difficult.

Lack of space, as in cities, river crossings or alpine passes, compounds the problem. In addition to these fundamental congestion factors, many planned and unplanned events trigger unforeseen problems when conditions are ripe for congestion to occur. Planned events include construction, border control, unwieldy loads and slow moving vehicles. Unplanned events include accidents, breakdowns, inclement weather, strikes and blockades.

The European Environment Agency (1999a) predicts a 30% increase in passenger traffic (passenger-km) and a 50% rise in freight transport (tonne-km), principally by road by 2010 as the shift to road travel is expected to continue in the business-as-usual forecast. A reason for this increase is the development of high capacity roads – for example the Trans European Network (TEN) includes 74500 km of highways and main inter-urban roads, of which 27000 km are planned for completion by 2010 (EEA, 1999b) – as supply fuels demands. Generally, the zoning of residential land use plays a very important role.

Most studies predict a continued increase in road transport. Forecasts are based on current policies, existing trends and behaviour, and the capacity of the road network. For this reason they should be treated with caution. But, would this lead to a serious congestion problem in the future?

Goodwin (1997) presents a realistic vision of the approach to congestion in the UK from a planner's perspective. In the 1960s, in spite of great visionary developments where most problems were already understood – the slow method of travelling is the fastest – the next three decades were devoted to 'predict and provide'. In this period, road

construction shadowed economic growth predictions. In the 1990s the trend was not continued and we entered a phase of 'predict and under-provide' as the complex behavioural dynamics between more roads and increased traffic begun to be understood.

From the definition, congestion leads to a decrease in speed resulting in lost time. Stop-go conditions increase energy use and worsen pollution. Rat running (i.e. instead of driving the shortest and most direct route from home to work, etc., taking a quicker and (usually) more convoluted route through residential areas) harms the quality of life, community and security of others. Furthermore congestion increases highway crashes and decreases access to certain places. But congestion also has some positive consequences. Lower speeds can reduce environmental impacts and the gravity of accidents. Disliking congestion may make other transport modes more attractive and create a convincing argument to travel less often or less far, thereby reducing the impacts of traffic. The net result of congestion is quite difficult to establish.

Measuring congestion

Congestion is usually measured by analysing the cost of time lost. Two approaches are used that consider costs for a whole road network: engineering and economic approaches. *Engineering Approaches*

In engineering approaches time loss is measured by calculating the difference between the time spent by

Table 1. Forecast annual road transport growth (%)

EU-15+2	1995-2010	1995-2020
	TRENDS	Dreborg
cars	0.26	0.5
buses	0.07	0.3
lorries	0.3	1

Note: EU-15+2 is the 15 EU countries plus Switzerland & Norway
Sources: TRENDS database, quoted in Maibach *et al.* (2000); Dreborg, quoted in Schallaböck & Petersen, (1999)

Table 2. Estimates of the costs of congestion

Author	Location	% of GDP	Notes
<i>Engineering approach to calculating costs</i>			
Faller	Austria	15	speed 60 km/h
ECMT	OECD countries	0.5	
Maibach	EU15+2	1.9	€ 128 billion
<i>Economic approaches to calculating costs</i>			
calculating the economic cost of present congestion relative to optimum congestion			
ECMT	OECD countries	0.75	
Prud'homme	France	0.1	
Maibach	EU15+2	0.5	
suppressing congestion with road pricing and tax revenues			
Maibach	EU15+2	3.74	

travellers in the actual congested network and the time spent when roads are empty, set at an arbitrary speed, or set at the speed limit (Prud'homme, 1999). Usually, the cost of time lost is priced at average hourly income levels, generally with some adaptation; but this can lead to important disparities. Faller aspires, for example, to an ideal speed of 60 km/h on a highway in South-east Vienna. By placing a high price on lost time, including factors such as congestion induced increases in mobile phone use, setting a high speed optimum, and generalising from a particular local situation to the national network, he obtains the high cost of 15% of Austrian GDP (Faller, 2000).

Maibach *et al.* (2000) set the cost at €128 billion in 1995 in EU-15+2 (the 15 EU countries plus Switzerland and Norway) which is 1.9% of GDP. Researchers at ECMT (1999a) agree on a value of approximately 0.5% of GDP in OECD countries. Widely used, the engineering approach has the advantage of being simple, but misses the link between the desired speed on a road and the road demand. 'Free-flow' is neither a realistic reference situation, nor is it always desirable.

Economic Approaches

Economic approaches consider an optimum traffic level, which is a function of the demand for road use (Prud'homme, 1999). The reference situation is then this optimum speed linked to willingness to pay. One method consists of suppressing congestion with road pricing and tax revenues. With this method Maibach *et al.* (2000) establish a value of 3.74% of GDP for EU-15+2. As this method gives much higher values, Maibach gives two interpretations: either road transport should be taxed more heavily to internalise external costs or a larger share of tax revenue should be used to increase road capacity. Another method consists of estimating the efficiency gains which could be realised by reaching the economic optimum of road use (i.e. calculating the economic cost of present congestion relative to optimum congestion). This method gives a value of 0.75% of OECD GDP according to the ECMT (1999a). Maibach *et al.* calculate total congestion costs as 0.5% of GDP in EU-15+2. Germany, U.K., northern Italy, France and the Benelux triangle are the most congested countries. Prud'homme (1999) assesses congestion costs of 0.1% of GDP for France, based on data from the Paris region.

In general, evaluations are much lower now than previously. There is a general consensus around 0.5% of GDP, compared with the 2%+ of previous years. This difference arises from using the economic method (with an optimum congestion level) instead of the engineering method (with free-flow as a reference and improved evaluation of time loss valued controversially at average income levels).

The way time loss is valued should have important

consequences for congestion costs, expressed as a percentage of GDP. Given the expected increasing value of time in the future, then the costs of congestion are likely to increase. According to Maibach *et al.* (2000) total congestion costs are estimated to increase by 142% by 2010 in EU-15+2. Greatest growth is calculated for France and Portugal, followed by Ireland and Finland with values close to 200%. On interurban road networks the increase would be some 124% while on urban roads growth of 188% is forecast. Netherlands and the U.K., already highly congested, would see their congestion costs increase by less than 100%.

According to DETR (1997b) drivers will respond to growing congested road conditions in the U.K. by travelling more during off-peak hours on motorways and countryside networks. Goodwin describes the phenomenon as differential growth. With such 'adaptive behaviour', traffic congestion is increasing at times when, and places where, it is the least intense – and it seems to occur when and where it already is well developed.

On the other hand, changes in policy and behaviour could modify the trends of increasing congestion costs substantially. Counter-trends to congestion also exist. This is the case in many city centres previously subject to most congestion (Dargay & Goodwin, 1999). Goodwin, Hass-Klau & Cairns (1998) have studied more than 100 places where road capacity was reduced resulting in 15% of the traffic vanishing.

Engineering and economic values of congestion are still in vogue despite very inconsistent results. Bovy & Salomon (1999) listed the problems which need to be solved to obtain a broadly accepted economic measure of congestion (Table 3). They believe that it is essential to distinguish clearly between private and external costs, road users and non-road users, travel

Table 3. Problems which need to be solved to obtain a broadly accepted economic measure of congestion

... a much more rigorous and systematic analysis of congestion costs is needed in European countries, exhibiting, among other things:

- a clear distinction between private and external costs;
- a clear distinction between road users and non-users;
- a clear distinction between travel costs and other congestion costs;
- a clear definition of the reference situation based on a standardised, economically optimal network design;
- a standardised and valid calculation procedure of the costs elements;
- congestion figures for both network elements and for trips; and
- flow and speed data that refer to hours.

Source: Bovy & Salomon (1999)

costs and other congestion costs, and trip and network figures for congestion. In addition they see the need to define an unambiguous, common and relevant baseline reference calculated rigorously, methodologically and scientifically using universal, consistent and transparent units.

In general, critics of these approaches call for the separation of congestion costs from other types of costs (1). They fail to take into account the dynamics of increasing road demand; a dynamic approach taking into account the rebound effect could be developed (2). With this approach, the design of roads for higher speed increases the measured amount of congestion even though speeds are increasing (Dargay & Goodwin, 1999). Speed could become a parameter for congestion (3). Attempts are made to develop a general congestion index (4). Engineering and economic approaches do not account for the local and temporal nature of congestion; calculations for a corridor can be developed (5). In general, congestion cost calculations are focussed on time loss and miss other external costs linked to congestion, such as stress, increased pollution, etc.; Congestion costs are compared with other traffic impacts (6).

