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Developing a new consensus for physical activity in England: Evidence of the growing convergence of transport and public health policies

Adrian L. Davis

KEYWORDS: physical activity, intersectoral collaboration, public health

The recent consensus within physical education research that moderate physical activity should be (re)integrated into the routines of daily living has shifted the focus away from a traditional sports and exercise bias. This has come about largely as a result of new medical evidence and an understanding that the greatest public health benefit is to be achieved through increasing activity levels among those most sedentary. This change could strengthen recent efforts within the transport sector, which now includes a National Cycling Strategy, to promote cycling and a forthcoming walking strategy as environmentally sustainable modes of transport. This paper charts recent developments in the public health and physical activity sectors to illustrate how health and transport concerns are leading to a convergence of public policy goals. However, key to this are new ways of thinking and working, requiring broad intersectoral alliances.

Is telecommuting a panacea for urban transport ills? An Australian perspective

Dr Laurence Knight

KEYWORDS: information technology, work practices, suitability for employment situations

Urban transport provides society with a range of benefits, but it also generates serious problems in the form of air and noise pollution, traffic accidents and congestion. Attempts to solve these problems through conventional means have achieved limited success. An alternative approach (promoted by information technology corporations) is for people to satisfy their needs without travelling - in the case of employment - by telecommuting.

This paper examines the context in which the discussion about telecommuting is taking place, as well as recent data on the uptake of telecommuting. Coming from an Australian perspective, the paper argues that while telecommuting will not provide a stand-alone solution, it has the potential to influence travel distances in its own right, and (more importantly) enhance the effectiveness of other policy mechanisms.

A Wish called Wander: Reclaiming Automobility from the Motor Car

Ian Ker & Paul Tranter

KEYWORDS: language, freedom, restrictions to mobility

Argues that in pursuit of a specific kind of 'automobility' we have unwittingly reduced the independent mobility of many people in the community, including the elderly, the disabled, women and children. Discusses alternative understandings of the term automobility. Argues that the current dominant use (or misuse) of the term has facilitated the acceptance of the view that cars provide freedom. The mythical nature of this viewpoint is explored.

Local Agenda 21, sustainability, and British policy on foodstore location - a case study

Alan G. Hallsworth, Rodney Tolley & Colin Black

KEYWORDS: Liphook, retail vitality, attractivenes and accessibilty for shopping

The growth of out-of-town and edge-of-town superstores in Britain has had an adverse effect on the vitality & viability of traditional, long established retail centres. The dilemma facing many of these centres is whether a superstore in the town would increase business and induce a trickle down improvement to existing retailers.

Freedom of movement for women: Feminist approaches to traffic reduction and a more ecological transport science

Gabi Zauke and Meike Spitzner

KEYWORDS: women, mobility, planning

This paper is based on the thoughts, work and discussions of the German network *Frauen in Bewegung* (Women in Motion). There is a gender imbalance in transport planning. More women must be involved in planning, and the needs of women must be addressed, if we are to achieve a sustainable society.

Trunk Roads and the Generation of Traffic: the SACTRA report and associated Government guidance - What does it mean and does it matter?

Keith Buchan

KEYWORDS: United Kingdom, traffic growth, COBA

A government study into traffic growth on major roads and motorways in the UK was published in December 1994 by the Standing Advisory Committee on Trunk Road Assesment ("SACTRA"). The government's formal response and an accompanying guidance note to road planners were published at the same time. This article, first written in pamphlet form in early 1995, surveys these three key documents and explains the substantial changes in appraisal methodology that should arise from them.

Editorial

THIS is the first editorial since the election of a Labour government in the UK in May 1997. The new government has already launched into the transport debate with statements of intent about supporting integrated public transport and "ending the love affair with the car". It has studiously avoided the controversial battlefields of transport policy including a new terminal for Heathrow Airport and bypasses, such as that around Newbury, and has supported the spending restrictions of the previous Conservative government.

The next few months will be critical for this government. If it can move the transport system away from its obsession with large scale infrastructure projects and towards numerous small scale improvements in quality of life for rural and urban residents alike then it will have done more than all the sustainability rhetoric we have seen since the Rio Conference in 1992. In this respect the UK government has an historic opportunity to demonstrate that there are wide ranging economic, social and environmental gains to be had from a sustainable transport policy.

However, this opportunity will be brief if only because honeymoon periods for new administrations are brief. The time is now right for a bold statement about reducing car dependency, transferring freight from lorries to the alternatives and restoring rights, freedoms and social justice to pedestrians and cyclists.

This is of wider significance than the UK alone. Just as cities need role models before they initiate car restraint policies so it is the same for countries. Israel is currently embarking on a huge investment in a road that will dramatically alter its geography and increase the amount of urbanisation and long distance commuting. The costs of the 300 km long "Road Number 6" are in excess of $1 billion and the benefits are very few. Its supporters argue that Israel needs the road because international statistics show that the country has a lower than average car ownership rate and "not enough roads".

Israel needs a different role model. Japan has the lowest level of spending on roads and car parking as a percentage of GDP than any other advanced industrial nation. It is not noticeably failing in its economic performance. Britain could set the standard for a new kind of national transport policy with strong local autonomy and strong local support for car reduction and improvements in air quality. We will soon know whether or not the new government will use the landslide electoral victory to make a difference or to give us more of the same.

In this issue of WTPP we give prominence to some of the new insights that are ready and waiting to fire a new government with enthusiasm. Davis focuses on the links between transport, physical activity and public health. Spitzner and Zauke draw our attention to the needs of women in society and the extent to which transport systems are designed by men to serve a narrowly based male view of the world. Hallsworth, Tolley and Black take us into the world of shopping (normally the task of women) to reveal the extent to which shopping trips impact on transport demand and the environmental consequences of that demand. Knight reminds us that telecommuting has advantages and disadvantages and is a legitimate part of an holistic view of transport and travel demand. Ker and Tranter develop the holistic strand by shedding some light on the fundamental tendencies in society and individual lifestyles that fuel the demand for motorised transport. These insights help to construct policies that are capable of moving us to lower levels of dependency on private motorised transport.

In addition, we publish in full a commentary on the UK report from the Standing Advisory Committee on Trunk Road Assessment (SACTRA). This report was published in 1994 by the UK government and gave authoritative support for the view that building new roads creates additional ("induced") demand and therefore can be expected in some circumstances to make a very limited or non-existent contribution to solving transport problems. Induced demand also has an impact on cost benefit analyses and can reduce by a considerable margin the benefits claimed in time savings for an individual road scheme. The original SACTRA report was and is very significant. We publish Keith Buchan's original commentary from the same year because it is a "milestone" document still in demand and not easily available. Its views on the SACTRA report and its additional insights are of vital importance everywhere in the world where new roads are still being put forward as solutions to transport problems. Let us hope the Israeli government takes notice.

John Whitelegg, Editor

Developing a new consensus for physical activity in England: Evidence of the growing convergence of transport and public health policies

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Abstract

The recent consensus within physical education research that moderate physical activity should be (re)integrated into the routines of daily living has shifted the focus away from a traditional sports and exercise bias. This has come about largely as a result of new medical evidence and an understanding that the greatest public health benefit is to be achieved through increasing activity levels among those most sedentary. This change could strengthen recent efforts within the transport sector, which now includes a National Cycling Strategy, to promote cycling and a forthcoming walking strategy as environmentally sustainable modes of transport. This paper charts recent developments in the public health and physical activity sectors to illustrate how health and transport concerns are leading to a convergence of public policy goals. However, key to this are new ways of thinking and working, requiring broad intersectoral alliances.

Introduction

In public health research the value of intersectoral collaboration, as it has been termed by the World Health Organisation, has been recognised to be critical to the promotion of health promoting public policies within and beyond the health sector. The Government's White Paper 'The Health of the Nation: A strategy for health in England' formally acknowledged that the strategy should be focused as much on health promotion as on health care, 'the pursuit of 'health' in its widest sense, both within Government and beyond' (Health of the Nation, p2). Its overall goal was to 'add years to life' and 'add life to years' by addressing five 'key areas'. The World Health Organisation 'Health For All' strategy was acknowledged as guiding this development, suggesting that Government was prepared to re-orientate health policy, and implying the need for reorientation in other sectors of public policy and beyond. Indeed, the White Paper was circulated to local authorities with a letter from the then Health Secretary urging them to work with health authorities in 'healthy alliances' in order to achieve the strategy's targets. In this the White Paper was attempting to shift the focus for health towards the need for healthy public policies across the policy spectrum:

> "*Local Authorities are responsible for a wide range of public services, many of which impinge on health and are linked with the strategy set out in the White Paper; these include education, transport, social services, environmental health and food safety. Their contribution is vital to the achievement of the strategy and I hope that together with local NHS Authorities and others, you will help to set up local alliances and initiatives to improve the health of local populations.*" (quoted in Blackman, 1992, p. 34)

This paper charts recent developments in the public health and physical activity sectors in illustrating how health and transport concerns are leading to a convergence of public policy goals, and the promotion of what has been termed healthy public policy.

Healthy public policy

Healthy public policy is characterised by an explicit concern for health and equity in all areas of policy and by accountability for health impacts (World Health Organisation, 1988). A useful distinction has been made between healthy public policy and public health policy in that the latter term refers to a narrower set of policies, more usually aimed at the system of caring for ill people. This distinction is a crucial one. Healthy public policy self-consciously aims to go beyond the health care system and its more traditional hospital and physician based care (Hancock, 1982). Definitions of healthy public policy incorporate broad visions of health, crossing traditional disciplinary, organisational, and governmental categories. They refer to a concern for manipulating the social policy environment to create a healthy society, implicitly recognising that social and environmental factors are important health determinants.

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The healthy public policies approach developed in the mid-nineteenth century with public health attempts to combat diseases of poverty such as cholera, associated with working class urban living conditions. Improvements in health came largely through improved sanitation and housing rather than medical treatment. With the discovery of the germ theory of disease, immunisation programmes and the growth of therapeutic medicine environmental approaches were overshadowed until their re-emergence in the 1970s (Ashton, 1992). The Lalonde Report (1974) and the work of McKeown (1976) were catalysts for this re-emergence, of the need for 'health conscious' policies beyond the health sector. The New Public Health, as it became known, incorporated and updated the nineteenth century emphasis on the physical environment as well as social factors as health determinants. The Ottawa Charter (World Health Organisation, 1986) stated that:

> *"Health promotion goes beyond health care. It puts health on the agenda of policy-makers in all sectors and at all levels … Health promotion requires the identification of obstacles to the adoption of healthy public policies in non-health sectors, and ways of removing them."*

The need for healthy public policies and intersectoral collaboration is, therefore, seen to be integral to promoting health. Health work must address the policy sectors and organisational actions affecting the conditions and conduct that create health (Milio, 1986). A series of initiatives initiated by the World Health Organisation have sought to develop such thinking. Yet the professional structures in which public health work is undertaken often mitigates against this. As Baum (1995) notes:

> *"The need for public health understanding to be broad and to draw on a range of disciplines is contrary to the tendency towards academic specialisation, stressing narrow knowledge, extremely detailed about a particular topic but lacking in a wider appreciation of how it fits in the broader scheme of things."*

In this respect the issues addressed here about health, physical activity and transport, involving the tensions between narrow sectoral thinking which acts as a barrier to effective intersectoral policy and broader policy goals, are also critical issues in much broader debates about sustainable development. Narrow, sectorally-constrained policy development fails to address the inter-relationship between policy areas such as transport, health and the environment. Delivering sustainable transport requires a multitude of actions across a range of policy areas. There is a small but expanding volume of literature about intersectoral collaboration which is now drawing attention to a range of structural and cultural barriers at inter-national, national and the local level (Spangen, 1995; Davis, 1996; Bäckstrand, Kronsell and Soderholm, 1996). This mirrors on-going work on projects such as *Healthy Cities* and *Health For All* which view intersectoral collaboration as a key tool in increasing the profile of health across all aspects of municipal government (e.g. Rathwell, 1992; Tsouros, 1995).

Physical activity and health

The benefits of physical activity in terms of reduced risk of cardiovascular disease and strokes have been documented through studies since the hypothesis was first developed (Morris *et al*, 1953), and they were identified in the Health of the Nation strategy for England (1992). Physical activity was also seen as contributing to reduced accidents and mental health benefits, two of the other four national 'key areas'. The strategy acknowledged the value of targets at a population level in stimulating progress and providing a measure by which it could be assessed. It also identified that intersectoral working or 'healthy alliances' at all levels were an important element in the reorientation of health policy towards prevention and health promotion.

Shortly before the launch of the Health of the Nation the first comprehensive picture of adult fitness levels in England was published. This reported low levels of physical activity among the majority of men and women aged 16-74. A key finding was that seven out of ten men and eight out of ten women fell below their age-appropriate activity level necessary to achieve a health benefit. Published by the Sports Council and the Health Education Authority (HEA), the Allied Dunbar National Fitness Survey (ADNFS) gave substance to the view that the British adult population is increasingly sedentary, although 80% of those surveyed believed that they were fit and took sufficient exercise (Sports Council/HEA, 1992). Reasons given for low levels of activity focused particularly on people not seeing themselves as 'sporty', as well as feeling overweight and embarrassed. The report stimulated further research into barriers to

physical activity but also importantly provided a focus for action to address declining levels. In this respect the ADNFS provided a benchmark by which efforts to improve physical activity levels among adults could be gauged.

In March 1992 the British Medical Association (BMA) launched a report promoting cycling which signalled a complete U-turn in policy from a view of seeing cycling as 'dangerous'. Drawing on earlier research the report concluded that 'even in the current hostile traffic environment, the benefits gained from regular cycling are likely to outweigh the loss of life through cycle accidents for the current population of regular cyclists' (BMA, 1992). An organised national cycling lobby ensured that the report received maximum publicity. Within six months a leaflet, funded by the BMA, the bicycle industry, and the main cycle campaign body, had been sent to all doctors' surgeries setting out the findings and encouraging the uptake of cycling as an environmentally-friendly means of transport and as part of a healthy lifestyle. Although as Whitehead (1992) has noted:

> "… as well as motivating people to take up cycling there have to be parallel public policies in place making it safer and more pleasant to do so… people cannot be expected to maintain an initial interest in activities such as cycling if conditions on the road do not improve."

'Physical activity' or 'sport'?

Approaches to fitness and physical activity have been dominated by a sports and leisure-led approach. Historically close links between the sports and physical activity lobbies through universities and research bodies had resulted in a bias and strong lobby which, to a large extent, has dominated physical activity research, debate, and policy formulation. This is reflected by a considerable volume of research on physical activity being published within journals associated with sport. The ADNFS had reported the association of physical activity with 'sporty' images in public perceptions. Further work by the HEA, using in-depth discussion groups which sought to complement the ADNFS, identified that physical activity operated as a generic term for sport, exercise and leisure pursuits (HEA, 1993). Images of sport and exercise were associated with youthful men and women with 'rippling muscles', with sport being perceived as particularly male oriented.