1 Separating congestion costs

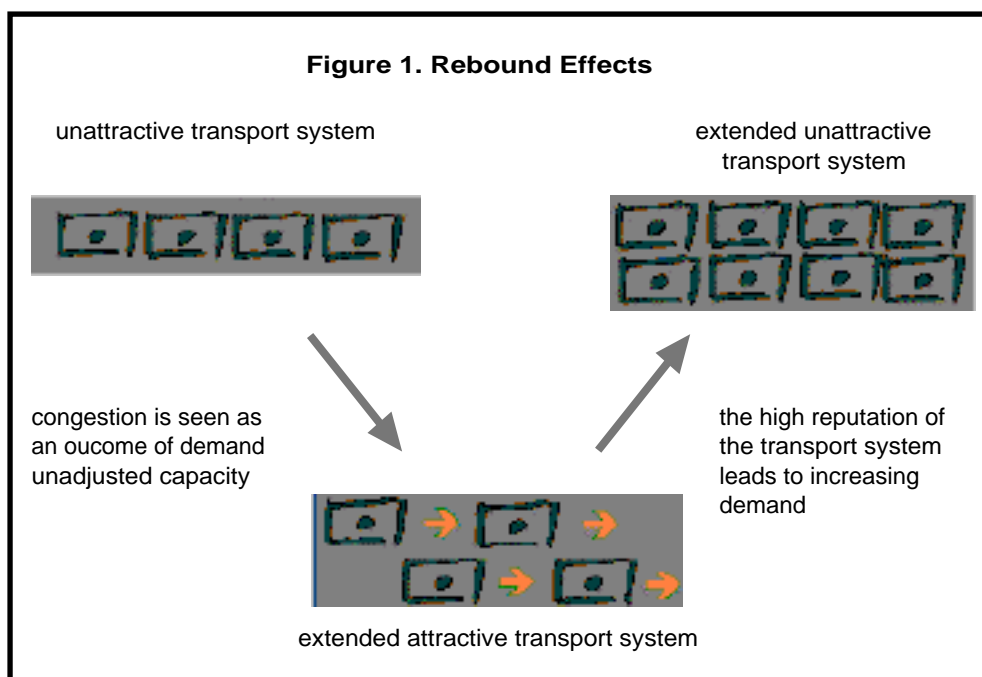
Maibach *et al.* (2000) question the relevance of congestion cost calculations. Therefore, they have separated congestion costs from 'other external costs'. In many studies they are often mixed with other costs in the headline 'external costs'. As opposed to normal external costs, these methods involve a somewhat 'utopian' reference situation of uninterrupted traffic. Why not an optimum for public transport or bicycles as a reference instead? Also the methodology is not standardised and gives very different results. Usually,

evaluations consider congestion costs as external because individuals do not bear costs in proportion to what they impose, e.g. by making other users miss their appointments. The congestion caused by one extra vehicle in the congested state is much greater than the delay felt by the individual. Generally, not accounted are the costs inflicted on other people who use more space- and energy-efficient modes of transportation, such as public transport or bicycles. However, since some of the costs are borne by the people who causes congestion, it might also be considered at least partly as internal.

2 The dynamic approach: taking into account the rebound effect

The engineering measure of congestion considers an arbitrary reference situation where the desired speed is linked to the infrastructure. In the economic approach with optimum speed is linked to the level of road demand. Neither approach links demand (and traffic levels) with speed and congestion. A dynamic approach would link traffic increases with congestion reduction. This traffic increase when roads are used more efficiently is called the 'rebound effect'. Rebound effects are defined as increases in demand due to reduced costs stemming from more efficient use of resources (in this case, traffic infrastructure).

The idea that traffic is induced by the rebound effect on increasing road capacity is gaining greater acceptance (Waddell, 1998; Litman, 1999), a measure that we call highway 'extensification' (Nordmann *et al.*, 2000). In a 15-year study of highway expansion and congestion in metropolitan areas, the Texas Transport Institute presents 'substantial evidence that ... building new roads often increases congestion'.



The authors found that in metropolitan areas, every 1% increase in new lane-miles generated a 0.9% increase in traffic in less than five years, which led them to conclude that ‘With so much induced demand, adding road capacity does little to reduce congestion’ (Texas Transport Institute, 1998). But the rebound effect occurs for any efficiency improvement, including that from ‘intensification’ (such as using the network more efficiently by employing computer management systems) or from redistribution/modal transfer (Nordmann *et al.*, 2000).

Time lost in traffic congestion is actually minor compared with time losses which can occur in the transportation sector. Schallaböck and Petersen have estimated time lost per German in traffic jams at 2 minutes per day, which is tiny compared to the 25 minutes per day that Germans spend on the roads. As speeds on roads have increased, the main cause of any increase in road journey times is increases in the distances that people choose to travel. Moreover, a loss of 2 minutes is a frequent experience of pedestrians waiting at crossings for the signal and of public transport users. For public transport, although congestion can increase journey times at specific times and locations, lack of investment in a regular and well-developed public transit system – as well as administrative support for and structural organisation around car use – is more to blame for delays. Congestion time loss is more negligible when we consider the time spent working to pay the internal costs of the car, even if those costs have remained somewhat constant through the years. External costs of road transport may also lead to time loss, e.g. through pollution-induced ill-health.

If we consider the increase in traffic and the increase in travelling by road that would be induced by reduced congestion, then a dynamic approach would take into account the increasing amount of time lost and link it to increased travel time. Schafer and Victor (1997) claim that the average travel time budget is independent from the available technology and amounts to 90 minutes per day. If this theory is correct, congestion does not create any time loss if we take into account the dynamics of the rebound effect.

3 Speed as a congestion parameter

Another way to measure congestion is with speed since it is linked to the basic definition of congestion. With this measure, congestion increases when speed decreases. With the hypothesis that time spent in transport remained somewhat constant, speeds on roads have actually doubled since 1970. If speed reduction is a measure of congestion, then congestion is continuously decreasing (!), due to improvements to the road network giving a completely different picture of congestion (Dargay & Goodwin, 1999). Furthermore,

this trend is likely to continue with the planned building of motorways within the TEN guidelines and the general increase of road capacity through widening programmes, etc.

4 Developing a Congestion Index

Dargay and Goodwin develop the idea of another measure of congestion based neither on lost time nor on its cost evaluation. The index is based on the ratio of vehicle km to the capacity of the network (Equation 1), and enables a ranking of different countries. Their analysis shows that most countries have witnessed an increase in vehicle km per road km, exceeding the trend of car ownership growth. These calculations support the idea that cars are being used more intensively. In the U.K., Germany and Netherlands, the index exceeds 2000 vehicle km per road km. However, these calculations suffer from a lack of data on the width of the network; capacities being measured only with road length data. Considering lane length would be more appropriate. Indeed, there were substantial motorway and road enlargements which explain the continuous increase in speeds in the EU. The index addresses the problems linked to cost calculations but the method seems not to be applicable yet.

5 Accounting for the local and temporal nature of congestion

The present paper focuses on an evaluation of the general importance of the problem of congestion. For this reason, the indicators described do not consider local and temporal aspects of congestion. Construction sites on highways are excellent example of localised and temporary congestion affecting only a small part of the network, while in other cases major parts of the network are congested at particular times (such as rush hour). In general, congestion concentrates in the densely populated areas of North-west Europe and in highly urbanised areas throughout Europe (Bovy & Salomon, 1999). In Italy, 90% of time lost to congestion is in urban areas (Ferrovie dello Stato & Amici della Terra, 1999). Another way of measuring congestion, taking into account its local and temporal aspects, is to consider time loss and its economic costs for a given journey or a ‘corridor’. This type of measure, based on costs calculated with its engineering and economic

Equation 1. Congestion index

$$\frac{\text{vehicle km}}{\text{network capacity}}$$

Source: Dargay & Goodwin (1999)

factors, shows considerable variation depending on the route considered. In Europe, according to Maibach *et al.* (2000), average road congestion costs are a mere 6% of other external costs (i.e. 5% of all external costs including congestion), but it can be considerable for specific routes. The extreme case is the Paris-Brussels corridor with a value of 870%. On the other hand, while the aggregated figures show an increase in travel time, travel time per trip seems to remain constant (Bovy & Salomon, 1999) because the increase in distance travelled is not taken into account anymore with the corridor method. However, this more local approach is not the focus of this paper.

6 Congestion compared with other traffic effects

Comparing congestion costs with other external costs of transport is not free from difficulty; congestion calculations have many methodologies with varying reference situations mixing internal and external costs. The external costs, excluding congestion, of all transport modes are generally estimated at 4% of EU GDP (EEA, 1999b), although more recent figures from Maibach *et al.* (2000) estimate these at 8% of EU-15+2 GDP. If we exclude the contribution of non-road transport, Maibach *et al.* (2000) estimate the external costs of road transport, excluding congestion, at 7.2%. When congestion costs were believed to be as much as half of other external costs, congestion was calculated to be 2% of GDP. When congestion is estimated at 0.5% of GDP and other road external costs at 7.2% of GDP, we see road congestion costs as a mere 7% of road transport external costs in the EU. Then congestion appears to be a minor problem relative to other external costs of transport. In the next section the contribution of congestion for each impact parameter is discussed.

Road Traffic Accidents

In EU-15, 41,539 people died in road traffic accidents in 1997 (Eurostat, 1999). The ECMT evaluates the costs of accidents at 2.5% of EU GDP (ECMT, 1999b). Congestion is often blamed for accidents, but generally it is omitted that speed reductions due to congestion (and traffic reductions) reduce the gravity of traffic accidents (Peeters *et al.*, 1996). On the other hand stop-go and heavy traffic increase the frequency of collisions, while new routes through residential areas generate conditions for more accidents. The resulting impact of congestion on accidents is difficult to evaluate, but may be considered marginal when compared with safety problems linked to road transport in general.

Noise pollution

Some 32% of the EU population is currently exposed to road noise levels above 55 dB (EEA, 1999b). Since noise is linked to traffic speed (Peeters *et al.*, 1996), congestion has the potential to decrease road noise

levels (Schallaböck & Petersen 1999). On the other hand, frequent engine revving and use of horns in traffic jams, and rat running may increase noise exposure.

Air pollution

In 1996, road transport was responsible for 40% of NO_x emissions, 56% of CO emissions and 31% of VOC emissions in Europe. Road transport guzzled almost 83% of the European transport sector energy consumption and 25% of total energy consumption in EU-15 in 1996. Despite improvements in fuel efficiency during the last decade, road transport has shown no improvement because of the development of heavier and more powerful vehicles, decreased occupancy rates and load factors. CO₂ emissions follow the same trend; in 1996 transportation emitted 22% of total EU-15 CO₂ while road transport discharged 84% of these. (Eurostat, 1999). These increases are the main cause of increasing EU CO₂ emissions which endanger the EU's Kyoto commitments.

The contribution of congestion to these figures is still controversial. The German road construction industry estimated that 20% of energy could be saved by eliminating congestion (cited in Schallaböck & Petersen, 1999). This figure was criticised as it is based on unrealistically high expectations of speeds in free-flow situations. According to van Wee and van den Brink (1999), 85% of all congestion flows at an average speed of 60 km/h. This is within range of the optimum speed (60–80 km/h) in terms of energy efficiency and low emissions per vehicle km. Moreover, dense highway traffic moving at 85 km/h reduces fuel consumption per car-km by one-third relative to a free-flow situation without speed limits (Schallaböck & Petersen, 1999). It is believed that congestion is responsible for some 2% of total fuel consumption in Germany (Schallaböck & Petersen, 1999) but just 0.1% in the Netherlands (van Wee & van den Brink, 1999). Reducing average speed to a less varying optimum could reduce consumption while increasing road capacity.

With regard to NO_x emissions, congestion has a positive effect because these emissions increase linearly with speed (Schallaböck & Petersen 1999). Energy consumption, and thus CO₂ and hydrocarbons emissions, increase with speeds higher or lower than the optimum of 60–80 km/h. Since congestion reduces vehicle speeds, it therefore has a positive effect when it inhibits speeds higher than this optimum. However, it has a negative effect when it creates stop-go traffic. The overall effect of congestion is a slight increase in energy consumption and thus CO₂ and hydrocarbons emissions (van Wee & van den Brink, 1999). CO emissions follow similar trends, but its short life and toxicity at higher concentrations makes it a

potential hazard in very heavy stop-go traffic. Nevertheless, it is generally safe to say that congestion contributes only marginally to traffic emissions.

Social Impacts

Congestion can adversely affect social conditions by generating noise and vibration, inducing stress and anxiety, impeding social contacts and access to facilities and services, severing communities and reducing recreational possibilities by restricting access to places of interest. However, access difficulties are also increased by the contemporary trend towards the locational and temporal separation of activities that seems to be associated with car use. Access difficulties are acute for people who do not have a car on demand, but far worse are the access problems of households without cars – 30% in the EU (EEA 1999b, 68-70). When the public transport exists, the time lost while waiting is generally far greater than the time experienced in congestion, and the danger of road traffic make foot and bicycle alternatives unattractive for many users. Hence, the problems of access of car users to activities appears minimal compared with the difficulties of access created by the development of car and truck traffic. Being blocked in a traffic jam may also cause stress to road users. Here too the general stress linked to traffic in general, especially in large cities is quite important. The volume of road traffic is seen as the single most important environmental problem by Europeans (EEA 1999b, p. 141).

Taking account of the rebound effect on other traffic impacts

While congestion creates problems such as noise, emissions, accidents and access restrictions, road traffic causes far more problems. Developing a dynamic approach would associate reductions in congestion with increases in traffic and increases in traffic-induced problems – and congestion – which can only be solved by reducing congestion. Evaluation of emissions, for example, takes account only of the direct effects of congestion but not of the effects of congestion on the amount and behaviour of traffic. Using the constant travel budget theory, van Wee and van den Brink (1999) calculated that car use would increase by 3% without congestion. Therefore, in certain circumstances, these indirect (rebound) effects of increasing traffic congestion can put a check on energy consumption and pollution (Schallaböck & Petersen, 1999, p. 35).

Congestion would also have a reducing effect on other impacts of traffic, including accidents, noise, land take, fragmentation of habitats, etc. Moreover this analysis does not take into account the long-term effect of suppressing congestion, as congestion might occur again at higher levels of traffic at each new attempt to increase capacity. If the network capacity

of 1970 had remained, the level of traffic measured in vehicle km would not have been able to triple as it has.

Conclusion

Until now the two visions of the problem of congestion are contradictory. On one side congestion is viewed as insufficient capacity for the level of demand. On the other congestion is seen as an excessive demand for the level of capacity. Congestion is now regarded as less costly than it was thought previously (refinements of methodologies may also lead to new evaluations of the problem), and congestion impacts are negligible compared with general road impacts. As Prud'homme (1999) and ECMT (1999) put it, congestion might not be a relevant argument for increasing road capacity but the 'predicted' increases of mobility do require it.

There are two possibilities:

- Traffic growth is the priority – congestion should be solved, not for the problem it itself creates, but because it prevents this growth. Traffic impacts will likely increase. Are we ready to accept the consequences, as they appear to disregard what seemed not admissible as congestion impacts?
- Reducing traffic's impacts are the priority – to reduce the problems caused by traffic obliges us to reduce the level of traffic in general. Fundamentally, is mobility – and increasing mobility – worthwhile?

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Why rural areas in Britain will not benefit from lower transport fuel duty

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Abstract

At the end of 2000, the U.K. Government put forward its new policies for transport in rural areas. Two of the main areas of policy were reducing transport fuel duty and increasing the level of support for public transport. In this paper, I argue that these are two incompatible strategies and that substantial increases in fuel duty, rather than decreases, may have more benefit to rural areas. I show that accessibility in most rural areas in Britain has been in decline for years and argue that reducing transport fuel duty is only likely to increase problems of social exclusion and environmental damage in these areas. I begin this paper by outlining current government policy on transport in rural areas. I present some of the recent trends in accessibility, showing that many local services in rural areas are in decline. I then examine the implications of these trends for transport and identify how increases in fuel duty may benefit rural areas in terms of accessibility, social inclusion and environmental quality.