An outcome has been that public perceptions are biased towards an understanding that physical activity is largely something that time has to be made available for, something many people claim they cannot find. Together with special clothing, and activity centres that need accessing, this has meant that physical activity has been seen as largely the domain of young, slim and athletic men and women, not attainable by the majority of the adult population. Moreover, research has identified that a significant section of the adult population feel themselves fit enough for the lifestyles they lead, having adapted lifestyles to accommodate low fitness thresholds. This results in a view that: 'I'd say I was fit - well, fit enough to do what I need to do'. This section of the population, 29% of men and 28% of women aged 16-74, lead largely sedentary lifestyles. For them physical activity of all kinds was often viewed as difficult, unpleasant and a little pointless (Killoran et al, 1994).

The perception of physical activity as sporty and an activity beyond the routines of daily life for the majority of the population has resulted in the 'ghettoisation' of physical activity within the sport and physical education sector, with little intersectoral working beyond traditional boundaries. Operating within a predominantly biomedical disease and lifestyles based approach to health led to a failure to set behavioural change programmes within broader policies for environmental modification (Davis and Jones, 1996). Suggestions for policy changes which would facilitate cycling as part of everyday life, as proposed by the BMA, for example, are infrequent in physical activity research.

This bias linking physical activity with sport and exercise is also evident within health education (Edmunds and Bowler, 1995; Trippe, 1996). Much emphasis, for example, has been placed on GP referrals to exercise schemes managed by staff based in leisure centres. Yet while researchers suggest that physical activity programmes can increase participation sufficiently to achieve long term health gain their research findings

> "do not support the increasingly popular prescription for exercise schemes… we have found no evidence to support the efficacy of facility based interventions."

In contrast, the researchers suggest that physical activity at sufficient frequency and intensity to provide long term health gain

> "is best achieved when exercise is home-based, of moderate intensity, can be performed alone or with others, is

enjoyable, convenient, and can be completed in three sessions per week. Walking will satisfy all of these criteria." (Hillsdon, *et al*, 1995).

Barriers to intersectoral collaboration at the local level

Researchers, particularly of public administration, have noted that coordination within and between organisations and professions is a perennial problem, making policy processes and implementation issues important areas of study (Barrett and Fudge, 1981; Healey, 1990). Barriers to coordination include vested interests, structural complexity, and divergent professional and organisational cultures. The way professions organise and operate tends to encapsulate these barriers through the defining of boundaries that separate them from other sectors so framing what is to be excluded. Sectors tend to be marked out by specialised discourses of knowledge and expertise in seeking their legitimisation and maintenance. Each sector has well established functions and its primary interest is normally to maintain and develop these.

> *"Sectors are institutionalised mobilisations of bias. 'Sectoring' is orientated towards protecting, if not advancing, the differentiation of one sector from another. This involves not only segmenting particular aspects of social and economic life but also designating and hence restricting who is to have standing in problem definition, and programming in and constituting and delivering treatments and interventions." (Degeling, 1995, p. 294).*

This knowledge sits uncomfortably with the need for intersectoral collaboration in order to achieve mutually supportive policy goals. The interconnection between sectoral policies may be far from clear among sector members, including some within the health sector. This is reflected in the literature, that collaborative approaches to health and sustainable development are reported to be marginal to core agenda (Norton and Rogers, 1981; London Reseacrh Centre, 1993; Blackman, 1995; Bäckstrand, Kronsell, and Soderholm, 1996).

Within health and medicine, sectoring with its concern to maintain its dominant expertise base is evidenced by the continued dominance of the bio-medical model, with claims that exponents of the New Public Health produced socially desirable talk but no hard data (Vandenbroucke, 1994). Moreover, the dominance of quantitative approaches in both health and road transport sectors have been seen as 'value-free' in research and policy formation among these groups, and among politicians seeking 'hard' evidence in support of policy choices. This has led to an emphasis on individual behavioural changes with structural change largely absent from debates. In turn this has allowed a business as usual strategy to remain dominant with minimal recognition of the interconnection of policy areas.

Intersectoral collaboration at the national level

The goal of reducing coronary heart disease and promoting physical activity has been progressed by the Department of Health through the establishment of a number of key groupings. A Health of the Nation Cabinet Sub-Committee was established at which all government departments were represented to help enable intersectoral working. In addition a Physical Activity Task Force was established in July 1993. There were concerns over a sports and exercise bias with the appointment of the Task Force members, principally among the cycling lobby, pedestrian groups, public policy researchers and some public health interest groups. These lobby groups had consistently argued that traditional and narrow sectoral policies were not effective. Three of the Task Force members were medically trained (albeit one was a public health director), another three were health education specialists, two were leisure and recreation officers from local government and two were Sports Council executives, one of whom was Chairman. A further grouping of health and sports advisers were available to provide additional assistance as well as officials from Government departments.

The rejection of targets

During the first year of the Task Force's work a considerable amount of time was spent on developing physical activity targets. At a HEA symposium in April 1994, designed to support the Task Force in developing a national strategy, a specific objective was to examine possible targets for physical activity. Three targets at a population level were presented, having been proposed by the Task Force. Based on medical evidence, and the ADNFS, these were focused on reducing the proportion of people who are sedentary, increasing the proportion taking a minimum of 30 minutes of at least moderate physical activity five days a week, and increasing the proportion taking on average three periods of

vigorous activity for 20 minutes a week (Fentem and Walker, 1994).

The Cabinet Sub-Committee subsequently rejected a targets oriented approach, perceiving that they might be misconstrued as individual targets, and was concerned to avoid claims of 'nanny-state' interventionism. Targets had previously been set by two other Task Forces, on nutrition, and obesity. More so than these, however, it was recognised by Ministers and officials that physical activity could impact on policies across a wide spectrum of public policies with the potential of raising political and technical impediments. Members of the Task Force were also concerned that targets might be used crudely. The Department of Health's (1995) consultation document, which appeared in May 1995, reflected this view, so that on "*balance it has been decided not to set targets for physical activity, but to concentrate instead on promoting the uptake of a more active lifestyle.*"

The consultation paper set out the medical evidence indicating that the greatest health gains would come from shifting the emphasis from regular vigorous to moderate physical activity. This would be a more realistic feat for those currently sedentary or having low activity levels. Only 36% of men and 24% of women are sufficiently physically active to achieve health benefits. Essentially, despite omission of 'targets' from the consultation paper the three identified target areas were retained as core goals for the development of a physical activity strategy.

National policy shifts

During the drafting of the consultation pressures to reflect wider public policy changes were important in shaping the paper. The combination of the latest medical evidence with that of adult fitness levels reinforced the need for a broader policy focus in halting and then reversing the decline in physical activity and fitness. The public health case for focusing on moderate physical activity which could reach a far wider section of the population could only be achieved through a move away from the sport and physical education predominance.

By 1994, policy changes in both the Environment and Transport departments within central government had begun to focus attention towards the need for more sustainable transport through landuse planning in reducing the need to travel (and carbon dioxide emissions) (DoE/DoT, 1994). In the Department of Transport itself, a recognition of the need to shift from seeking

to meet 'demand' for road space to 'demand management' led to a remarkably swift change towards promotion of cycling. The BMA report had added extra ammunition for carrying through this change. Indeed, two weeks after the publication of the physical activity consultation paper the Department of Transport announced its intention to develop a National Cycling Strategy (DoT, 1995).

The influence of lobbying and campaigning

The pressure for a shift in influence away from the sport and physical education sector was strengthened through long term lobbying in the environment policy sphere where transport campaigners had been arguing the case that environmental as opposed to purely behavioural changes were required in order to reduce environmental impacts. Such concerns were endorsed by the widely publicised Royal Commission report on Transport and the Environment (1994). In this sphere there was a growing recognition of the need for public policies which could enable healthy and environmentally sustainable choices to be made, accelerated by the Bruntland Report 'Our Common Future' (1987), the Earth Summit in Rio de Janeiro in 1992, and the Government's response to these - 'Sustainable Development: The UK Strategy' (1994). The changes in transport policy especially enabled a broader policy focus on physical activity, strengthening the case of those seeking action beyond the traditional sectoral focus for physical activity promotion.

The National Heart Forum, an influential coordinating body for an alliance of heart health organisations, played a key role in the physical activity debate. Represented on the Task Force, the Forum took a broad public health view of the need for healthy public policies and a strong intersectoral focus in the development of the physical activity strategy. Close links with environment and transport groups informed and strengthened its own lobbying of the Task Force. The Forum provided support for the position agreed at the 1994 HEA Symposium and reiterated in the consultation paper that "successful promotion of physical activity in England amounts to encouraging the reintegration of physical activity into every day life". (Killoran, Fentem, and Casperson, 1994, p 3). A copy of the Forum's response was sent to all public health and health departments mid-way through the consultation period to help inform and influence other responses.

The consultation paper was strikingly similar in emphasis to the statement on the health benefits of physical activity developed by a joint committee of the World Health Organisation and the International Federation of Sports Medicine (FIMS) in 1994. In this, daily activity was accepted as being the cornerstone of a healthy lifestyle:

> "Physical activity should be reintegrated into the routine of everyday living. An obvious first step would be the use of stairs instead of lifts, and walking and cycling for short journeys" (World Health Organisation, 1995).

The timing of this statement and the signatories to it which included some of the most prominent public health researchers in this area, added further weight to efforts to promote physical activity through public policies which enable physically active lifestyles.

The publication of the strategy

In March 1996 the Department of Health issued a 'Strategy Statement on Physical Activity' confirming support for the consultation paper's positioning among the majority of the two hundred plus submissions from consultees. Much of the Statement focused on the work of other government departments such as Environment, Education and Employment, Heritage, and Transport and external agencies such as the HEA's 'Active for Life' campaign, launched the same day. The HEA was also given responsibility for taking forward the work of the Task Force, which was concluded, although against the wishes of some members.

Although the Statement did not constitute a comprehensive physical activity strategy for England as proposed in the consultation paper, the resolution that physical activity should be reintegrated into everyday life indicated a recognition of the failure of narrow sectoral policies to promote physical activity and health. Sport, by its very nature tends to involve vigorous activity, recognised to be 'an unrealistic goal for the majority of the population'. Realistically, addressing wider public policy issues was the only way in which declining levels of physical activity could be challenged.

Conclusion

The physical activity debate was dominated by factors strongly indicating a need for a broader focus on physical activity beyond sports and exercise. Pressure for change came from an alignment of health, environment and physical activity lobby groups who had consistently argued that narrow sectoral policies were not effective. The changing policy direction within both the transport and environment sectors were important leverages. The Department of the Environment's publication of a Sustainable Development Strategy, a parallel to the Health of the Nation, was an important spur to action. This, combined with specific targets to reduce carbon dioxide emissions through land-use planning, measures to tackle air pollution, along with complementary policies from the Department of Transport, signalled that policy focus was shifting upstream towards environmental modifications. The recognition by both of these sectors at Government level of the need for environmental modifications, which include regulation, indicated that behavioural change programmes, although ideologically preferable, was not sufficient to contain individually and environmentally health damaging lifestyles.

More recently, the issue of a discussion paper on walking (Department of Transport, 1996), and its acknowledgement of the health value of walking suggests policy convergence leading to healthy public policies is gaining further momentum. Other examples include a policy statement on transport and health from the BMA (forthcoming) and an extensive review of the health benefits of cycling commissioned by the Department of Transport. Moreover, this is working synergetically with other pressures for policy change in transport. As Goodwin has noted,

> "There are other important elements in transport policy which - for reasons quite separate from health - are leading to the same conclusion … [so that] the health argument is likely to find an unusually favourable hearing." (Goodwin, 1997)

The question arising from this policy debate is whether intersectoral alliances between the transport and health sectors at the local level will burgeon in the spirit of healthy public policy. Recent health education programmes such as Active for Life will need significant and long-term assistance from other major policy areas if the public are to be enabled and encouraged to act on health messages concerning healthy living. Promoting health and sustainability require new ways of thinking and working, often in alliances well beyond those commonly practised to date. Moreover, recidivistic tendencies, likely to be common to all policy sectors, may provide strong resistance to strategies seeking to promote

policies if these seem beyond traditional professional and sectoral remits. As Healthy Cities projects have found, politicians and public servants may be happy to choose policies which result in minor changes that don't require more than incremental change. They may be unwilling, however, to accept more radical programmes which require, for example, a redistribution of road space from motorists to pedestrians and cyclists. It remains to be seen whether the growing convergence between public health and transport policy will result in the surmounting of the sectoral and structural barriers which currently stifle moves towards environmentally sustainable and health promoting transport.

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A Wish called Wander:
Reclaiming Automobility from the Motor Car

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Abstract

In pursuit of 'automobility' we have unwittingly reduced the independent mobility of many people in the community, including the elderly, the disabled, women and children. Alternative understandings of 'automobility'. The current dominant misuse of the term has facilitated the acceptance of the view that cars provide freedom. The mythical nature of this viewpoint is explored.

Introduction

Transport economics textbooks always used to argue that the demand for travel is a derived demand: that is, we do not seek travel for itself but for what it enables us to do. If that is so, then why do we devote ever greater amounts of time to it rather than trying to minimise the travel we undertake? Although those economics texts do recognise tourist and certain types of leisure travel as exceptions, most urban travel is for utilitarian purposes. According to the theory, we should aim to minimise, rather than increase, our consumption of travel. And yet, when faced with an increase in the speed of travel (for example, by the construction of a new rapid transit system), we tend to reduce the gains in terms of longer journeys, thus maintaining the same travel times.

Collectively, transport planners then treat this additional travel as a benefit, on the basis that it reflects an increase in the range of choice available to each of us. One might well question the utility of additional choices when most of us are already suffering from information and option overload (Keyes, 1991). Might it also not be possible that the additional choices made available to us through time savings are less of a benefit than they seem at first sight? Have we reached the stage where we simply spend more time choosing and suffer a real dis-benefit through continually wondering whether we have made the right choice?

It is increasingly being recognised that in making our private choices we often impose unforeseen costs on others. This paper shows that in pursuit of a specific kind of automobility, we have unwittingly reduced the independent mobility of many people in the community, including the elderly, the disabled, women and children. In doing so, we have reduced their access to opportunities such as employment, education, recreation and social interaction. In the particular case of children, we have inhibited their development of independence, with far-reaching and long-term consequences.

Yet it is not only the transport disadvantaged whose freedom is curtailed by the motor car. Motorists themselves have also been misled by the myth of cars as freedom machines: the myth that car based mobility directly complements autonomy or self-directedness. Consequently, motorists become more dependent on others (including car manufacturers and repairers) rather than gaining autonomy.

In this paper, the following questions are addressed:
- is automobility 'bad language'?
- who has access to car based mobility?
- are children and women marginalised by an increased reliance on car based mobility?
- is it a myth that cars provide freedom?
- what are the dangers of a high technology vision for automobility?

Is 'automobility' bad language?

In the study of transport (or any other social issue) we often overlook the subtle effects of language on the acceptance of dominant ideologies. Modern English speaking societies have uncritically accepted the use of the word 'automobile' to mean the private car, and hence 'automobility' to mean private car use. However, an examination of the meanings behind this term suggests that such usage is based on false assumptions.