Keywords

rural transport, fuel duty, government policy, critique

Introduction

Two policy documents are of particular importance to the debate about rural transport in Britain: the White Paper on the future of transport, 'A New Deal for Transport – Better for Everyone', published in July 1998 (DETR, 1998) and the White Paper on rural affairs, 'Our Countryside: The Future', published in November 2000 (DETR, 2000a).

The transport White Paper of 1998, issued after wide consultation and a long wait, reports that there is clear consensus that rural areas have particular transport problems (according to the analysis of consultation responses in an appendix to the transport white paper) (DETR, 1998). However, the White Paper only identifies a handful of policies or actions that are specifically relevant to transport in rural areas – most are generic. Of the few specifically rural policies, most are concerned with improving public transport, traffic management or building bypasses.

The transport White Paper contains much more emphasis on physical mobility (how to move people to jobs, services and facilities) than on measures that might reduce the need for physical mobility (bringing jobs, services and facilities closer to people) through land use planning or the use of information technology for example.

The rural White Paper contains less emphasis on physical mobility (Box 1), although it does also include a number of proposals aimed at influencing physical mobility (Box 2). It argues that

'people in rural areas also want and should be offered the level of consumer choice which comes with being able to travel to local or regional centres'.

It reaffirms the government's commitment to a reduction taxation for motorists to 'help those who rely on the car', which was announced a few weeks before the rural White Paper in the Pre-Budget Report (HM Treasury, 2000) – a measure which is entirely inconsistent with most other transport and mobility measures proposed: reducing fuel duty will provide no incentive to reduce car use in rural areas (or elsewhere) and will reduce any likelihood of viable rural public transport operation even further.

Box 1. Measures for reducing the need for physical mobility from the Rural White Paper

'Addressing rural transport issues is not simply about how to improve people's personal mobility. A major part of our strategy is to make access to important services less dependent on travelling, whether by car or other means. We will be issuing planning policy guidance (PPG 13) emphasising the need to site new development where it is accessible by public transport or where, in the case of housing, people can access other services ... [N]ew technology will be used to provide more services direct to people's homes (e.g. NHS Direct) and locally – in the Post Office, or community centre. This offers important benefits for users of services and for the environment if journeys are reduced. It can help to strengthen and sustain smaller rural communities by reducing the need to look further afield for the services on which people rely.'

Source: DETR (2000).

Trends in rural accessibility

Despite increases in the rural population (Table 1), there has been a long-term trend in the loss of services in rural areas. More than one third of all villages have no shop, post office or school, and more than half of all villages have no general store, doctor or a daily bus service (Table 2). It is reported that the loss of banks, garages and pubs in rural areas is continuing (Cabinet Office, 1999). Between 1965 and 1990, around 15% of rural communities lost their last general store or food shop (DETR, 2000a). Supermarkets have eroded the profitability of smaller shops and forced some of these out of business. Since 1990, 4000 more food shops in rural areas have closed (*ibid*). On average about 200 post offices have closed each year since 1980 (Cabinet Office, 2000). Closures of rural schools increased in the 1970s, reaching an annual peak of 127 in 1983 and continuing at around 30 a year up to 1997 (DETR, 2000a). School closures have been justified on the grounds of low teacher/student ratios and high costs for the education authority. Smaller hospitals have been closed on the grounds that larger hospitals are needed to provide specialised treatment, although Elkin *et al.* (1991, p. 69) argue that specialised treatment is a small part of medical care and that a larger number of smaller medical facilities would be preferable from the perspective of both patient and service provider. The loss of local services and facilities has clearly influenced the self-containment of rural areas.

Rural areas have gained employment at a faster rate than population gain over recent years (Table 1), although some sectors (such as agriculture) have declined. So accessibility to employment in rural areas

is (in theory) somewhat better than in the past. Nevertheless, commuting distances have increased over recent years across all types of areas (see, for example, Banister & Gallent, 1998). The current flows in population and employment have followed what

Box 2. Summary of transport measures in the Rural White Paper

- additional rural bus services through increased funding: £132 m over three years (2001- 2003) for Rural Bus Subsidy Grant and £60 m over the same period for Rural Bus Challenge
- doubling of Rural Transport Partnership funds (from £6 m to £12 m) to deliver to up to 500 new Rural Partnership schemes over three years (2001-2003)
- a new Parish fund of £15 m over three years to support small-scale, locally generated transport solutions
- consultation on measures designed to relax restrictions on rural transport services to allow for more responsive and flexible provision in areas not well served by scheduled services
- pilot schemes and funding for car sharing schemes and car clubs in rural communities
- better and more integrated travel information, including developing a comprehensive internet information and retailing service 'Transport Direct'
- additional funding for Community Rail Partnerships – local authorities and businesses working together to promote local rail services
- rail franchises which protect rural rail services
- actions to make towns, villages and rural roads safer – through reduced speed limits, more investment in traffic calming, and rural bypasses

Source: DETR (2000).

Table 1. Population & employment change in England & Wales between 1981 & 1991

Type of Area	Population:			Employment:		
	Total 1991	Change 1981-1991	Change 1981-1991 (%)	Total 1991	Change 1981-1991	Change 1981-1991 (%)
Inner London	2,627,000	77,000	0.03	8,095,000	-612000	-0.07
Outer London	4,263,000	8,000	0			
Metropolitan Districts: Principal Cities	3,451,000	-99,000	-0.03			
Metropolitan Districts: others	7,716,000	-88,000	-0.01			
Non-metropolitan Cities	4,676,000	98,000	0.02	2,856,000	39000	0.01
Industrial Areas	6,852,000	142,000	0.02	2,605,000	7000	0
Districts with New Towns	2,382,000	195,000	0.09	1,143,000	118000	0.12
Resort, Port & Retirement Areas	3,626,000	257,000	0.08	1,143,000	106000	0.1
Urban & Mixed Urban-Rural	9,964,000	464,000	0.05	3,529,000	403000	0.13
Remoter Mainly Rural	5,544,000	413,000	0.08	1,925,000	280000	0.17

Sources: Breheny (1995); Keeble & Tyler (1995).

Champion *et al.* (1998) term the ‘counterurbanisation cascade’, in which population and employment has steadily moved from larger to smaller towns and cities, and from inner urban areas to peripheral and more remote areas (Figure 1).

Few rural areas are well served by public transport. Many rural services do not run a regular daily timetable: 20% of rural settlements in England are estimated to have a bus service below ‘subsistence’ levels (defined as fewer than 4 return journeys a day, and no evening/weekend services) (DETR, 1998) and 75% had no daily bus service (Cabinet Office, 2000). Just 16% of rural households are within a 6-minute walk of a bus stop served by regular services (operating at frequencies of 30 minutes or less), compared to 66% of all households in Great Britain (*ibid*). The vast majority of households in rural areas (around 88%) are more than a half-hour walk to the nearest railway station (DETR, 2001).

In response to these declining trends in rural accessibility, government policy has recently begun to reconsider the importance of local services and facilities. The role of the local post office and the village shop in rural areas is recognised in the transport White Paper (DETR, 1998 p. 113). The rural White Paper sets out a policy for the extension of the rate relief for rural post offices (DETR, 2000a p. 88). In terms of school closures, it announces a general presumption against these (DETR, 2000a p. 28). Various spending commitments for rural public transport were made in both the transport White Paper and rural White Paper. The rural White Paper also sets out a target for improved public transport provision in rural areas: the proportion of the rural population living within a 10-minute walk of a regular bus service (hourly or better) should increase from 37% to 50% by 2010, with an intermediate milestone of 42% by 2004 (DETR, 2000a p. 19).