Dictionaries gave the following definitions:
- *auto-* (in combination). Self, own, of or by oneself (Greek *autos*).
- *mobile*. Shifting position readily, not fixed.

It needs only a little reflection to realise the absurdity of equating *shifting position readily by oneself* with the private motor car, in many of the major cities of the world. Not all cities are as bad as Bangkok, where traffic moves at not much more than walking pace, but all cities have times and places where the car is not a very mobile piece of equipment. Jokes about freeways (roads with restricted access) being very expensive linear car parks are too often not far from the truth.

But even when it is mobile, the motor car does not provide *automobility* to people. Simply to keep oneself mobile in a car requires large vehicle manufacture, service and repair industries, the road building industry, an international oil industry and, of course, an external source of energy.

Therefore a paradox is in operation. The motor car appears to provide its owners with the independence to travel when and where they choose. Yet there is a fundamental dependency on the goods and services provided by a multitude of others. The apparent 'independence' provided by the car is quite illusory.

The only true *automobility* is achieved by walking, but cycling comes pretty close since most people can effect the necessary maintenance and repairs to keep a bicycle in running order and the rider provides his or her own energy to achieve the mobility.

The consequences of this are not trivial. We find ourselves in the situation where suggestions that we must seek alternatives to the private car in our cities are seen to be advocating a reduction in the ability of individuals to be independently mobile. Such suggestions conflict with modern concepts of individuality and are strongly opposed. Yet much of this opposition may be based on a misunderstanding of 'automobility' and of the supposed 'freedoms' provided by the motor car.

Automobility for whom?

Automobility, in its current (mis)usage as car based transport, applies only to a minority of the population at any one time. Even in western societies, almost half the population does not have independent access to a car.

Using data from Western Australia, the transport disadvantaged are disproportionately the young (100% of those younger than 17), the aged (43% of those over 60 do not have a driver's licence) and women (25% of women over 17, and 60% of those aged 60 and over, do not have a licence to drive).

Australian cities are among the most car-dependent cities in the world. Yet despite the dominance of the car in Australian cities, 45% of people do not have a driver's licence, either because they are too young to drive (26%) or because of disability, the cost of owning a car or historical circumstances (particularly amongst the elderly). There are also a significant number who have a licence to drive, but do not have access to a car.

So far, our most common approach to the mobility disadvantages of such groups as children, women, the elderly or the disabled has been to attempt to provide more car based mobility for them, usually as passengers. While this may seem an appropriate choice in some circumstances, in doing so, we have, often unknowingly, contributed to the lack of true automobility (i.e. independent mobility) for the rest of the population. Ironically, one of the most hazardous tasks for any pedestrian (especially children, the elderly or those with disabilities) is trying to negotiate the traffic jams around schools at the end of a school day; traffic jams caused by parents trying to compensate for their children's lack of genuine automobility.

Automobility for those too young to drive

Children represent an obvious group that has not been a major beneficiary of developments in mobility via the car. Although they can travel as car passengers, children aged from 7 to 12 in many western countries now have much less freedom than in previous generations to travel around their own neighbourhood or city without an adult (Hillman *et al.*, 1990; Tranter and Whitelegg, 1994; Tranter, 1994).

The reduction of children's true automobility can be related to the growth in the reliance on the motor car, either directly through its effect on traffic danger, or indirectly through its effect on the location of activities, and the reduction in local, neighbourhood-based communities.

It could be argued that the loss of this independent mobility has been compensated for by extra car trips as passengers. As car passengers, children can travel to more (and more distant) locations than they could otherwise. However there are considerable costs involved in depriving children of their freedom, not only for the children themselves, but also for their parents, the wider environment, and for the whole community (Moore, 1986; Tranter, 1994, 1995; van Vliet, 1983, Kegerreis, 1993). The independent mobility of children is something which may not be compensated for by increased mobility of children in cars.

The most significant costs of the lost freedom relate to the children themselves. Children's own personal, intellectual and psychological development may be impaired when their independent mobility is restricted (van Vliet, 1983; Kegerreis, 1993; Moore, 1986, 236, 239). In order for children to be able to get to know their own neighbourhood and community, they need to have active exploration. This is not provided when children are passengers in cars: children may see more, but they learn less. Without true automobility, children are unlikely to experience a strong sense of local community, nor are they likely to feel as though they are an important part of that community.

The importance of independent mobility for children is expressed very powerfully by Engwicht (1992, 39):

"… freedom to explore the local neighbourhood … gives [children] an opportunity to develop a relationship with the placeness of their physical environment. Robbing children of a sense of place robs them of the very essence of life".

Another consideration is that if children are constantly driven to school and to other places, they lose one regular way of maintaining their physical fitness. The effect of this lack of fitness on self esteem and obesity has been noted by an Australian paediatrician, Dr Simon Clarke:

"… their parents bring them to see me because they are overweight and have self esteem problems. Of course they are overweight. They are all ferried about by car to organised sport and organised music" (Donaghy, 1994, 15).

While it is important that children be able to get to local play areas by themselves, walking or cycling journeys to school and to other destinations also provide genuine play activities in themselves (de Monchaux, 1981, 97 -99). Research in the United Kingdom (Keynes, 1995, 2) found that the majority of primary school children would rather walk or cycle to school than be taken by car.

Not only is the automobility of children decreased by excessive reliance on the motor car, but the automobility of their parents is also decreased when parents are forced to spend more time acting as conscript chauffeurs, and hence have less time available for walking or cycling. Children in car dominated environments are much more likely to be driven to school, to sport, to entertainment, and even to their own friends homes. Those who are most likely to be the chauffeurs are the mothers of these children.

Women and automobility

There are some important gender implications of the increased dominance of the motor car. Although some women may appear to have been advantaged through increasing car ownership, in general, women have benefited much less than men. Women generally have less access to private motor vehicles (Pickup, 1988). However, many women feel forced into purchasing a motor vehicle because of fears for their personal safety as pedestrians, as cyclists or on public transport (Hamilton and Gregory, 1989; Wekerle, 1984). Thus women may feel deprived of the freedom *not* to own a car.

Despite recent changes in the rates of women in the workforce, research in Australia, Britain and the USA demonstrates that "outside the home, women are still primarily responsible for domestic related travel purposes; for example, shopping and school escort journeys" (Pickup, 1988, 104). As Tivers (1988, 93) argues, "this is clearly the result of gender role differentiation of activities". Women's traditional child care role now includes the responsibility to keep children safe when moving from one private space to another, safe from traffic dangers for example. Thus women not only have less access to cars, but they are more likely to have to use them for purposes that are nothing to do with autonomy or self-directedness, but more to do with perceived constraints or obligations.

Automobility for motorists? Mobility, freedom and unfreedom

The emphasis on private motorised mobility systematically discriminates against substantial sections of the community in terms of access to the facilities, services and opportunities most of us take for granted. Yet even those who still have car based transport are being deceived by the apparent advantages of the motor car.

Residents of modern cities have collectively constructed a myth concerning the freedom provided by the car. As argued above, the mobility provided by the car is contingent on the support provided by a plethora of goods and service providers. The myth that the car provides us with freedom is also based on the false premise that mobility facilitates freedom. This idea is related to the mechanistic model of the world which still pervades Western society (Capra, 1982). In this world view, objects (including people and machines) are not seen as productive unless they are doing things, or moving. Unfortunately, so much emphasis is placed on moving that we have forgotten what movement can destroy. As Engwicht (1992, 18) explains "for many people, movement can be an expression of tyranny, a loss of freedom". For example, people may be forced to drive children to organised sport simply because they feel it is too dangerous to let them play locally. Engwicht suggests that "true freedom lies in having access to the interaction (exchange) that we need for personal and community well-being".

Motorists themselves often do not have the freedom NOT to own a car. As Catton (1993) argues, "freedom involves the ability to act in ways that are consonant with one's values". Growing numbers of people now value:

- a safe and livable urban environment, protected from dangers such as traffic, pollution and other dangers such as the risk of assault;
- strong neighbourhood based communities, which allow people to feel as though they are an important part of a meaningful community;
- equity; and
- physical, psychological and spiritual well-being.

When people use their cars, collectively they are behaving in ways which are not consistent with this set of values. If people feel forced into car ownership, then this means that they have relinquished the freedom to behave according to their values.

But even if we accept the premise that speed of movement can be equated with freedom, the motor car has let us down. During peak hour traffic, average speeds in Australian cities are often less than the speed of a bicycle. Also, when the time devoted to earning the money for the purchase, maintenance, insurance and so on of cars is taken into account (as well as the external costs of cars), the social speed of driving is less than that of a cyclist. "In the final analysis, the car wastes more time than it saves and creates more distance than it overcomes" (Gorz, 1973).

Despite the current emphasis on speed and convenience, the value of wandering around is still recognised in our society, sometimes in seemingly unlikely contexts. For example, even within the U.S. Air Force it is realised that the best leaders adopt the "LBWA" strategy: "Lead by Wandering (Walking) Around" (Lester, 1995). This allows leaders to stay in touch with people and with their working environment.

In the same way, urban residents need time to wander around their neighbourhood to give themselves a sense of place and a sense of community. When people walk (or cycle) this is not merely transport as "a means of getting to a place, it can be an experience of place in itself" (Engwicht, 1992, 39; see also Ohlenschlager, 1990, 28).

Dangers of a high-tech vision for automobility

As motorists travelling at speed, our vision is restricted to a narrow band, approximately the width of the road. Similarly, transport planners can easily be narrowly focussed on technological solutions to the problems of the motor car. A current example of this is the technological view of automobility as "cars that drive themselves". This new development in transport policy may make it even harder to reclaim automobility from the car. Zygmont (1993) suggests that in "traffic-choked regions like the LA basin, automatic driving will first appear around 2010". This would be facilitated by Intelligent Vehicle Highway Systems, which may eventually facilitate cars driving in "platoons" at speed

on freeways, steering themselves by following a guidance system transmitted from sensors in the cars. Such a system is claimed to increase freeway capacity by up to 300%. This approach supposedly solves the problems of cars by making cars better!

One of the many problems which such a technological approach is that even if it works on the freeways, it will simply mean that there will be more cars coming off the freeways into urban areas at either end, where the cars will disrupt communities, kill people and make streets even more unlivable. It will also further encourage the trend towards the dispersal of land uses, because when people save time on transport they use it to buy more distance. Consequently, life will be even harder for pedestrians and cyclists.

By adopting a more logical definition of automobility, we can envision different directions for our cities and their transport. In a city in which people are genuinely automobile:

- walking and cycling are the primary modes of transport; motorised transport (public and private) is used only where non-motorised transport is unsuitable.

- streets are places for people, rather than simply movement corridors for motor cars (Tranter and Doyle, 1996). Adults as well as children use the streets as places to socialise, places to 'wander'.

- most of the present road space and car parking space is used primarily for non-motoring uses including recreation, work activities and food production.

- significant car-free areas are provided (Reutter and Reutter, 1996)

- public transport operates in ways which promote ease of independent use by all people, without itself creating barriers for those who wish to wander.

Such a city is one where people of all ages, abilities and incomes are freer to 'wander', to explore, to interact, to play and to socialise. Such a city is ultimately more equitable, because the ability to access opportunities becomes less dependent upon being able to command the substantial resources necessary for private motorised travel.

Conclusion

People may well have an innate 'wish to wander'. When we rush from one activity to another, when we treat ourselves as machines, trying to be as productive as possible, we are depriving ourselves of important experiences. We lose our sense of place and history. We lose the opportunity for the sense of belonging that comes from keeping in touch with our communities.

Activists for more livable cities are constantly searching for new ways to reduce the dominance of the motor car. Already there are numerous in-action models throughout the world showing how we might be able to move towards this goal (traffic calming, reclaiming streets for people, charging the full costs of cars, etc.) (Hass-Klau, 1990; Hass-Klau, 1992; Hawley, 1993; and CART, 1989). The difficulty arises in being able to engender widespread enthusiasm for the necessary changes. An attitudinal change in society is needed; dominant social values need to be challenged.

This paper has identified one important way to help produce such an attitudinal change: raising an awareness of the misuse of language. The widespread misuse of "automobility" is not just bad language, its constant use helps to repress the challenge of the myth of cars as freedom machines. If enough people can understand the basis of this myth, if we can understand the link between cars and "unfreedom", if we can see the value in "wandering", then perhaps we really can reclaim automobility from the motor car.

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Freedom of movement for women: Feminist approaches to traffic reduction and a more ecological transport science

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Abstract

This paper is based on the thoughts, work & discussions of the German network *Frauen in Bewegung* (Women in Motion). There is a gender imbalance in transport planning. More women must be involved in planning, and the needs of women must be addressed, if we are to achieve a sustainable society.[1]

Introduction

Frauen in Bewegung (Women in Motion) is a nationwide network of women experts drawn from science, planning and politics which works towards an ecological, social and feminist change in mobility and attitudes towards mobility as a subgroup within the German Green Party's working group on transport. These are the results of the thoughts, discussions and work of *Frauen in Bewegung*.

I. An outline of the main current developments:
- The role and interdependence of women and ecology;
- An overview of the discussions between those engaged in the themes of mobility and transport;
- A feminist evaluation of transport expenditure;
- A feminist evaluation of five key traffic generating principles;
- The discussions on transport research, politics and planning; and
- Ensuing ecological questions (mostly in connection with the results of the survey by the Enquete Kommission of the Bundestag on the Protection of the Earth).

II. Women's views will be given on three strategies that critical transport research is going to focus on. These strategies have been recognised in established discussion for the last three years.

III. Finally, we will cover some areas of interest to women where practical, solutions-based research is necessary and where women are involved already.

I. Major current developments

I.1 The interdependence of women's endeavours and ecological efforts are more a strategic question.

We want to emphasise that now is the time to draw together the women's movement and the ecological movement, because the demands of both for structural and fundamental change to science, planning and politics are very similar, there is an increasing danger that both movements will be played off against each other by established lobbyists, there is a reaction against both movements, and there are many opportunities to learn from each other and to correct and develop visions, orientations and practical steps toward solutions.

I.2 The discussion among women interested in transport issues was started by an analysis of the effects of traffic and transport on women (Spitzner, 1993). They recognised that the orientation towards the automobile in research, planning and policy resulted in discrimination of space and time against women, stabilised the structure of domination and violence, worsened the psychological discrimination of women and was counterproductive to the very important aims of equal opportunities policies such as better conditions for combining work and family, assuring an individual (material) existence, etc.

Traditional transport planning and policy - a very "tough" economic sphere - continues to ignore the tasks involved in women's everyday work. However, initiatives by women are increasingly part of theoretical and practical discussions, experience is gained in case studies and a number of feminist experts are involved in transport research and the planning of work processes (Spitzner/Zauke 1994). Today we are at the point of elaborating integrated methods in transportation research, criteria of planning, and expressing concrete positions on actual political decisions (e.g. the privatisation of the national railways). In discussions about

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all these questions it became clear: ecological and sustainability objectives and intentions of equal opportunity are very close related.

Women are not only the victims of anti-ecological traffic planning, but also the ecological avant garde. Accordingly, we need to orientate the practice of transport planning and policy towards women. Men are the problem and the object of the practical critics.

I.3 The following is an example of the problems of male-dominated, selective research categories.

One of the daily problems of the effects of transport on the environment is illustrated by the research category "shopping traffic". Transport research expenditure by the Federal Republic is largely limited to the *Stelzenbahn* (Transrapid) project which provides our Minister with a very nice illusion of a *Wirschaftsstandort* (research standard). The objective of this project is to encourage people to travel between Frankfurt and Hamburg (a distance of 370 kilometres) to shop. There is widespread resistance in Germany against the spending of billions of Marks and the passing of several laws for this project, because the usefulness is difficult to determine, the economic value is uncertain, other projects need the money, and the venture is inconsistent in relation to sustainability targets.

I.4 Five traffic producing principles of the established transport science, planning and policy are the targets of feminist criticism:

(i) The connections between economic growth and transport growth, the primacy of the market economy, and the political realisation of the external costs of the effects of transport and traffic (monetary and non-monetary, work intensive and time consuming) are absorbed by society as a whole;[2]

(ii) The primacy of job/working/labour analogue, of a market economy in relation to the deficits of change in the gender division of work and in relation to the spatial division of work;

(iii) The androcentric paradigm of transport science and the resulting irrationalism concerning the recognition of an analysis of reality of importance to mobility, concerning the awareness of the significance of the different types of problems, the ecological potentials of solutions, and the evaluation and development of measures and instruments.

Implementing certain economies of scale to achieve greater efficiency of factors of production has effects which generate traffic. Irrational (and inefficient) fixation of institutional, material and personnel capacities on technological efficiencies instead of discussing interdisciplinary approaches to problems involving mobility and coping with everyday life has serious effects. In practice, they lead to misjudgements with serious consequences regarding the problem solving potentials inherent in:

- technical solutions;
- large scale solutions and large projects;
- the significance of long-distance traffic;
- higher speeds.

Table 1 : Differences in Access and background - a comparison

Traffic Policy Operatives	
Traffic Planners and policy-makers Design of mobility parameters	"Transportation Users" Mobility needs
Men 'in the prime of life: 30 to 60 years of age, largely relieved of work in and for the home, 'healthy', not of foreign cultural background Engineers	Women, girls and boys, senior citizens
Activities	
Employed	Those involved in so called 'reproductive' efforts to keep the breadwinner fit for work; working in the informal sector, part-time and full-time employment; 'flexible working hours'
Orientation of acting and thinking	
Questions applicable to individual, discrete assignments and projects	Questions relating to everyday life, communications, interpersonal relationships, the organisation of (daily) life
Orientation towards feasibility, technical options	Orientation towards the limits of what can be coped with
Efficiency categories for the various rationalisations	
... of feasibility	... of utility
Speed Longer distances (home, neighbourhood, district) Large projects Specialisation of functions Standardisation of 'solutions'	Slowness, non-accelerability Reference to room and nearby sites Incremental improvements General utilisation; multiple utility (of space)
Technical optimisation by increasing technical effort	Minimum (tranportation) cost and effort
The automobile as an 'absolute necessity' Being 'on the road'	Freedom of choice of tranportation means Accessibility, freedom of movement
Structural traffic generation	**Structural traffic avoidance**

These biases, which tend to create more problems instead of solving them and which correspond to business interests, have for years now generated additional traffic.[3]

(iv) The isolation of politics favouring equal opportunities for women and men, the delegation of policies encouraging equal opportunities to women and the lack of integration and implementation of policies, practices and resources which encourage equal opportunities at an official level.

(v) The over-simplified meaning of ecology and sustainability - the isolation of natural resources from human resources is a reflection of gender hierarchy and power relationships in general, which runs parallel to the institutionalising of environmental tasks.

I.5 Discussions on climate and related ecological matters has resulted in a fundamental re-evaluation of transport research.

The Enquete Kommission *Vorsorge zum Schutz der Erdatmosphere* (Protection of the Earth) of the Bundestag has explained the results from decades of scientific research to politicians and planners. It recommends four key strategies in the following order:

(i) traffic avoidance;[4]

(ii) substituting unsustainable modes of transport by more sustainable ones (which means, for example, offering the choice of going by bus instead of going by car).

(iii) technical treatments,

(iv) change of values and behaviour.

Table : Mobility figures: comparison between men and women

(A) Automobile ownership: Passenger car ownership per 100 persons in 1986 by age groups		
Age	*Cars/100 men*	*Cars/100 women*
18 - 24	42	16
25 - 34	86	36
35 - 44	96	34
45 - 54	107	27
over 55	70	9

Source: Flade, 1989

(B) Access to a passenger car (Town of Leverkusen) in 1989	
Men	*Women*
72%	37%

Source: Flade, 1989

(C) Percentage holding full driving licence	
Men	*Women*
81.7%	51.5%

(D) The younger women have almost 'caught up with' the men: % holding a driving licence, age 18 to 40 years	
Men	*Women*
90%	80%

Sources: Deutsche Shell AG, 1987 / Flade, 1989 / BMW 1991

Traffic and transportation are not ends in themselves. Traffic is generated by the way in which society arranges its activities, in terms of both time and space. If today we are confronted with an excess of traffic, does traffic reduction mean giving up certain activities and forsaking a degree of mobility?

This idea arises from the concept of the "auto-mobile" society. Vehicular traffic is neither the equivalent of nor identical to mobility. Quite the contrary: many people find that their personal mobility is, in fact, restricted by vehicular traffic – not at all by the mobility of pedestrians, not very much by cyclists – but quite seriously by motorists and the effects of traffic planning and policies fixated on the automobile. In many cases reducing vehicular traffic enhances mobility.

It is not just fringe groups who are affected. It is often taken for granted that the use of an automobile is universal. That this by no means is the case can be established quickly by examining statistics on driving licences, the availability of a vehicle and its use by women.

A comparison of population groups from a variety of types of settlements also demonstrates that the automobile mania apparent in traffic policy and planning runs well ahead of actual utilisation rates. "Liberation from the automobile" for those who do not have a car is limited, however, to their individual way of travelling - they are by no means liberated from the effects of cars.

However, the mobility of motorists themselves is hampered not only by traffic jams. The amount of time, effort and money devoted to traffic is growing; traffic service and performance levels are increasing. What happens, for instance, when more and more women acquire driving licences and gain access to an automobile? A common experience among women is relegation to "chauffeurette" for immediate family members, relatives or neighbours - unpaid and at the expense of her own free time. This has even become institutionalised in so-called community bus services manned (but usually "womanned") by volunteer drivers. Longer travel distances, based on the automobile, will have to be compressed once again; roadway planning giving priority to automobiles along the paths children take to school make it necessary to provide

accompanying traffic, in which a supervisory person, usually a woman, will also go along to ensure safety. This is (auto)mobility imposed from above - and it can be avoided. Determining which factors and structures generate traffic requires detailed analysis.

Structural avoidance of traffic aims at preserving and increasing the mobility of both women and men in a manner which is environmentally and socially equitable, is in the interest of providing choices in lifestyle pattern and individual distinctiveness that principally affect their day to day activities, and is achievable within an environment and parameters which are sustainable. Mobility increases as the effort and cost required for transportation, its organisational preparations, etc., decline. The effort required for travel is impacted by the distances to be covered, time factors and technical investment (i.e. vehicles). Eliminating situations which impose travel is the first step toward structural reduction of traffic volumes; the perspectives include modifying time and space structures, altering the circumstances which make travel necessary, and changing ingrained habits. The relevant magnitude to be considered is the reduction of distances travelled and the number of passenger kilometres and ton kilometres to be covered in motorised vehicles.

II. Women's view on strategies for transport aimed at CO$_2$ reduction and mobility research.

From the feminist point the strategies make sense but a very different sense than the mainstream of transport science until now:

1. The strategy of traffic avoidance means avoidance of factors forcing transportation.

2. The strategy of substitution optimises mobility conditions because of the current substitution in the other direction (motorisation of women).

3. Technical strategies are not so important. More important are strategies co-ordinating small scale technical improvements.

4. A change in values and behaviour concerns not only people's private behaviour, but also the values and behaviour of professionals. Simultaneously, it optimises the conditions of implementation, augments the structures of decision making and fills the gap of women/men power.

III. Areas of Implementation

Given the realisation of ecological and environmental change among developed countries, feminist demands regarding the implementation of sustainability may be described in the following ways:

1. To achieve traffic avoidance it is very important to ensure a reorientation of planners, politicians and researchers towards autonomy of mobility (not auto-mobility) for all - especially for the benefit of children and women. There are four key requirements:
• reduce speed;
• provide privileges for car-free people's mobility;
• reduce privileges for automotive mobility by internalising the social and environmental costs (especially in the freight sector); and
• reintegrate work in the house and on the job.

2. The implementation of strategies to substitute unsustainable modes of transport with sustainable modes is topical. The privatisation of the railways which is encouraged by the European Union is one of the most important decisions for the future of sustainable mobility policies and offers a possibility of a turning point. Privatisation involves regionalisation of local and provincial transportation. Regionalisation means new planning procedures and reorganisation of public transport provision. As this brings new planning procedures, women are asking for a systematic analysis of the mobility problems of women in everyday life. The new organisation of public

Figure 1: Children going to school unaccompanied - 1971 & 1990
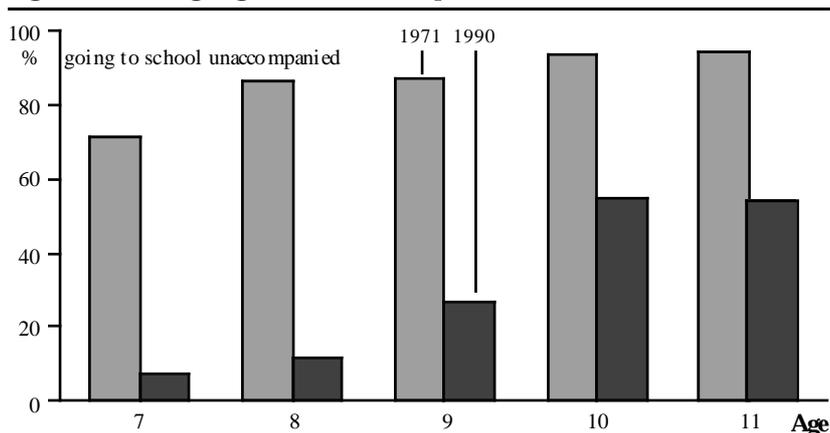
Source: Hillman, Adams, and Whitelegg (1990 "One False Move…A Study of Children's independent mobility."

transport (for the near future) has potential for a fresh start. Women request a professional who works explicitly for equal opportunities in public transport planning.

3. To achieve a change in the values and behaviour of professionals there is a need to reorganise the established institutions and organisations. There is a recognisable demand for a change to different forms of political and planning organisation. However, we need to overcome the entrenched, conservative views which continue to dominate. These can be overcome by introducing new procedures. For example, a condition of getting a job as a planner should be that candidates must have had practical experience of people-centred work.[5]

These are the areas of implementation and practice. In addition, there are many related questions and areas to research. There are the questions of consumption - the car is a product which is connected with the ideology of freedom. There is the question of the future of work and labour and the integration of different kinds of work (jobs and household and self determined work).[6] There is the question of our common future and the need to re-establish local distinctiveness as a means of reducing transport intensity. There is the issue of self-sufficiency. There is the myth of being a man and the quest for freedom. Perhaps we need a man's policy.

Women and the environment need an emancipated sustainable change of transport and mobility, and everyone everywhere in the world needs ecological, social and equal opportunity-oriented freedom of movement.

Figure 2: 'Women move more ecologically' - Availability of a car to women and men in different situations of life
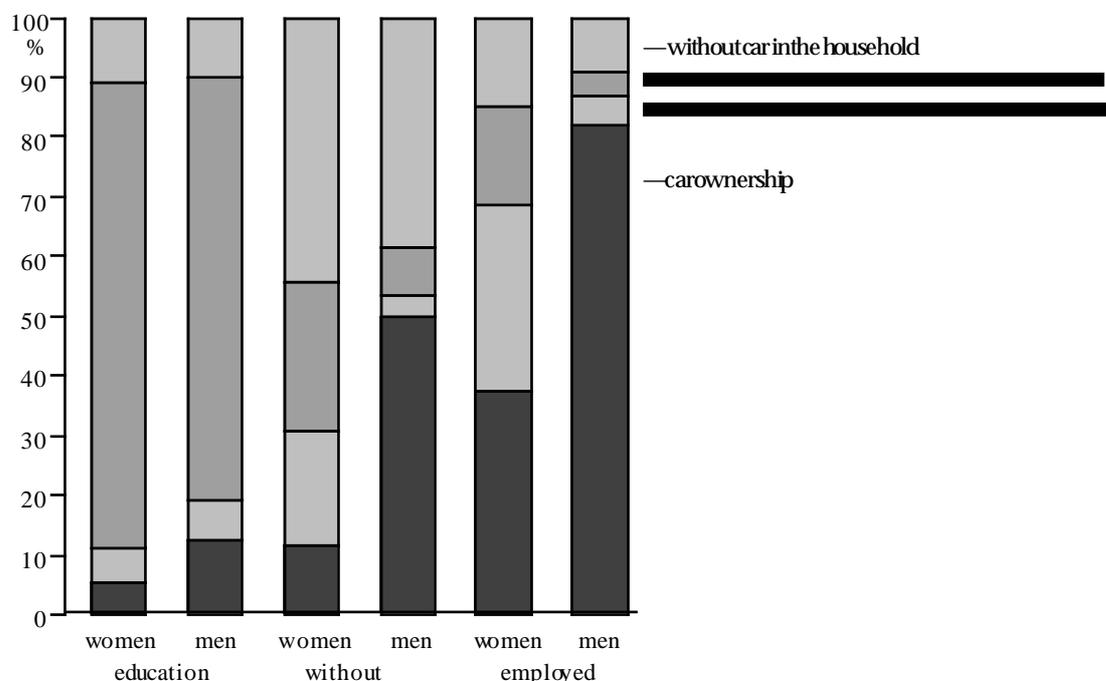
Source: KONTIV 1989, (unpublished) Meike Spitzner

Notes

1) This paper was presented at the European Congress "Emancipation as related to physical planning, housing and mobility in Europe" September 11-14, 1994, Driebergen, The Netherlands.

2) The meaning of social subsequent costs is, not the consequences for the interrelationships among people or among groups within the population, but rather those subsequent costs which are socialised, absorbed by society as a whole, both private households and public budgets. These are costs which are not charged to the initiators. These are - simply for methodical reasons - primarily environmental costs which can be expressed in monetary terms. The social, male-dominance, democratic, communicative and socio-psychological aspects, which are relevant to maintaining social values and transition have not found any access to this discussion, since by nature they are determined neither economically nor directly within their contexts.