Transport implications

These trends in rural accessibility have had a number of implications for transport and travel patterns in rural areas. Car ownership and use is substantially higher in rural areas than the national average. Nearly 40% of households in London and the metropolitan areas do not have a car, compared with only 16% in rural areas (Table 3). In rural areas, 39% of households have two or more cars, compared with 17% in London. Government projections suggest that the proportion of rural households with cars will rise to 85% by 2026 (DETR, 1997). However, this does not necessarily mean that the majority of rural residents have constant access to a car: members of a car-owning household can be deprived access to a car as soon as another household member uses the car. Patterns of driving licence holding are broadly similar to patterns of car ownership. In 1997/99, 81% of adults in rural

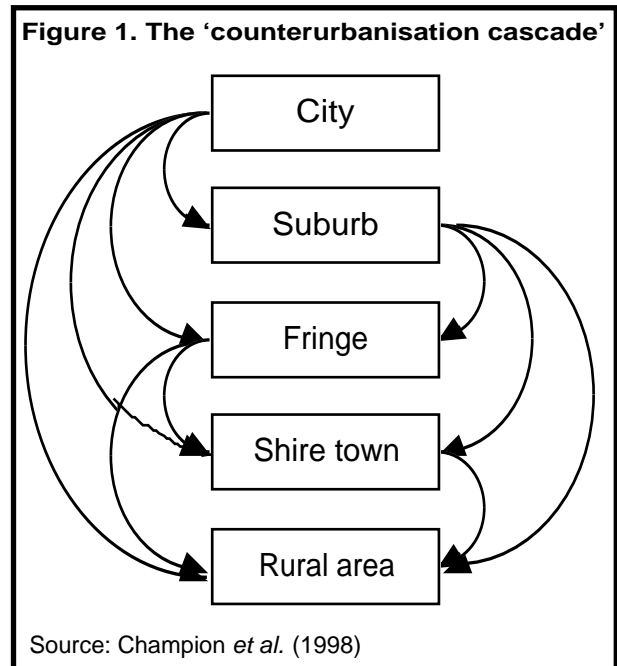
areas held a full driving licence for a car, compared with 70% in Britain as a whole (DETR, 2001b). The costs of using a car have hardly increased in real terms in recent years, whilst the costs of public transport have risen substantially (DETR, 1998), making public transport less viable and undermining its frequency and, at the same time, increasing the attractiveness of car use. The national 10-year plan for transport suggests that traffic could grow by 25% on non-urban roads between 2000 and 2010 (compared to an increase of 22% over the whole network) and congestion in rural areas could rise by 35% (compared to 15% over the whole network) in the absence of new policies (DETR, 2000b).

There is little difference in the average number of trips made by urban and rural residents (Table 3), but rural residents make longer journeys, so they travel

Table 2: Provision of key services in rural areas

Key service:	Proportion of parishes lacking access (%)
Permanent shop of any kind	42
General store	70
Post office	43
Daily bus service	75
School (for any age)	49
GP (based in the Parish)	83
Job centre	99
Village hall/community centre	28
Public house	29

Source: Rural Development Commission (1997).



further in total. For journeys greater than 1 mile, rural residents travelled 9,293 miles per year on average in 1997/99, compared to an average of 6,806 miles across Britain (DETR, 2001a). Journeys in rural areas are more car-based, as a consequence of poorer levels of public transport service and local facility provision. Rural residents travelled an average of 8,052 miles by car in 1997/99 (87% of all distance travelled), compared to a national average of 5,334 miles by car (78% of all distance travelled). Journey distance by foot is lower in rural areas than any other type of settlement (journey distance by foot is highest in large urban areas).

Since travel is more car-based in rural areas, household expenditure on motoring is higher in rural areas than elsewhere, whilst public transport fares and other costs are lower than in other areas (Table 4). Total travel expenditure (including public transport costs) in rural areas is a little higher than the national average and as a proportion of all household expenditure (18.1% of household expenditure compared to 16.7% nationally). Cullinane and Stokes (1998, p. 217) report that, as a proportion of motoring costs, fuel costs are quite low (around 25% on average) and only slightly higher in rural areas. Because of less congestion and higher travel speeds in rural areas,

rural residents only spend marginally more on fuel than urban residents (*ibid*).

The case for higher transport fuel duty

Because of their heavy reliance on the car, many rural residents (and also many urban residents) regard car use as a 'necessity' and argue that there should not be high taxes on such things that people depend on. I present two arguments against this position. First, most people have some choice in where they live, work, shop, send their children to school and so on. The choice to live at a long distance from the things that are part of everyday life is very often a self-imposed decision, so the idea that a car is a necessity is most often a self-imposed necessity. Moreover, the contention that the car is a necessity is often little more than a lazy excuse for not wanting to consider changing habits and/or lifestyles. Most people have the choice to move closer to jobs, services and facilities that are part of their everyday life if they feel that they cannot afford higher fuel costs. Reducing fuel prices will only encourage more environmentally damaging and unhealthy ways of living and bring the threats of climate change and fossil fuel scarcity closer

Table 3. Transport and travel characteristics by settlement size, 1997/99

	London	Metropolitan areas	Large urban areas	Medium-sized urban areas	Small urban areas	Rural areas	All areas
<i>Household car ownership:</i>							
None	38%	39%	33%	29%	22%	16%	29%
One	45%	40%	45%	46%	46%	45%	45%
Two or more	17%	21%	22%	25%	32%	39%	26%
<i>Journeys per person per year:</i>							
Car	478	567	603	675	710	758	646
Walk	316	286	317	283	275	203	281
Other	213	146	131	102	91	76	119
total	1007	999	1051	1060	1076	1037	1046
<i>Distance per person per year (miles):</i>							
Car	3528	4326	4679	5298	6968	8052	5334
Walk	169	160	184	179	162	112	191
Other	1838	1228	1196	1183	1188	1129	1281
total	5535	5714	6059	6660	8318	9293	6806
<i>Average distance per journey (miles):</i>							
Car	7.4	7.6	7.8	7.8	9.8	10.6	8.3
Walk	0.5	0.6	0.6	0.6	0.6	0.6	0.7
Other	8.6	8.4	9.1	11.6	13.1	14.9	10.8
total	5.5	5.7	5.8	6.3	7.7	9	6.5

Source: DETR (2001a, 2001b)

more quickly. Furthermore, it makes no sense to find ways of reducing the tax burden of rural dwellers, since the average income of rural residents is higher than the average income of urban residents (Cabinet Office, 2000). Of course there are people on very low incomes who live in rural areas but they may actually benefit from increases in fuel costs, particularly in the long-term (discussed below). Gray (2001) has recently examined the contention that high fuel prices impact unfairly on rural areas and has concluded that only a minority of households (mainly those on low incomes) are affected by high fuel prices, and the impact on the rural population overall is not significant. He reports that households in rural areas are more *reliant* on the car than elsewhere but there is little evidence to suggest that they are appreciably more *dependent* on the car (*ibid*).

Second, the idea that fuel should not be so highly taxed because many people depend on it misses the point that there are external costs associated with fuel use (such as air pollution and noise, which affect health). A fair way to cover the cost of the externalities of fuel use is through the application of the 'polluter pays principle' – raising revenue from the people who create the problem (see also CEC, 1995). It is generally agreed that road transport, particularly the car, does not cover its full external costs (see, for example, International Union of Railways, 2000). Increasing transport fuel duty is one way to cover these external costs reasonably equitably without extremely complex pricing systems¹. In this case, people who drive more and/or have low efficiency vehicles (and therefore use more fuel) pay more towards the externalities of transport use. Cullinane and Stokes (1988, p. 217) argue that much of the opposition to increased fuel costs comes from 'those who are well able to afford increased motoring costs and who currently display levels of mobility above what might

¹ Establishing the precise contributions that rural and urban residents make to these externalities is problematic. Statistics indicate that rural residents travel further and make more journeys by car but some of the environmental and social impacts of these journeys (such as noise and local air pollution) may be lower because: (i) some or all of the journeys made by rural residents will be in rural areas, which means that the driving conditions may be more conducive to efficient fuel consumption than in congested urban conditions; and (ii) fewer people might be affected by journeys in rural areas because the population density is lower than in urban areas. So it may at first appear that the externalities of 'rural journeys' are lower than for 'urban journeys'. However, the situation is more complicated than this. There are other issues to consider such as the fact that rural residents travel further perhaps puts them at risk of being involved in more crashes (which then contribute to externalities if, for example, medical attention is required by anyone affected) and the fact that rural residents do not just make 'rural journeys' – they also travel into urban areas and contribute to transport problems in urban areas (and, by the same token, urban residents do not only make 'urban journeys'). It is not inconceivable of a situation in which a rural resident could make mainly 'urban journeys' (or a situation in which an urban dweller could make mainly 'rural journeys'). So the relative contributions that rural and urban residents make to transport externalities is difficult to pinpoint. Kortzen (1995, p.30) observes that it is often the case that groups who experience most environmental pollution may be those who contribute least: "although it is true that poor people are far more likely to be living next to waste dumps, polluting factories and other scenes of environmental devastation than are wealthy people, this doesn't mean that they are major consumers of the products in those factories". In the case of transport externalities, urban residents (particularly inner city residents) are more likely to suffer from air pollution from transport but they produce proportionately less air pollution than rural dwellers on average.

be regarded as necessary'.