3) Roadway construction, high-speed railways, the expansion of regional airports, engineering vehicles for the "three-car family" in the form of electric cars, etc., always implies not only shifting traffic volumes to ecologically less sound transport media, but always and at the same time the generation of new traffic and new growths in traffic which will have to be dealt with - of approximately 50,000 trips on the French TGV Sud high-speed train in the first year some 35,000 were trips which would not have been taken; an elevated Transrapid maglev route, for which plans were resurrected once again, this time for construction in eastern Germany, if set up as a connection between airports is seen as the driving factor for a considerable growth in air traffic; according to current estimates by the Parliament of North-Rhine Westphalia, a Transrapid link between Bonn and Berlin would generate 3.1×10^9 passenger kilometres in new travel, etc. The recognition that traffic creates traffic is decades old but has not become a guide for action even down to this day.

4) Traffic Avoidance Working Group of the Fraction of the Social Democratic Party of Germany in the 12th Session of the Bundestag, 17 October 1991 in Potsdam. The Greens had previously, in 1990, published the brochure prepared by their National Traffic Working Group: "Learning to walk again, reducing traffic - creating nearness - gaining time".

5) Cf. Grote *et al.* (1991) "Approaches to strategies implementing the participation of women experts, forms of participation of women civilians and the significance of women's commissions and networks, and changes to administrative structures", in: Spitzner, M., Beike, U. *et.al.* (1994) *Optimating the Opportunities of Mobility and the Participation of Women.* A study about possible legislative and planning intervention by the State of Rhineland-Pfalz in the interests of and promoting participation by women, to improve infrastructural developments for women in rural areas. Project report commissioned by the Ministry for Equal Opportunities for Women and Men in Rhineland-Pfalz, Wuppertal Institute, Wuppertal.

6) In the next five years the Wuppertal Institute and the Institute for Ecological Research on Economics (IÖW) Berlin/Wuppertal is going to do a study about "Changed labour, work and world of life and mobility" within a research project "Sustainable Mobility in City Regions - Models, Criteria, Strategies of Implementation", commissioned by the Ministry of Research and Technologies of the Federal Republic of Germany.

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Is telecommuting a panacea for urban transport ills? An Australian perspective

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Abstract

Urban transport provides society with a range of benefits, but it also generates serious problems in the form of air and noise pollution, traffic accidents and congestion. Attempts to solve these problems through conventional means have achieved limited success. An alternative approach (promoted by information technology corporations) is for people to satisfy their needs without travelling - in the case of employment - by telecommuting.

This paper examines the context in which the discussion about telecommuting is taking place, as well as recent data on the uptake of telecommuting. Coming from an Australian perspective, the paper argues that while telecommuting will not provide a stand-alone solution, it has the potential to influence travel distances in its own right, and (more importantly) enhance the effectiveness of other policy mechanisms.

Urban Transport Ills

Historically, one of the constants of human congregation has been the persistence of transport problems in the form of congestion, traffic accidents and pollution. Technological development has been enlisted in the search for solutions to these problems, but its main contribution to date may have been the substitution of air pollution for horse manure as the primary transport pollution problem.

Various studies have been conducted into the economic cost of transport 'externalities' in OECD countries. Although varying in their methodologies, these generally put the cost of these externalities in the range of 2-4% of GDP (EPA Victoria, 1994). To place this in some sort of context, the gross expenditure on research and development in OECD countries is typically in the range of 1-3% of GDP (McGauran, 1996). Alternatively, a study by Maddison and Pearce *et al* (1996) estimated the external costs of road transport in the United Kingdom to be in the range of 45.9-52.9 billion pounds per year. Averaged out over the 410 billion kilometres covered by road transport in the UK, this equates to a cost of between 11 and 14 pence per vehicle kilometre travelled (which is greater than the retail cost of fuel in most countries).

An inordinate amount of time, money and effort has been consumed in attempts to reduce these costs. Cars have been engineered and re-engineered to make them safer and less polluting, motor fuels have been reformulated, and billions of dollars have been spent on the construction of mass transport systems and additional road space, yet these problems persist. Consider the case of air pollution.

In Sydney's case, motor vehicles are estimated to contribute 90% of the carbon monoxide, 80% of the oxides of nitrogen, and approximately 45% of the fine particulate matter, hydrocarbons and volatile organic compounds emitted in the metropolitan airshed (NSW EPA 1994). Photochemical smog formation is considered to be the main air quality problem by environmental authorities in Australia. Ozone (a noxious gas) is formed when oxides of nitrogen react with volatile organic compounds in the presence of sunlight. Given the right meteorological conditions, smog levels can build up over several days until they are well in excess of acceptable levels.

A large part of the technological response to the photochemical smog problem had its origins in the United States. There, ozone concentrations often exceeded the World Health Organisation's one hour standard of 0.12 ppm. In Los Angeles' case, for example, the standard was exceeded on an average of 161 days per year (Appleby, 1992).

Much of the initial response centred on the development of '3-way' catalytic converters to clean up engine exhaust gases. For the catalysts to do their job of converting these pollutants to nitrogen, carbon dioxide

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and water effectively, the combustion process required an air-to-fuel ratio of 14.7:1. Maintaining this 'stoichiometric' ratio required the development of electronic engine management systems. Carbon canisters were also fitted to minimise the amount of fuel that evaporated from cars.

These measures produced considerable reductions in emissions per vehicle kilometre travelled. However, those reductions were largely offset by continuing increases in vehicle kilometres travelled. In addition, the emission control equipment fitted to cars wore out or was damaged by motorists.

Environmental regulators in the United States responded by implementing 'inspection/maintenance' programs, where motor vehicles had to pass annual emission tests as part of their re-registration process (US EPA 1992). This measure was complemented by the development of 'onboard diagnostic' systems which monitored emissions and warned motorists of problems. Other developments included 'remote sensing devices' (similar in function to speed cameras), the development of 'reformulated gasoline' (Auto/Oil 1993) and the fitting of vapour recovery systems to petrol bowsers.

Considerable effort (and argument) has gone into the development of accurate inspection/maintenance systems. However the programs instituted have yet to deliver significant benefits, not least because motor vehicle repairers have difficulty providing cheap and effective repairs (California I/M Review Committee, 1993). At the same time, the aggregate distance vehicles travel is still climbing.

The state of California has forced the issue by requiring the development of 'zero emission vehicles'. These vehicles will be powered by either batteries or fuel cells and will provide low impact transport in sensitive air-sheds. However, it must be remembered that they are 'elsewhere pollution vehicles' (not zero impact vehicles) and a combination of carrots and sticks will be required to get motorists to buy and use them in the short term.

Australian and European governments appear to be on similar technological paths, but somewhat in arrears of the American response. For example, Australian Design

Rule 37 was revised in 1995/96 to require petrol-engined vehicles from the 1997 model year onwards to meet the United States 1981-1993 emission standards. Similarly, the New South Wales Environment Protection Authority has been examining the prospects for using remote sensing devices and implementing annual vehicle inspections.

Australia has not been in the technological vanguard of motor vehicle pollution control, partly because Australia isn't big enough to drive motor vehicle development in the world market, and partly because urban air quality was traditionally perceived to be 'relatively good' - smog levels in Sydney exceed the 0.12 ppm standard on an average of 5.5 days per year (NSW EPA 1994). Europe on the other hand, while suffering from air pollution, has traditionally had high levels of public transport patronage and a large proportion of the pollution there has come from industrial (and cross-border) sources.

The Case For Telecommuting

The problem with the above approach is that as much as motor vehicle pollution control technologies improve local and regional air quality, they do little to reduce carbon emissions, noise pollution, congestion, accidents and the amount of urban space 'consumed' by transport infrastructure. To make matters worse, measures that address one problem (such as congestion) often make the others worse. While there are some measures that address more than one problem, their prospects do not appear good.

For example, getting people to walk, cycle or patronise public transport instead of using their cars would ameliorate most transport externality problems, as would the implementation of 'polluter pays' charges. Unfortunately, the physical structure of Australian and American cities militates against the former (Knight, 1993), while the political climate in many countries all but rules out the latter, at least within the short term. (During 1995, for example, a proposal for the implementation of a carbon tax in Australia had a quick and inglorious fate).

Ultimately, it could be argued that conventional approaches to urban transport problems are all examples of the practice of putting the cart in front of the horse (Knight, 1995). They treat symptoms rather than address root causes.

Working from first principles, people normally travel to obtain goods and services, and to engage in activities. Rather than attempting to clean up an ever-increasing amount of travel, it might be more logical to provide access to those goods, services and activities in ways that do not require travel. Such 'instead-of-travel' measures would have the potential to address virtually all the transport ills of western cities simultaneously.

Telecommuting is sometimes presented as such a panacea. To avoid confusion, this paper will use the term telecommuting as the home-based subset of teleworking (using communications technology to substitute for work related travel). Telecommuters work from a home office. Instead of commuting to and from work, their work comes to them.

This is not a recent idea. People have been using communication systems as an alternative to personal travel for hundreds if not thousands of years. In Australia's case, children living in the outback were receiving an education via 'the school of the air' (two-way radios) well before people were using the term 'telecommuting'.

These days, anything that can be converted to a form of information (such as a digitalised picture) can be transferred from one place to another via communication technology instead of being physically transported. Given the convergence between information and communication technologies, the scope for such information transfer is increasing.

Is it possible then that information and communications technologies might provide a 'magic bullet' for transport problems?

Telecommuting is often presented using attractive images. The practice will enable people to work in country retreats, far from the madding crowd; facilitate the employment of people with physical disabilities; and provide employers with a carrot to retain the services of highly valued employees (e.g. Janelle, 1986; Ritter & Thompson, 1994; Mokhtarian & Sato, 1994). Telecommuters save time and money (and suffer reduced frustration) by not travelling to work. Businesses benefit through reduced office costs, having sales and service staff in closer contact with clients, and being in a better position to contract out work (Anon, 1995). Society in turn benefits through reduced congestion, emissions and accidents. In theory, everyone is a winner.

The Wider Context of the Discussion

The current discussion on the prospects of telecommuting is not situated in a vacuum. Not only is it taking place in a context where government agencies are concerned about transport externalities, the winds of 'globalisation' are blowing and corporations are seeking to reduce costs by 'rationalising' their operations.

In other words, the influence of national and regional boundaries on business, trade and culture is diminishing as the world becomes a more competitive place. In response to these pressures business practices are changing, with many businesses shedding labour and 'outsourcing' work (internal capability is replaced with contract services).

In this context, telecommuting may have a role in the progressive 'casualisation' of labour and the demise of the employer-employee relationship as workers become self-employed contractors (Mitchell 1995, 1996). Consequently, telecommuting may not be used primarily to retain the services of valued staff members who are in a position to demand flexible working conditions. Rather, telework may become the province of low status telecommuters working in 'electronic sweatshops' (Bibby 1995). Given the trend towards economic globalisation, there is increasing potential for such contract telework to be carried out in low wage regions (and countries). That might not be a permanent trend, however, as associated technological developments could result in such work being automated (Schoeffel *et al*, 1993).

There appear to be elements of 'technological determinism' in the discussion. There is a sense that since the technology is now available, society and work practices will inevitably change in particular ways. There is also a feeling that information equals knowledge and that information transfer equals meaningful communication.

Development in information technology is directed towards increasing speed and capacity while improving control over access. The technology is transient

(characterised by rapid obsolescence) and in communication terms, favours quantity rather than quality (Stoll, 1995).

While there are a number of reports on telecommuting trials in the literature, it is worth noting that some of the widely publicised telecommuting success stories involve programs run by either computer or communications corporations such as IBM, Compaq, AT&T and Pacific Bell (e.g. Anon, 1995). These are companies with a financial interest in the diffusion of telecommuting. Similarly, a proportion of articles extolling the virtues of telecommuting are written by people with links to those industries (e.g. Dutton, 1996).

Current Evidence

The potential market for telecommuting is still rather nebulous. Handy and Mokhtarian (1996a) for example, estimated that 'telecommuting conducive' occupations made up 57% of the US labour force in 1990. These 'information' jobs do not require people to work at a fixed location and are a growing proportion of the labour market.

At present only a small fraction of people in these occupations are actually telecommuting. Handy and Mokhtarian (1996b), estimated that about 1.5% of the population were telecommuting on a given day in 1991, and that this rate might increase to a saturation level of 40% at some time between 2006 and 2060. These estimates are a far cry from the incredibly optimistic prediction made by US telecommunications giant AT&T in 1971 that all Americans would be working from home by the year 1990 (Berry, 1996).

In practice, Handy and Mokhtarian's (1996a) reference to telecommuting conducive occupations should be interpreted with care. Information based work does not come in a homogenous collection of jobs that are equally conducive to telecommuting. Full-time telecommuting may be eminently suited to the work done by staff handling travel bookings for an airline like Qantas (Peters, 1996). It is poorly suited to work involving close team interactions.

Leaving aside that point, at first glance it might appear that employees with 'home offices' would telecommute on a near to full-time basis. Consequently, a 40% take-up of

telecommuting would lead to a close to 40% reduction in commuting, and hence a proportional reduction in cars on the road and emissions. Unfortunately things are not that simple.

So far, it appears that most people who currently telecommute do so on a part-time basis. That is, they work in a normal office most of the time and telecommute on one or more days per week. There are a number of factors that militate against full-time telecommuting by employees (Berry, 1996; Raghuram, 1996):

- People working full-time at home experience social isolation;
- Management approaches need substantial modification;
- Telecommuting technology cannot replicate the patterns of communication that occur in an office environment - meaningful communication is not simply an exchange of words;
- Staff training and development - normally facilitated through informal patterns of peer advice and discussion, shared experiences and on-the-job training - becomes more difficult;
- There is less scope for shared problem solving; and
- It is difficult to develop and maintain an organisational culture amongst a group of individuals who are isolated from each other.

Where people telecommute on a part-time basis, they gain the benefits of teleworking and avoid these problems. This helps to explain Handy and Mokhtarian's (1995) study of a number of pilot telecommuting programs which found that participants telecommuted on an average of 1.2 occasions per week. In this case, a 40% take-up of telecommuting would lead to a 9.6% reduction in aggregate travel to work.

Nevertheless, this reduction in commuting would occur during the morning and evening peak periods, and so have beneficial impacts on peak hour congestion. Ritter and Thompson (1994) for example note that a 7% reduction in traffic during the 1984 Los Angeles Olympics reduced congestion by 60%. While telecommuters still have to travel during peak periods for personal or family reasons (e.g. to take children to school) Ritter and Thompson (1994) report that residual peak hour travel falls by 60%

and total travel falls by up to 75% on those days that workers telecommute. Nilles (1996) reports similar results.

Unfortunately, there is no guarantee that telecommuting will reduce long-term congestion, for two reasons. First, any reduction in congestion has the potential to encourage additional car use by people who did not previously travel or who used public transport. Second, in Australia's case, a significant proportion of the people whose work is suited to telecommuting would be employed in inner-city offices. Many of these people would travel to work via public transport, so their adoption of teleworking would do little to relieve traffic congestion. Indeed, given that public transport is widely used by people travelling to work in central locations, the main effect of widespread telecommuting by inner-city workers may be a reduction in the viability of public transport services.

The evidence to date does not support any prediction that telecommuters will mostly be information workers employed by large organisations. Rather, most people with a home office are either self-employed, small business-people or travelling sales and service people who work from a home base. Berry (1996) for example, found that only 16-17% of teleworkers in either the United States or the United Kingdom were employed by large organisations, and of those teleworkers, less than a third spent a majority of their work time at home.

It is possible that people promoting telecommuting have based their paradigms on the situation of self-employed people (Qvortrup, 1995). While 'electronic home offices' are eminently suitable for self-employed people, technologically forcing their lifestyle on wage and salary earners may not be desirable. The latter tend to value their leisure time and may experience difficulties separating their work and leisure time when working in a home office.

Similarly, Hill *et al* (1996) found that telecommuters were likely to work longer hours and to experience greater difficulties in balancing their work with family commitments than their colleagues working in traditional offices. Given that a short journey helps to provide a transition between home and work, neighbourhood 'telework centres' may be more appropriate for wage and salary earners than home offices.

Finally, the freelance telecommuting work envisaged by Mitchell (1996) as the way of the future currently appears to be limited to niche areas. If the 'Telecommuting Jobs' home page (http://www.tjobs.com) can be used as a guide, most telecommuting positions offered and sought involve computer programming, graphic art, web design, freelance writing, desk top publishing, sales, word processing and data entry. (There does not as yet appear to be a strong demand for freelance academics and policy analysts.)

No Short Term Panacea

Studies of the diffusion of technological change have found that innovations are most likely to be adopted when they function as intended, they are compatible with the local culture and infrastructure, and they satisfy market demands (Walker, 1986). The 'technology push' by industry has to match 'market pull' from end-users.

In the case of telecommuting, current information technologies are adequate (for some occupations) and the necessary communications infrastructure is largely in place. There are also pressures creating demand for telework in highly congested and polluted conurbations with high office rent costs. Employers in some United States cities with poor air quality, for example, are required by law to encourage their employees to use alternative means to driving alone for their travel to work (Orski, 1991).

However, compared to their Asian, European and North American counterparts, these pressures may not have the same motivational impact in Australian cities. In particular, there is no sign that Australian governments will force employers to adopt 'transportation control measures'. While they are technologically feasible, it appears that Toffler's (1980) 'electronic cottages' may not yet be compatible with either the needs of employers or the current workplace culture.

Indeed, the wider uptake of information technology may not be as rapid as some might predict, as there is emerging evidence that many people are uncomfortable with the new technologies (Sless, 1996). Corporations also have concerns about the proven benefits of aspects of information technology, the transient nature of technical standards, and the threats to the integrity of their computer

networks. A recent international study of 1500 firms by Deloitte and Touche found that less than 5% use the internet for business transactions due to such concerns (Anon 1997).

That is not to say that teleworking technology will not be used, but that it may be used for alternative purposes. New technologies are often used in different ways to those initially envisioned. Computers, for example, were supposed to eliminate 'paperwork', increase office productivity and improve communication. In actuality, computers simply channelled office work in different directions, failed to reduce the amount of paper used, and have done little to improve the quality of internal communications (Attewell, 1996).

It is worth remembering that people continue to visit their friends even though they can talk to them on the phone, they go shopping though they can mail order and teleshop, they watch movies at cinemas though they can watch them on television, and they eat in restaurants and cafes when they can have food delivered. People are more likely to use a new technology to extend the range of their activities than to change activities.

Instead of using a home office to telecommute, employees may be more likely to use teleworking technologies to enhance their work capacity from either a conventional office or a telework centre. That is, they will use the technology to improve their capacity to access, process and transmit information, but they won't necessarily be doing it at home. Schoeffel *et al* (1993) for example, predict that specialised small businesses will use information technology to communicate with their clients. In addition, the technology will enhance people's capacity to take work home (assuming they want to) or to work at home on an occasional basis (e.g. to care for sick household members).

Consequently, it does not appear that telecommuting will be a cure-all for transport problems, at least in the short term. The technology is there, but the practice may not fit in with employer needs or even employee wants. There remain unresolved issues associated with information security, insurance, occupational health and safety, land use planning and taxation (Gillespie *et al*, 1995).

Further, it would appear that travel to work contributes a declining proportion of total travel distances (Orski 1991). Consequently the capacity of telecommuting to contribute to the solution of urban transport problems is also declining. People would need to adjust their behaviour in other areas if information technology is to cure urban transport ills.

Notwithstanding these constraints, telecommuting has the potential to be more than a placebo. Telecommuting will be suitable for some people in some occupations and there will be some benefits to society flowing from this. Perhaps 10% of the work-force will be telecommuting in one form or another by the turn of the century. What is more, people are likely to use teleworking technology to increase their work output without increasing the amount of travelling they do.

More importantly perhaps, telecommuting may facilitate the implementation of 'transport demand management' policies by state and federal governments. Measures such as traffic calming, parking controls, traffic bans, road pricing and pollution taxes can reduce traffic. Unfortunately, they only work (politically and in practice) when people have a convenient alternative to using their cars (Knight, 1993). Providing the public transport to enable people to travel conveniently to destinations other than central business districts is unlikely to be feasible. If people can satisfy their needs through the use of information and communications technology, then transport demand management might be politically acceptable and may just do the trick of getting people out of their cars.

Telecommuting may not be a panacea for urban transport ills, but it could improve the effectiveness of some of the other treatments.

Dr Lawrence Knight: Is telecommuting a panacea for urban transport ills? An Australian perspective

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Local Agenda 21, sustainability, and British policy on foodstore location - a case study

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Abstract

The growth of out-of-town and edge-of-town superstores in Britain has had an adverse effect on the vitality & viability of traditional, long established retail centres. The dilemma facing many of these centres is whether a superstore in the town would increase business and induce a trickle down improvement to existing retailers.

Introduction

Recent British Government policy towards retailing seems to carry the strong implication that decentralised store locations will, in future, face severe restrictions. Both in Planning Policy Guidance for retailing (PPG6) and transport (PPG13) one finds the presumption that activities will be focused on established centres, with the implication that new locations generating perhaps excessive new car-borne journeys will not be permitted. Equally, there is the requirement to show how any new proposal might affect established traders.

It follows that developers of large new foodstores (superstores) that are currently seeking large sites with ample car parking may be especially disadvantaged. The issue of accessibility and trip-generation is not a new one (Hallsworth, 1991) nor is it straightforward since retailers have themselves commissioned reports implying that some new stores can reduce the need for trips to more remote locations. This issue of trip reduction carries with it echoes of Local Agenda 21 (from the Earth Summit at Rio de Janeiro) and also raises the question of sustainability. That is, what type of basic provision (for essential items such as are sold in foodstores) will best serve the needs of the population in a fuel-starved future. Hitherto, however, little empirical work has existed to show how the local shopping public of small towns is presently served by retailing and how that provision is used. This paper seeks to address that deficiency.

Key elements of the sustainability initiative and many projects under Local Agenda 21 (LGMB 1994) have at their root the notions of travel minimisation and economic localisation (Black, 1995). The United Nations Conference on Environment and Development, better known as the 'Earth Summit", was held in Rio de Janeiro in 1992. It broke new ground by beginning to address environmental issues from a holistic perspective and was exceptional for many things including popularising a radical way of looking at environmental and development concerns. It was seen at the same time that legislation alone was not enough to control environmental misuse, but that a change in attitude was needed by the people of the world. The breakthrough at Rio was to get most governments to accept that the solutions to many environmental problems lie in the hands of all people, but that a vehicle was needed that could go beyond the traditional structures of decision-making. Agenda 21 was one of four main agreements signed at Rio by representatives of some 150 different countries. It is intended to be "a comprehensive programme of action needed throughout the world to achieve a sustainable pattern of development for the next century". Those countries that signed Agenda 21 agreed to produce national action plans by 1994, and it was expected that most local authorities would work with their communities, through a process of consultation and consensus, to produce Local Agenda 21 programmes by the end of 1996.

Local Agenda 21 therefore is a mechanism to inform people about what they can do to further sustainable objectives and to let them discover what they can do to benefit from behaving in an environmentally and developmentally considerate way. There is a surge of evidence that such precepts are being accepted at many levels of public and private enterprise. One such proposal was pursued during 1995/1996 by Liphook Parish Council in Hampshire which raised the question of whether or not it would be (hypothetically) more beneficial to perhaps attract a sizeable food superstore within its local centre than to reject the notion, leaving those seeking such shopping provision to
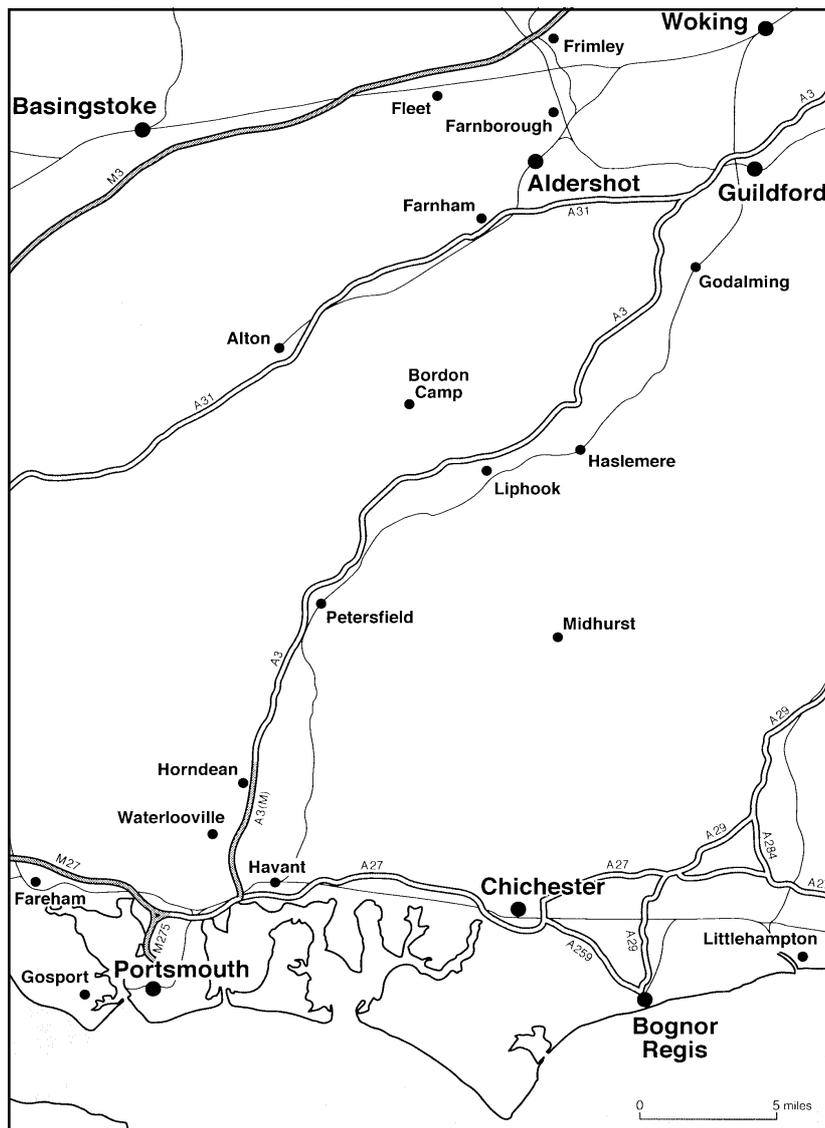
look elsewhere. Clearly, this notion has strong links with current government Planning Policy Guidance (PPG6) with its emphasis on vitality and viability. The ability of local people to obtain a satisfactory level of basic shopping provision is a key element of making an area locally sustainable. Yet, of course, much recent planning policy has had the effect of placing foodstores at some distance from existing centres. This trend, however, should not be overestimated since many large foodstores constructed from the 1960s onwards have avoided greenfield sites. (Hallsworth, 1988 esp. pp. 163-164).

A further notable factor is the rise of the local loyalty card on the Leominster model (Worthington and Hallsworth, 1996). It may be that a key element of the whole process revolves around whether a food superstore is close enough to the centre to be regarded as part of it, or so far away as to be a freestanding rival.

Figure 1: Liphook Study Area, Hampshire, England

An empirical study

Past research has shown that microscale differences in location between foodstores can be major factors in who uses them and how they are used. Yet there is a distinct lack of recent evidence relating to how people shop for food in centres that do not have a major food superstore. Given the popularity of such stores and the market power of their operators this is an important deficiency. This paper seeks to address the problem by reference to empirical research findings on the efforts of the small town of Liphook to find an appropriate solution. It was decided to tackle the problem via survey methodology previously used in the area (Hallsworth, 1991). One series of questionnaires was to be mailed to households in the local postcode area, another to be left with local shops. It was felt that this approach would gather responses not only from those who used Liphook but from those who lived nearby yet chose to shop in other locations. It was known that the area had high levels of car ownership and that Liphook functioned as a dormitory town for larger centres of employment including London. Part of the exercise was to confirm these facts, putting especial emphasis on car-borne trips whilst recognising that it is possible to commute by train to London.

The study area

Liphook is one of the small Hampshire towns situated along the line of the A3 road and the London to Portsmouth railway line (Figure 1). Transport axes therefore run markedly Northeast to Southwest and the availability of trains does add the potential to make significant journeys other than by car. With the construction of a series of linked bypasses, Liphook became just one of a number of settlements (most notably Petersfield) to have substantial amounts of through traffic removed from its streets in recent years. This, in itself, has become an impetus to define a suitable future for the town. Note that this is, in large part, a Parish Council initiative. Hampshire, like other British counties does not "benefit" from shopping-related incentives enjoyed in countries such as Canada, France, Norway or the USA [Holdsworth, 1985; Burt, 1984; Kirby, 1983; Mallett, 1994]. Indeed, a key point of conflict with established town-centre retailers is that the general under-funding of local government in Britain often means that local councils have few ways to raise extra revenue. One of the few available

to them is to impose car-parking charges: an inevitable source of conflict with small retailers who naturally note that large freestanding stores escape such charges. Indeed, they argue that such policies make driving to peripheral locations even more attractive. A further issue souring retailer/council relations is that of the Uniform Business Rate (UBR). This particular formulation of taxation replaced local business property taxes some years ago. Under the previous regime, retailers were always anxious that taxes raised locally were then re-spent for local benefit. It is the essence of the UBR that the rates are set nationally and, whilst the UBR is paid by local shops, the revenue goes directly to central government to boost general taxation. A surprisingly high percentage of small retailers remain unaware of the nature of the change and that there is now no local accountability for tax gathering or spending. They see the financial drain ... but they ingnore the fact that there is no link to local payback. Not only does this sour retailer/local government relations but it runs entirely counter to the spirit of LA21. It yet remains to be seen if the May, 1997 change of central government power will affect this situation.

The survey approach

It was decided that the only way to assess the existing "viability" of Liphook was to discover the extent to which local "needs" as well as "wants" were being satisfied locally and the extent to which under-provision might, literally, drive custom elsewhere.