Increasing fuel duty will mean that rural living is less financially attractive to long-distance commuters. This might then reduce the demand for rural homes and consequently their price, which could increase the availability and affordability of houses for rural residents on lower incomes. Higher fuel costs may also promote (in the longer term) more local services (such as shops, post offices and pharmacies, for example), whose owners find that they can begin to compete with larger (but more distant) services when customers take account of travel costs. According to Cullinane and Stokes (1998 p. 327), many of the more mobile rural residents currently do not use local facilities and the decline in rural services of nearly all kinds can be attributed, at least in part, to high mobility. Continuing with policies that allow high mobility will add to the further degeneration of rural facilities. Higher fuel prices, on the other hand, may be able to reverse the decline in rural services. Internet and television-based communications increase the ability to carry out a wide range of activities (including working, banking, shopping, entertainment and medical functions) without the need for a car, even in rural areas (see Foresight, 2000).

The attractiveness of sending children to local schools will also increase with higher fuel costs. Faced with higher travel costs, there will be added pressure for more village schools. According to the transport White Paper, information and communication technology will open up new possibilities to enrich learning and increase the viability of isolated rural schools (DETR, 1998). The same is true of local healthcare facilities: it is likely that higher transport fuel costs could also increase the demand for these. In addition, the competitive advantage of rural produce might increase as transport costs rise, which could stimulate more localised production and consumption. Higher fuel costs increase the incentives for local markets in food and other produce, a concept that has been more widely discussed since the outbreak of foot and mouth disease in 2001.

Changes in transport costs will, as the Royal Commission on Environmental Pollution (1994) recognises, have impacts on patterns of settlement, employment and consumption in the longer term. In the shorter term, it may be necessary to introduce supportive policies and actions to help manage this change. A number of these supportive policies and actions were proposed in the rural White Paper². Examples include incentives for the introduction of ICT in rural areas, or the improvement of rural public

² The inconsistency in the rural white paper, however, is in introducing these initiatives at the same time as reducing fuel costs. Lower transport costs are likely to result in the slower introduction and take-up of ICT in rural areas, even lower use of rural public transport and few new local services and facilities being provided in rural areas.

transport services, or the provision of local services and facilities in rural areas (other examples from the rural White Paper are shown in Table 5). Another supportive measure is the idea of a social audit of local services and facilities, proposed by Banister (1997). The purpose of the social audit would be to broaden the decision process to include both economic and social costs in development decisions, whether it relates to closure of existing sites or the opening of new ones. In the recent past, too much emphasis has been given to the economic and efficiency arguments in a very narrow sense of profitability to the public or private sector.

Conclusions

Recent trends indicate a decline in a range of rural services and facilities, despite increases in the rural population. Whilst the costs of using a car have hardly increased in real terms, the costs of public transport have risen substantially over recent years. This has contributed to increases in car ownership and fewer local services and facilities for rural areas. The government has recently put forward new policies for transport in rural areas. Two of the main areas of policy were reducing transport fuel duty and increasing

the level of support for public transport. However, reducing fuel duty is inconsistent with its other policies to help achieve increased levels of accessibility for rural residents. It will provide no incentive to reduce car use in rural areas and will reduce any likelihood of viable rural public transport operation even further. Although more households own cars in rural areas than in urban areas, it is not necessarily the case that the majority of rural residents have constant access to a car: members of a car-owning household can be deprived access to a car as soon as another household member uses the vehicle. Promoting accessibility for all should not be concerned with increasing mobility: it should be concerned with providing services and facilities locally so that everyday activities can be carried out without long journeys.

Addressing the issue of rural accessibility requires a carrot and stick approach – promoting the provision of local services and facilities and discouraging the use of the car. It also requires a broader perspective. A home in the countryside is the aspiration for most of the British population. One of the most important factors

Table 4. Household travel expenditure by type of area

Type of area	Expenditure on motoring	Fares & other costs	Total household expenditure	All travel costs as a proportion of total household expenditure
London	£ 44.80	£ 17.90	£ 403.90	15.5%
Other metropolitan areas	£ 43.80	£ 7.20	£ 311.00	15.4%
High population density (> 7.9 persons per hectare)	£ 47.60	£ 8.20	£ 336.30	16.6%
Medium population density (2.2 to 7.9 persons per ha)	£ 56.00	£ 7.60	£ 359.70	17.7%
Low population density (< 2.2 persons per ha)	£ 57.70	£ 6.50	£ 354.40	18.1%
All areas	£ 50.50	£ 8.70	£ 348.20	17.0%

Source: Office for National Statistical (2000).

Table 5. Mechanisms for improving rural services

<i>In the home</i>	<i>In the village</i>	<i>In the market town</i>
<ul style="list-style-type: none"> • health advice by phone – ‘NHS Direct’ • social services by phone – ‘Care Direct’ • education and employment services online & by telephone • car share & community transport schemes run by parish councils 	<ul style="list-style-type: none"> • a new range of services at the ICT-linked Post Office including: <ul style="list-style-type: none"> – business services – banking – pensions & travel passes – health & education applications • re-establishing shops & other community services • community use of school facilities • more childcare places • better bus links to market towns & more flexible local transport 	<ul style="list-style-type: none"> • ICT learning centres • improved primary healthcare using telelinks & ICT to specialist centres • better transport links – bus & rail • improved ICT & business support • strengthened role as retail & business centre

Source: DETR (2000a).

in the appeal of rural areas as places to live is the quality of the environment. However, it is not just the pull of rural areas that makes them so attractive – there is also a strong push factor: many city dwellers aspire to live in more rural areas because of the poor of quality of life in urban areas (in many cases as a result of pollution from transport!)³. However, rural living can never become a reality for the majority.

Accommodating the majority in the countryside is a mathematical quandary (59.5 million inhabitants divided by 242,910 square kilometres does not leave a lot of countryside left) and a political quagmire, not least because of strong opposition to any new development by most rural residents, whilst also promoting accessibility for existing residents. Higher fuel duty can help to reduce the current intense pressures on rural development. Of course, other supporting policies are also important in reducing pressures on rural development, such as measures to improve the quality of life in urban areas, requiring action on a whole range of issues such as education, crime, pollution and public transport.

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³ A recent public opinion survey found that 71% of people believed that quality of life is better in the countryside than elsewhere and 66% said that they would move there if there were no obstacles to do so (Cabinet Office, 2000).

Strategic Environmental Assessment: a new paradigm for the EU?

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Abstract

Environmental policy in Europe can be considered to exist in a neo-liberal context. Strategic Environmental Assessment may constitute a challenge to the prevailing neo-liberal ethos of the European Union and have implications for those states within it that are most enamoured of competitiveness, deregulation and a declining role for the State, notably Britain. The troubled gestation of Strategic Environmental Assessment poses fundamental questions about both transport and environmental policy in the EU and whether fundamental challenges to neo-liberalism might be needed to fully integrate environmental policy into other policy areas.

Keywords

Strategic environmental assessment, environmental policy, European union, public policy

Environmental Policy in Britain can be said to be dominated by the legislative output of the European institutions. The legislation created in the European context exists in the neo-liberal conditions of the European institutions, which with reference to the single market envisaged in the original Treaty of Rome, can be said to have been a feature of the European Community at an early stage. Neo-liberalism has been explained as:

‘... a combination of economic policies which include the decline of Keynesian demand management, growing reliance on unconstrained free markets, the reduction of taxation, and a roll-back of the welfare state. Deregulation is an aspect of this, involving a reduction in the constraints imposed on free markets by such government measures as those to protect inefficient industries, sustain quality standards beyond those demanded by the market, protect the environment, or safeguard working conditions.’ (Rhodes *et al.*, 1997, p. 158)

Neo-liberalism can be applied as an analytical framework to the European Union, to environmental policy and to the nature of the globalising economy of the present period (Grahl & Teague, 1990; MacEwan, 1999; Toke, 2000). It is also appropriate to consider in

Britain the extent to which neo-liberalism has become the guiding ideology of the Labour Government elected in 1997 (Hay, 1999, p.184). What implications might this have for the environmental policy introduced into an EU or a Britain in which neo-liberalism is in the ascendancy? The EU’s paradigm in the area of environmental policy can be said to be about to be changed significantly, by the introduction of Strategic Environmental Assessment. This could, potentially, have profound implications for transport policy throughout the EU and within new entrant states in the future. Consequently, what follows is an examination of the development of SEA with special reference to the EU Trans-European Transport Network policy.

Strategic Environmental Assessment (SEA) can be defined as a formal, systematic and holistic process for evaluating the environmental impacts of a policy, plan or programme and alternatives to it (Glasson *et al.*, 1999, pp. 401-402). It is also possible to understand SEA as an environmental impact assessment (EIA) of policies, plans and programmes.

An explanatory definition of the nature of Strategic Environmental Assessment has also been offered by Karl Georg Hoyer:

‘Most environmental impact assessments are carried out at the project level, e.g. the individual road project. SEAs look at the ‘3P’ level: Policies, Plans, Programmes. This is important because of the inherent limitations of project-oriented assessments, which severely limit the scope for meaningful public participation ... There are two main types of SEAs: incremental assessments are similar to project-oriented ones, starting with the projects and projecting their consequences, giving a more comprehensive picture and a better coverage of alternatives ... target-oriented assessments start with environmental policy targets ... making the choice of projects, alternatives and mitigative measures contingent on achieving these targets.’⁴

Utilising British Government definitions may help to clarify some of the above: policies are: ‘the Government’s objectives and the preferred means for

⁴ Nature and Youth - *Concrete Action*, No.5, April-May, 1995. Oslo: Nature and Youth.

trying to achieve them'. Programmes or plans are 'sets of related activities and expenditure that give effect to' policies. Programmes may incorporate specific projects, discrete activities at specific locations and plans may have more specific meaning in the context of land-use planning, for example. Thus, projects are undertaken within a programme, which is the result of a policy (Therivel *et al.*, 1992, pp. 37–38).

In January 2001, Conciliation began, in the Co-Decision procedure of the European Parliament, on a Directive designed to introduce SEA into EU environmental policy (CEC, 2001). This procedure came at the end of a lengthy period of concern about the effectiveness of EIA, both within the Commission and amongst non-governmental organisations (NGOs). This process has now been completed as Directive 2001/42/EC, 'on the assessment of certain plans and programmes on the environment.'

The concern of the Royal Society for the Protection of Birds that the existing Environmental Impact Assessment (EIA) Directive (85/337/EEC) was limited in effectiveness led the organisation to commission substantial research in co-operation with the then Oxford Polytechnic (now Oxford Brookes University). The project orientation of EIA had meant that 'cumulative, indirect and synergistic effects' were being neglected (Therivel *et al.*, 1992, p. 7). The resulting research noted that:

'... the arguments for assessing the impacts of a policy or programme before it becomes manifested in projects themselves need reviewing in the context of a more general discussion of the policy process.'
(p. 31)

The neglected aspects were those considered 'strategic', in the sense of linking the issues surrounding a project together in an overview of all conceivable effects. It is unstated but this could be considered to mean raising the prior question of need for all large-scale projects, something British planning authorities have seemed anxious to avoid whenever possible, and which the current Government seems to wish to prevent in its Planning Green Paper of December 2001. Therivel *et al.* quote the Standing Advisory Committee on Trunk Road Assessment (SACTRA) as identifying a need for a more wide-ranging form of Assessment (p. 33). They also suggest that a strategic form of assessment would obviate the need for repetition of debates on some issues at project level, offering savings in time and costs, (p. 35) but this can be considered over-optimistic since the engagement of local communities in the whole process would be unlikely until the point at which a particular project was deemed to be a threat. They are assuming a degree of knowledge about national policies which people may well not have until it appears in their local media. There are also considerable cost and human resource implications for local NGOs in

participating in what might be national level SEA and associated Public Inquiry in the UK context. Also, if we accept that competition is the dominant concern of Government in policy development, will the searching and holistic qualities of SEA be welcomed and fully implemented?

Therivel *et al.* do identify other problems for the future SEA. These include

- the non-specific nature of proposals and the fact that incremental decision-making that has not been precisely formulated, takes place;
- the sheer number of decisions at lower levels which might follow from a strategic decision and the analytical complexity of response required;
- problems of information on environmental conditions present and future;
- the need to consider alternatives at various stages in the processes;
- relative lack of shared knowledge about the history of EIA; and
- the political nature of decision-making (pp. 41-42).

At each stage, private sector organisations will have more resources to apply to the process than voluntary organisations and individuals to a development. Objectors receive no funding, and are reliant on voluntary contributions in the British context. SEA requirements would be situated within the extensive range of Planning Policy Guidance Notes issued and revised by Government. These are guidance only, and offer little practical constraint upon development.

EU awareness of the possible need for a strategic form of environmental assessment pre-dates the formation of the European Federation for Transport and Environment (T&E), an NGO which has subsequently supported its introduction. In the 4th Environmental Action Programme, agreed in 1987, the Commission suggested that the linkages between policies, plans, programmes and projects might need consideration in terms of 'their wider application'. Similar references were to be found in the 5th Environmental Action Programme of 1992 and in the EU submission to UNCED. It seems that the Commission had become convinced of the need for SEA as a result of the vicissitudes of its Structural Funds (Therivel, 1992, pp. 45-46), a field in which the World Wide Fund for Nature had laboured long to convince the Commission of fundamental problems with regard to the environmental effects of the Funds. At its present stage, the Draft Directive permitting SEA has not been amended to include the Structural Funds within its scope, as the Commission rejected a European Parliament proposal to this effect (COM (2000) 636 Final). DGXI (Environment) proposed a Directive on SEA in March 1991 which apparently ran into

opposition from some member states and was revised substantially, over a ten year period. The 5th Environmental Action Programme envisaged that this form of Assessment would be in place after 1995, (Therivel *et al.*, 1992, p. 49) but it was still an unspecified number of years away at the time of DGXI interviews conducted by this researcher in September, 1997.

T&E, set up in early 1990 as a coalition of groups concerned about European transport policies, did not enter the debate on the TENs until 1994. It had been engaged in other projects and lacked the personnel and resources to widen its scope at will. By the time T&E was involved in the TENs decision-making process, the TENs had been discussed in Council. Lobbying activities had clearly taken place earlier and the European Environmental Bureau had taken some action at that point. The general view of T&E appears to be that the Commission has 'a very poor record' on consulting non-road NGOs throughout the TENs process (Bowers, 1995, p.7). Gijs Kuneman, formerly Director of T&E, believes that the division of labour and consequent co-ordination of efforts by the European-level environmental groups was at its most successful to date when the TENs entered European Parliament discussions. He also pointed out that the environmental argument is generally well-received in the European Parliament. Officials in DGXI agreed, with a senior official with four years of involvement in work on the TENs emphasising the success of T&E in lobbying for the inclusion of SEA in the TENs guidelines⁵. The same official pointed out that the inclusion of environmental assessment at the point when the TENs guidelines were being drawn up met support from the Commission but resistance in the Transport Council. The environment had not been an explicit feature of the TENs up until that point⁶, a curious situation given the evolution of Community environmental policy and EIA in particular in previous years. This could be considered to be an aspect of neo-liberalism: like strict empiricism, the assumption of atomism seems to apply in that subjects are deemed unconnected and in this way social or environmental objections to transport policy are frequently not considered. The official observed that no environmental assessment would be likely to alter the 14 priority projects. Most interestingly, he offered that

⁵ Interview with Gijs Kuneman, Director of T&E, Brussels, 1st September, 1997; interview with senior official in DGXI, 2nd September, 1997, and a junior official with responsibility for SEA in DGXI, on the same date.