Using survey forms modified from several earlier studies in Hampshire [Hallsworth 1981a,b, 1982a,b, 1984, 1985 1986,1991] residents of the local Liphook postcode area were sent a reply-paid questionnaire on their current shopping habits.

The object was to assess the extent to which local shoppers were finding Liphook to be a satisfactory shopping environment or, conversely, was trade "leaking away" to other areas in a manner likely to exacerbate the long-term decline of the centre. The latter situation is a classic example of the "unsustainable" local environment that is a preoccupation of "Local Agenda 21".

In order to focus more closely on those definitely already using Liphook, a short survey form was left with local shops. We must, of course, note that however imaginative a local initiative, the shopping public remains remarkably unconstrained. Most retail change, though moderated by regulation, is driven by powerful market forces and agenda are set by the largest retailers. So, most retail change, like the sustainability agenda itself, is driven by external market forces over which localities have little control. Ultimately, too, the success or failure of LA21 type initiatives will be driven by long-term regulatory policy - for which "snapshots" of current shopper behaviour cannot be a substitute.

As we have argued, Local areas - under Agenda 21 - have to decide if they can facilitate a sustainable future. To do this requires a good degree of self-sufficiency in shopping - especially food shopping. The "straw in the wind" that offers most hope is that current trends within the British food retailing trade itself are away from free-standing "hypermarkets" and towards medium-sized, modern foodstores located near centres of population. This paper is therefore founded in the proposition that towns with such facilities will grow, or at least stabilise. Those without such facilities will slowly lose trade to those that do have them. Liphook is the test-bed for this notion.

The situation revealed by the household survey

Survey information on Liphook area residents became available in October/November, 1995 following distribution of 2000 questionnaires from which an above-average response rate approaching 80% was obtained. This response rate requires explanation since it is so much better than those normally obtained by post. The first key factor is that since the work was a Parish Council initiative it was possible to use official postage facilities. Return of questionnaires was free and extremely easy and the topic was one of extremely live interest at the time. These factors all combined to increase the response rate.

Key results

From examination of the returns and from consideration of the shopping "offer", Liphook was confirmed as a lower-order centre with a range of "convenience" or "local" shopping facilities. As a result, it would probably never attract a major retail store other than a large supermarket or superstore. It would also tend to lose trade to "higher order" centres such as Guildford, Portsmouth or London's Oxford St. whenever local people sought to make expensive purchases ... or shopped for goods for which one would normally "shop around" a range of stores.

The position on "local facilities" was revealed as fragile - though a number of local residents do still purchase "lower order" or "everyday" goods (notably food) in Liphook. Approximately 50% of respondents cited Liphook as their regular shopping location. This, however, should be treated with caution. Residents who are regular users of local shops are more likely to respond to such a survey. Those whose trade is already lost to other areas are less likely to respond because they are less likely to care.

Where respondents are "regular" shoppers, this basically means that they rely on Liphook for food shopping and purchase other items at the available stores. However, the shoppers who shop away from Liphook will tend to have better jobs, higher incomes and to be more mobile. People with access to a car will almost invariably use it for food shopping - and they will be attracted by large new stores with extra facilities plus, paramountly, abundant free parking. This requirement might seem to conflict with LA21. However, centres that are not competitive *now* may not survive until the days when mass car usage becomes unfeasible. Conversely, a higher proportion of those who shop locally for food tend, in particular, to be less mobile and have an older age profile. These people are also more likely to shop for food on a daily basis.

A key question is whether or not those who shop "away" can be "attracted back". Liphook is an attractive location for commuters, some of whom may have moved in from other areas where they still retained their jobs and where good nearby shopping might be available. Overall, those who "shop away" for food tend to use the types of large modern superstore built by the market leaders (Tesco, Safeway, Sainsbury) that are not currently available in Liphook. That said, nearby Bordon proves attractive to many - despite only having a bigger and newer version of the largest foodstore chain found in Liphook - Somerfield.

Those who "shop away" for expensive goods that are not sold in Liphook will probably pass close by large modern foodstores and so this type of business, too, will often "leak away". Petersfield with a recently built Waitrose store is already a beneficiary of this type of behaviour. Incidentally, local anecdotal evidence is that the Waitrose store, being very centrally located, has helped to revitalise Petersfield and increase its attractiveness to Liphook residents. Liphook does still demonstrate good levels of usage for other "village"

facilities such as shoe repair and chemist shop. These can be quite powerful symbols of having "viable" local shopping. Regrettably, no planning powers exist to require that such facilities must survive.

Overall, competition is most severe from centres aligned along the line of the railway and A3 road and this implies that Liphook could exert a "pull" on smaller centres on the Northwest/Southeast "axis" ... provided that the residents of those areas do not perceive it as simpler to use the main transport lines to Petersfield or Guildford. In other words the A3 road can be seen as a barrier that is both physical and psychological.

The survey in more detail...

Overall some 1600 questionnaires were usable at least in part - a response rate that reflects keen local interest in the topic. One of the key questions concerned respondents' "main" shopping centre. This was abstracted from as many forms as possible and showed 815 people regarding Liphook as their "main" shopping centre as against rivals Petersfield (184) Bordon (173) Alton (104) Farnham (103) Guildford (69) Godalming (63) Haslemere (40) ... and sundry others that can surely be accounted for in terms of people shopping from work. Most of these centres can be identified in Figure 1.

From this list, the relatively small centre of Bordon yet again stands out as one where Liphook residents are unlikely to find better "higher order" goods (i.e. expensive consumer items) ... just a slightly larger food superstore. This emphasises the attraction of centres with food shopping that is seen as superior to "local" rivals. We can clearly see that overall, Liphook loses about 50% of its regular available trade probably more if we take account of the survey bias that leads those who are positive about a centre to fill in questionnaires about it.

Survey highlights also included the following details (from this point, the bulk of the responses are based on the 1160 most complete replies received):
• Only 14.5% of households had no car;
• 81.5% of those with a car ALWAYS used it for shopping;
• Most respondents owned a freezer;
• Liphook was the most common point of employment - but workers in Bordon were more likely to shop from work;
• 23.5% of respondents claimed to shop from work at some time;
• For staple foodstuffs (Bread, vegetables, meat) Liphook dominated ... followed by Bordon and Petersfield. When looking at

purchasing of key individual food items, Liphook dominated for bread purchases (595 responses). Only Bordon registered more than 100 responses (132)… yet even with this basic item, 74 shopped at Petersfield.

It was also possible to identify by name the shops that respondents used. Most widely-used shops were Gateway/Somerfield (662 respondents): J Sainsbury 199 and Waitrose 135. For other (non-food) products, the questioning focused on the centre used, rather than the name of a store which, for infrequently-purchased items, might be difficult to recall. For each of a range of key products the centres most often used were…. Guildford (Furniture) Guildford (Clothing), Guildford (Shoe purchases) LIPHOOK (Electrical Goods) Liphook (DIY) Liphook (Car Accessories) Liphook (Shoe repair) and Liphook (Chemist). So, the more major the item, the more likely that respondents would shop at a larger centre.

It is also clear that the private motor car plays a vital role since 230 respondents reported that they had travelled by car for **every** major purchase made. Conversely, only 10.5% regularly used catalogue mail order and only 4% had groceries delivered.

These basic facts can be expanded on by combining two variables: for example, we can relate car ownership to car usage. We find that the respondents were very mobile. Of 1348 persons responding to both the car usage questions, only 200 had no car. Of those with a car, only 11 never used the car to shop. Of these, 10 were in one-car households (so the car may not have been available to them *personally*). These facts alone show how mobile the local population is - and therefore how much choice they currently enjoy. In households with no car, 10 shopped in Liphook for every one at Bordon. For 2-car households, only 4 shopped in Liphook for every one at Bordon.

A similar pattern emerged for vegetables. Eight people from no car households shopped at Liphook for every one at Bordon. For those with 2-cars, the ratio was only 4 to one.

A similar pattern yet again for meat. Nine people from no car households shopped at Liphook for every one using Bordon. For those with 2-cars, the ratio was again only 4 to one. The clear message is that, with its present retail structure, Liphook is vulnerable to "leaking away" of trade by those with cars. An interesting further exercise is to link the frequency of shopping to the "main" store actually used for food

shopping. Basically, for all shop types the commonest response is "once a week". However, at Waitrose, for every 2 shoppers shopping more frequently than that there are 3 who shop less often. For Sainsbury the ratio is 5 to one. This implies a higher proportion of people doing "bulk shopping". For Somerfield and Wavy Line the pattern is reversed and at Somerfield, more than twice as many people shop more often than once a week than do so less often. At Wavy Line the pattern is nearly six to one so the small local Wavy Line store is the one to which people make short, frequent trips for small purchases whilst the distant Sainsbury shows the opposite pattern. It follows that Liphook has no store capable of attracting shoppers wishing to spend large amounts on a major food shopping trip.

When we look at the shopping centre favoured by devotees of particular chains we find most Waitrose patrons shop at the Petersfield branch. 82 Sainsbury shoppers favour Farnham (56 use Alton) whilst the Tesco used is most often the Guildford branch

For Wavy Line virtually all respondents patronise Liphook - whilst Somerfield splits 476 at Liphook, 141 at Bordon.

We can also ask if length of residence makes a difference in an area where more than 400 of the respondents had lived in the area over 20 years.

In fact Somerfield is the most used store for all age groups but it emerged that the biggest group is those who have been resident 20 to 26 years (a total of 387 respondents in the overall survey makes this the largest "length of residence" group). Such is not the case with Sainsbury shoppers where the biggest group have been resident 1 to 6 years. For Waitrose, the groups that have been resident 1 to 6 years and those 7 to 12 years are joint largest. We can infer that there is an older age profile in Somerfield shoppers (this may be exaggerated if we split them between Liphook and Bordon). A clear picture is emerging whereby the full range of shoppers is not commonly present in Liphook because Liphook does not have a wide range of foodstores.

Survey at Liphook Shops.

This was the second mode of data-gathering, with forms left for shoppers to collect from the counter of any store they were using. No control could be exerted over who took the forms and reply-paid responses were not possible. The system depended on forms being returned for shopkeepers to pass on

and this cumbersome system meant that response rates here were disappointing as only some 80 persons responded and most were Liphook residents.

The only other settlements represented were Haslemere (4 respondents) Milland (4) Bramshott (2) plus Godalming, Headley, Farnham, Greatham, Midhurst, Bordon, and Liss. Again, this symbolises, in a more minor way, the fact that Liphook lacks outside "pull". At best, 20% of those responding came from "outside" Liphook whilst we know, conversely, that 50% of regular trade leaks away. However, the responses were helpful in that a snapshot emerges of shoppers who generally arrive from home and return there (perhaps after visiting other shops). Car transport dominated - despite the relatively short distances involved. It was four times more popular than walking and reflects the use of the car as a "mobile shopping basket". As is so often found, if cars are available, cars are used - and Liphook residents dominantly do have one or more cars. Such people tended to shop regularly: three times a week or more, (16 respondents) versus twice a week (13), and once a week (8)

The shoppers are generally mobile and of those stating their car ownership 4 had no car, 12 had one, 19 had two and 7 had more.

Since these respondents were regular users of shops in the centre of Liphook they were asked which facilities they would most like to see added. Responses were: Shoe shops (31 responses), Larger supermarket (17), Haberdashery (10), Clothing/Menswear (9) and Gift/card shop (6). A range of other facilities attracted fewer votes and, realistically, one can see that the only probable addition that local market circumstances would bear is, indeed, a larger foodstore.

These "loyal" shoppers were asked what were the advantages and disadvantages of shopping in Liphook.

Perceived **Advantages** of Liphook were: convenience (37), friendly local shops (11), free/easy parking (13). **Disadvantages** were: lack of range/choice (27) and problems with parking at peak times (4).

The patterns on spending for food and non-food items (including SERVICES) are broadly as expected but little reliability should be placed on results from so small a sample (Table 1) (for non-food amounts over £100 the pattern was biased to services (e.g. travel agents) or "other retail".

Summary

It is clear that Liphook has advantages for local residents - up to a point. There is not the basic catchment area to support the extra facilities that they would like. For example, shoe shops rarely open in ones or even twos - this is the type of good where people usually "shop around". It would be unlikely that one shoe shop could meet all tastes. For choice, most shoppers would surely go to Guildford (the stated main centre for shoes), Petersfield or Portsmouth and all of these are accessible by train for those without a car. This neatly summarises the dilemma. Liphook is small enough to be convenient (parking only becomes busy at certain times) but not big enough to meet all tastes. Lack of choice clearly emerged as the biggest problem. A clear trade-off emerges. As one perceptive respondent noted, the desired larger supermarket could bring back some of the traffic that the re-routed A3 took away! Conversely, for shop-keepers, traffic is business and the old adage "no parking, no business" still holds until such time as general traffic restraint is everywhere introduced or public transport is vastly improved. Indeed, this is a significant dilemma nationally since centres that introduce parking restraint *when nearby rivals do not* will inevitably find that they lose some of the car-borne trade (Black and Hallsworth, 1995).

Liphook faces many such dilemmas. A good proportion of the residents are wealthy and mobile; thus, whilst potentially excellent customers for local shops, they are also quite able to search widely for alternatives. Small wonder that fashionable Chichester is the main centre for 24 local respondents. Excellent road infrastructure that can easily "bring people in" can equally easily take them out.

Overall, we suggest that if Liphook could "raise its profile" by the addition of modern new retailing it might fulfil some Agenda 21 criteria by retaining expenditure within its area that is now leaking away. However, coping with the car will not be easy. Improvements in provision might, of course, increase the footfall sufficiently to support

Table 1. Amount spent by Liphook shoppers on food and non-food items (current shopping trip only)

Amount spent	FOOD	NON-FOOD
over £100	0	3
£50-£99	4	0
£10-£49	23	18
up to £10	9	25

the extra "higher level" facilities that locals say they want. However, this is a fearfully imprecise process. We cannot be sure that, if extra trade is attracted in (or the loss of stores stemmed), then the types of stores that appear will be what locals want. In Britain we have never taken on the power to say "permission is given for more retail *and this is what it must be*." Since Liphook has been losing stores for some time, the addition of extra facilities must be a priority. Undeniably, the extra attraction of a large foodstore would increase the total trade in Liphook. Any such store would be a threat to some types of traders - and an opportunity for others. Traders who can modify their lines in order to supply goods NOT available at a food superstore should benefit. We should also note that, due to long-running decline, some "village" facilities have already gone. Without an injection of modern new shopping, at a time when other centres are attracting new stores, that decline will slowly but surely accelerate. This again stresses that to do nothing is to accept that decline will occur. Since this leaves mobile shoppers with little choice but to drive away from their home area to purchase basic goods, it naturally runs counter to Local Agenda 21.

Since the survey is but a snapshot, it is clear that evidence of longer-term trends must be sought.