⁶ This is not quite true, as the UK Department of Transport notes: 'Although the Council agreed that protection of the environment is important and should have a central role in the development of transport projects, it could not accept the specific amendments proposed by the Parliament. It did however agree to a new indent to article 5 (priorities) of the draft Decision, to read 'the integration of the environmental concerns into the design and development of the Network'. This was prior to the entry of the Common Position on the Trans-European Transport Networks into the Co-Decision procedure. (Briefing for UK members of the European Parliament – Proposal for a Trans European Transport Network COM(94)106 final as amended by COM(95)Final - (Department of Transport, September 1995).

DGXI had been lobbying DGVII (Transport) for SEA of the TENs *prior* to the debates in the European Parliament. He concluded that the resulting compromise is '... sub-optimal [since] ... we are confined to developing methodology'. He did not believe further studies are actually necessary, although further efforts might be needed to anticipate resistance in transport ministries. In line with ideas about epistemic communities, he said:

'What we are trying to build is an expert community on strategic assessment of transport infrastructure projects at the Community and member state level.'

He coupled this with saying that DGXI and DGVII have a good mutual understanding on this matter and that a committee set up under the TENs Committee on environmental analysis will include transport and environment ministry representatives. However, his view is rather more optimistic than the general scepticism to be found in 1997 in DGVII about SEA⁷. The reservations of several key DGVII officials may be in anticipation of the 'movable feast' quality of SEA. Comments from the junior DGXI official most responsible for the development of SEA, and indeed the future Directive on this matter, suggests repetition of evaluations to achieve greater refinement of techniques. Both the existing Environmental Impact Assessment Directive and the proposed one for SEA contain articles on public participation and consultation and therefore of external review, necessary since developers are responsible for ensuring EIA takes place and the same is likely for SEA. Criticisms made within this process, akin to the Dutch system of SEA which already exists, might well lead to need for new Assessments and delay. Clearly, this maximises the time for opposition to gather to some particular project and does the exact opposite of what this particular official believes SEA is about, namely consensus-building activities⁸. However, the very fact of delay could present problems to voluntary bodies in maintaining focus upon a particular issue. Whether consensus or conflict results from SEA depends in part upon the ability of the Commission to co-ordinate within itself concerning the final version of the proposed Directive: Roger Vickerman, speaking in June 1995, was doubtful that DGVII and DGXVI (Regional Policy), communicated very much with each other⁹. He was also very dubious about the TENs serving regional cohesion objectives. Clearly, achieving such cohesion

⁷ Interviews in DGVII, 4th September, 1997. Debra Johnson, at the Trans European Networks conference of 16th June 1995, also suggested that there was no mechanism or criteria for strategic environmental assessment. The DGXI official referred to here may have been referring to ventures where DGVII participated in DGXI research projects such as Overview and evaluation of methodologies for the forecasting of induced traffic on new transport infrastructure, Final Report and Appendix, (DGXI, Brussels, October 1996).

⁸ Interview with junior official, DGXI, 2nd September, 1997.

⁹ Roger Vickerman, remarks, *Trans European Networks* conference, 16th June 1995.

might well involve well-judged transport infrastructure projects.

Opinions vary about the efficacy of SEA and whether the tools for it exist at present. One senior official in DGVII believes the 'techniques for Strategic Environmental Assessment are in their infancy.' He also expressed considerable scepticism about the possibility of a Strategic Environmental Assessment being done of the Network as a whole by 1999, as required in the TENs Guidelines. He believed that the Assessment must include behavioural factors for individuals and the business community and incorporate all that would normally be considered as a Strategic Economic Evaluation (SEE) as well¹⁰. A colleague of his concurred with this view, stating that as far as SEA concerned: 'The methods do not exist in a way that is accepted by everybody.' This same interviewee also expressed doubt about the techniques needed for SEE¹¹. (This coincides with pessimism from an official in the U.K. Government's Highways Agency about how such an evaluation might be done since international traffic was only about 3% of the traffic in the overall British road network – too small a scale to make for meaningful assessment in his view.¹²) Another official in the same Directorate-General expressed the view that, in the short-term, a manual of best practice might be what was attainable for SEA¹³. This insistence upon further complicating the nature of the proposed SEA could be seen as not entirely constructive. It is noteworthy how many working groups have already been generated in the pursuit of this form of Assessment, which could serve to stress the difficulties rather than the advantages of this technique of assessment to the Council and to the European Parliament.

More fundamental questions are raised by the T&E which had successfully campaigned for SEA. Their then Director pointed out that 'there is no legal obligation to link the result of the Strategic Environmental Assessment to the actual planning proposal'¹⁴. This is tantamount to suggesting that the development of SEA is no more than a delaying tactic, not the real widening of the agenda which some seem to think it represents. However, the DGXI official with the greatest responsibility for developing SEA does not accept that ... 'tools and techniques are the problem.' The official agrees with the view given above in DGVII that SEE must be incorporated into the

SEA. In fact, the Commission had engaged DGII (Economic & Financial Affairs) and DGVII in a macro-economic analysis of the employment impact of the TENs which came out positive. However, the official accepted the point made above about net job gains being critical and that the DGII contribution to the analysis mentioned was particularly to estimate what is generally referred to as 'crowding out' of employment, certainly not a feature of more enthusiastic advocacy documents by business groups like the European Round Table of Industrialists¹⁵.

Kuneman observes that neither the EIA Directive (85/337/EEC) or the proposed Directive on SEA, first published by the Commission in December 1996, are legally binding policies. Both can, potentially, be ignored in the final decision on a project (Kuneman, 1997, p. 16). This serves to suggest that these EU policies may be in reality only declaratory in effect, permitting wide deviations from the sustainable development the EU claims to favour (Baker *et al.*, 1997; Lowe & Ward, 1998; Grant *et al.*, 2000). This has implications for the seriousness of the EU concerning policy for sustainable mobility, as an example (Banister *et al.*, 2000).

Where SEA already exists in Germany, one third of the length of new High Speed Train lines planned in 1990, as a result of NGO persuasion, met environmental concerns by being in tunnels (Ross, 1994, p. 200). Kuneman takes a moderately optimistic view of progress in integrating environmental concerns into the EU decision-making processes, singling out SEA, EIA and the Habitats Directive as useful steps; Grant *et al.* (2000) seem more sceptical. However, he does this in the context of questioning the continued emphasis on infrastructure development and the reliability of depending upon national governments for policy implementation (Kuneman, 1997). In the same document he offers a critique of regional growth stemming from infrastructure investment in roads; observing that the rate of return on investment is more important than sheer volume of investments; and noting that Cost-Benefit Analysis does not take into account demand management of traffic, the benefits of alternative forms of investment, employment and production effects upon other regions. This is implicitly consistent with concerns expressed by Grant *et al.*, that environmental policy was still to be fully integrated into other areas of EU policy (Grant *et al.*, 2000, pp. 199–210). Many interviewees asked about strategic environmental assessment were also asked whether SEE of the TENs as a complete network was possible. The consensus view was that the tools for such an analysis did not exist and that piecemeal evaluations were more likely, although such an evaluation remained a desirable goal.

¹⁰ Interview with senior official, DGVII, 4th September, 1997. Gijs Kuneman does not believe a Strategic Economic Evaluation of the TENs is actually possible, and that you can only consider projects case by case.

¹¹ Interview with junior official, DGVII, 4th September, 1997.

¹² Interview with official, Highways Agency, London, 26th July, 1995. He defined 'international traffic' as comprising three elements: British origin traffic going to international destinations; vehicles of foreign origin; transit traffic to and from Ireland across Britain.

¹³ Interview with auxiliary, Unit A3, DGVII, Brussels, 4th September, 1997.

¹⁴ Interview with Gijs Kuneman, 1st September, 1997.

¹⁵ Interview with junior official, DGXI, 2nd September, 1997.

It may be concluded that the differing Commission interests shown during the long gestation of this policy initiative reflect the limitations of pursuing environmental policy development in a neo-liberal context. The critical research question, also raised by Grant and colleagues is whether implementation of policy and its integration into all policy areas is actually compatible with the neo-liberal competitiveness ethic or whether a meaningful SEA would involve doing serious damage to the current neo-liberal paradigm of the EU. If so, Toke offers a non-marxist critique of neo-liberalism of considerable value (Toke, 2000). For the British context, where the enthusiasm for privatisation survived a change of Government in 1997, the same research issue is relevant.

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