One is that the new route of the A3 has removed congestion - but also has removed casual trade that may have helped some local traders. Again, all the evidence is that a supermarket or superstore is the only form of large retail development likely to be attracted to Liphook. With the addition of a large tranche of additional modern shopping with parking, the attractiveness of Liphook to outsiders (and to the 50% of regular trade currently slipping away) will be enhanced. Existing retailers must then exploit the opportunity. Note, however, that large superstores are adding "in house" some facilities that small shops already offer. This could reduce the amount of spin-off trade. There is, overwhelmingly, the need to exploit new possibilities offered by Government Policy PPG6 and PPG13 for we have seen that, like Local Agenda 21, they stress the importance of supporting established locations. For Liphook this means arresting decline since, through time, it has been losing its less-well-located and more marginal shops. This is a trend in all shopping centres but one that does indicate decline.

LA 21, cars and superstores.

At this point we may raise some wider issues in respect of car use to superstores. The survey revealed that Liphook residents had to, and did, travel some distance to "preferred" superstores. It was found that Waitrose patrons shopped at the Petersfield branch, Sainsbury shoppers used Farnham whilst Guildford had Tesco. Many food superstore chains are now actively arguing that to develop more such stores is to "bring shopping nearer" to previously under-served populations. This, it is argued, minimises the need for longer car-borne trips to superstores. Not enough research has yet been completed to allow an overall picture to emerge *but taken on its own terms* this type of research has the merit of logic. The real problem arises when we start to consider just how readily it is assumed that shopping trips can, will and must, be undertaken by car. *Supermarketing* (1992) reported a survey by AGB that showed nearly 80% of all Tesco shoppers arrived by car. Even a group such as Waitrose which eschews genuinely out-of-town locations was seen to draw the majority of its custom from car-users (possibly because of its more affluent target profile). It was reported that "people who go shopping by car account for 66% of the total grocery spend" and " ... the percentage of customers who use a supermarket's free transport service barely registered but ... nearly 40% said they would use one if it were available" (*Supermarketing*, 1992 p16). More pertinently "Car drivers are most likely to travel between one and two miles to visit a store ... a further 21% will travel more than four miles" (*Supermarketing*, 1992 p16).

A key methodological problem is that shopping is all too rarely extracted from overall transport figures and highlighted in its own right as a source of congestion, fuel use and emissions. Accordingly, one finds in the pathbreaking work of Goodwin *et al* (1991) some useful overall figures but none that specifically focus on superstores. Nevertheless, the figures are disturbing. Goodwin *et al* note that "Transport as a whole accounted for 32% of all energy used in the United Kingdom in 1989" accounting for " ... nearly 70% of all petroleum use" with "Road Transport ... about threequarters of transport energy consumption ... two thirds of this is for cars" Goodwin *et al* (1991, p.8)

They also show, that cars and taxis accounted for 305 billion vehicle kilometres in 1988 (over 80% of the total) and that nearly 15% of the mileage travelled by

women is for shopping (for men it is around 7%) Goodwin *et al* (1991 p16). Interestingly, these figures are far less than for purposes of "social/entertainment" but we should not forget that the extent of trips for shopping is often under-reported. Goodwin *et al* (1991, p51) also note that "Motorised travel contributes to the global warming problem, accounting for (between) about one fifth of carbon dioxide emissions" and "Road transport is by far the greatest producer of carbon monoxide and is also a major cause of particulates and pollutants leading to ground level ozone". It is all too clear that shopping as a major element of total road traffic trips is a source of congestion, fuel use and emissions … and yet the topic remains under-researched.

Conclusions

Few small towns of the size of Liphook have taken the initiative to question what type of future they might face in the light of changing shopping patterns. However, this activity could represent an interesting precedent since the Local really is inherent in Local Agenda 21. Local communities are expected to be involved in local solutions and so Liphook Parish Council has, in a sense, pioneered this. In Britain the problem has often been that local people are, or believe themselves to be, powerless in the face of the dictates of central government policymakers. It remains to be seen if local opinion will ever have a real voice.

A further problem is that local people may be operating outside of the "wider picture" wherein a more holistic approach can be taken. This is not too great a problem if everyone appears to be acting in a long-termist and sustainable manner. Sadly, it has all too often been observed that present actions - usually invoked in the name of choice and market forces - may be acting to destroy provision that will be sustainable in a resource-constrained future but which is not "popular" in our profligate present (Black and Hallsworth, 1996). Unfortunately, it appears, no-one is going to pay today for facilities they may not want to use in the future. Whilst this is a classic fact of human nature it is also a basic facet of endemic British short-termism. Other countries have already planned for the type of future unlikely to be realisable in Britain. The Dutch, for example, have been planning-in cycle routes for years. They have also been restricting the out-of-town shopping that is a magnet for car-users (Roberts, 1990). Much of the data presented above on car-use patterns to British food superstores *takes for granted* that superstores are the preferred format for grocery shopping. This report has shown just how mobile and thus potentially car-dependent the respondents from this part of Hampshire currently are, thereby making it an excellent test bed for the role that foodstores can play in the sustainability debate. Of course, car-dependency is endemic where destinations can, and are deliberately planned to be, reachable only by car.

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Trunk Roads and the Generation of Traffic: the SACTRA report and associated Government guidance - What does it mean and does it matter?

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Abstract

A government study into traffic growth on major roads and motorways in the UK was published in December 1994 by the Standing Advisory Committee on Trunk Road Assesment ("SACTRA"). The government's formal response and an accompanying guidance note to road planners were published at the same time. This article, first written in pamphlet form in early 1995, surveys these three key documents and explains the substantial changes in appraisal methodology that should arise from them.

DEFINING "GENERATION" AND "INDUCTION"

Before describing the implications of the SACTRA Report and the Government responses in more detail, it is important to define a series of terms including "generation". This is because there has been considerable confusion over what generation really means, and between the different effects which are often lumped together under the one title. The SACTRA Report itself attempts to clarify these important issues, and supports the use of a new term, "induction", to supplement and partly replace generation (see SACTRA paragraph 2.12).

A view from the Road

A good starting point is to consider what a person standing at the roadside would perceive as extra traffic following the opening of a new road. From the observer's viewpoint, it is the volume of traffic which causes an increase or decrease. This is usually measured as vehicle kilometres. This is separate from any change in the number of journeys actually made (trips), and can be caused by a whole range of changes in behaviour.

A list which corresponds to that in SACTRA and the new Government note "Guidance on Induced Traffic" (GIT) is defined below. The reference in GIT is also given after the effect. SACTRA also lists real life travel "decisions" which people make in relation to these effects in paragraphs 3.05 and 3.06, and describes the effects themselves in a matrix form in Figure 3.1.

SACTRA also supports the use of a new term in an attempt to remove one particular definitional problem. The term "trip generation" is most frequently used to mean journeys to or from a new development, whether housing, retail or commercial. However, it is also commonly used to describe the journeys which arise from new road schemes in addition to that which would be expected from such development. In this sense, extra traffic which results from new road building represents an increase in the mobility of goods or people, not an increase in economic development. Combined with the frequent use of traffic generation as a general term for different forms of traffic increases, this creates great potential for confusion, for example recent statements that induced traffic is a "good thing". In fact it puts up transport costs and thus holds back economic development in any normal sense.

This is the thinking behind the use of a new term: "Induced Traffic". This is entirely separate from and additional to any traffic normally expected from existing centres of economic and personal activity or those planned in the future. New and old development should already be included in the traffic forecasting procedure. Thus traffic is "generated" by new development, extra traffic is "induced" by new road capacity. The SACTRA convention has been adopted by the DoT, and is used here. The one important exception is where additional development is attracted (induced) by the road scheme. In fact, this will be relocated from elsewhere, and it will usually be impossible to identify exactly where from, and in any case well outside the limits of any local traffic model. In this sense new development may turn up as local induction, but should be deducted from planned development in another part of the country. As SACTRA put it,

"An important development for city A is of no relevance in a national cost/benefit

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analysis if it is mirrored by a corresponding loss to city B."

These problems are discussed further in SACTRA, for example 3.35-36 and 9.24-33, and more briefly in GIT 2.5, and are relevant to the minority report by SACTRA Member Audrey Lees (Annex VI, Main Report). A separate discussion of this issue is given at the end of this report.

EXTRA TRAFFIC CAUSED BY NEW ROAD SCHEMES

A. Extra traffic without Induction

The first two effects listed here will occur with or without what people usually term generation or induction.

1. WIDE AREA REASSIGNMENT (GIT 2.1A & 4.8)

When the impact of a new road scheme is measured, its main effect is predicted to be to divert traffic from one road (for example the road a bypass is designed to relieve) on to the new road. What this process usually ignores is the ability of a new road to cause a rearrangement of traffic routeing (including rat runs) over a wider area than that normally included in a local scheme traffic model. Thus most schemes have to date exclusively modelled local rerouteing (reassignment). The problem has been that a small change in traffic over a wide surrounding area may have a major impact in the small area of the scheme itself. The failure to take into account the change in traffic patterns over a wide area inevitably leads to overestimation of local benefits. There may be some benefits outside the area covered by the traffic model but these are likely to be very diffused and elusive.

It should be noted that rerouteing will also usually involve a trade off between extra distance and higher speed (for some users). It is possible to save travel time on one person's journey but cause more vehicle kilometres and congestion overall, and this will add to the local increases caused by wide area reassignment. Both these effects in turn lead to congestion in the area surrounding a new road scheme, since drivers will queue up to save time on their journey, and this will cause delays (and therefore costs) to other users. This effect is discussed in 3.32 of SACTRA, and the special case of roads around major conurbations in 3.33.

2. RETIMING (GIT 2.1B)

One obvious response to travelling in congested conditions is to change to a less congested time of day. There are limitations, for example getting to work or school on time. However, more flexible journeys can be switched from peak to off peak. One word of warning: even this flexibility is not total. It is unrealistic to switch shopping or personal business trips (such as going to the bank) into the late evening. On the other hand, when a new road is built, people may feel able to travel in the preferred time period, and switch back into the peak period as soon as space is available.

The effect of retiming is to reduce vehicle kilometres at one time and increase them at another. Thus, this effect is not strictly speaking induction. However, because the benefits of a road scheme are calculated for each time period, the effect of retiming can be significant. If a new road causes journeys to switch back into the peak hour, the delays and thus the cost imposed on other road users will be higher than if the journey was made off peak. Again, if retiming is ignored it is likely to lead to an overestimation of benefits in congested conditions.

B. Transfer from other modes with and without Induction

3. PURE MODAL TRANSFER (GIT 2.1D & E)

The third effect is also sometimes included in generation (though not here or in SACTRA), although in fact it involves journeys that were made before a new road is built. In this case the time savings offered by a new road scheme simply attract people away from another mode of transport. The same journeys are made, but instead of walking, cycling or using public transport, people drive their car. SACTRA and GIT emphasise that the "slow" modes (walking and cycling) must be included (this is in fact a major change).

One important additional mode which is again usually ignored is when people travel as a car passenger. This is a potential source for transfer to car driver. Thus a new road could lead to lower car occupancy and therefore to increases in car traffic.

4. MODAL TRANSFER WITH INDUCTION FROM LONGER JOURNEYS

One important factor is the combination of modal transfer with a change in the destination of a particular journey. This is

obviously limited in the case of journeys to work, though in the longer term (and road schemes are essentially long term projects) location and job choice will change. However, travel to the shops or leisure facilities can be changed almost at once. In this case a journey by foot, cycle or public transport to a local centre is replaced by a journey in the car. Once in the car, the person may decide to use a facility which is further away or poorly served by public transport.

This effect is paralleled by the way in which existing car journeys can also change their choice of destination, and is the next effect described below.

C. Induction caused by changing destination (Redistribution) but without new trips

5. LONGER JOURNEYS (GIT 2.1c)

If we imagine the decision to travel in two parts, first to achieve a given purpose (for example to get some shopping) and secondly to choose where to fulfil that purpose, the ease of travel will influence the second even if it has not influenced the first. This effect has been recognised for a very long time, and has been included in some traffic models. Such "Trip Distribution Models" can vary in type and effectiveness. For example, their main purpose is often to distribute base year trips between traffic zones, and they can be rather insensitive to changes in journey time. The author does not consider that many existing models are either designed for, or capable of, reproducing this induction effect. In particular, most are single ended (only the destination changes). This is a matter of convenience and practice, in fact traffic induction implies a dynamic double-ended redistribution.

Overall, the lengthening of journeys is a long recognised source of traffic generation (or induction). It is not the same as trip generation (induction), although this may also lead to extra traffic. This has caused some confusion. Trip generation is also used to describe the effects of new land use development, as was described above, and thus the use of the term "induction" is being proposed.

Induction from entirely new trips

6 TRIP FREQUENCY (GIT 2.1f)

This is described as a separate effect by SACTRA and GIT, but is very closely linked to Trip Induction (see below) and the two are often considered together.

An increase in trip frequency occurs when a person who regularly makes a journey between two places decides to make exactly the same journey more frequently. Examples would be visiting a friend or relative or going to the cinema. The extra trips cause extra traffic.

7 TRIP INDUCTION (GIT 2.1g)

This has been the most controversial element in traffic generation and represents the case where people decide to make a new journey which was not made before. An example would be undertaking a leisure activity which was previously too difficult to get to by any means of transport. The case of shopping in a distant centre, or visiting someone who was not visited before may also be included, as could going to the cinema instead of reading a book. In practice, it is difficult to separate out "pure" trip induction from all the other effects (most obviously frequency, but redistribution will be of major importance). In its narrowest definition it may well be the case, as the DoT claim, that the effect is limited. This leads to an important comment on the whole basket of effects which give rise to increases in traffic.

THE REAL WORLD: INTERACTION AND CHANGE

To return to the position of a roadside observer, can they ever know what causes underlie the increase in traffic which they observe? As SACTRA recognises (3.06) traffic is the result of a series of individual decisions which are constantly responding to changes in travel conditions and costs. In a sense the different effects compete with each other: for example a large amount of modal transfer may reduce the potential for new or longer journeys. What is more, this pattern will change from one day to the next, and certainly there will be short and long term effects. In the midst of all this complexity, SACTRA returns to the crucial question of how far a whole group of effects has been ignored, and whether this makes any difference to road scheme appraisal.

Their answer is simple: the effects are real, they are largely ignored, and this is very likely to have a major (and mostly a determining) influence on road scheme appraisal. There is insufficient information to distinguish which elements are the most important in which situations, but that should not prevent taking them seriously. The Government's response, clearest in the

Guidance, is to mostly accept this view and give interim methods for including traffic induction in appraisal. The exception to this is that the importance of new car trips (switches from car passenger to driver, increased trip frequency and trip induction) is judged to be less than the others.

Overall, the greater a scheme's impact on reducing travel times the more likely it is that induction will occur. The more a scheme affects an urban area, the more likely it is that modal transfer and lengthening journeys will be important. So what schemes will actually be affected?

WHICH SCHEMES WILL BE AFFECTED BY THE SACTRA FINDINGS?

DoT Guidance and Criteria

The most important section in the DoT's Guidance sets out when induced traffic will be important, and its implications are critical to the whole shape and size of the roads programme. In paragraph 4.1, three criteria are listed which should determine whether and how induced traffic will be considered. These are:

- where traffic congestion is, or will be, a problem;
- where travel behaviour has a high potential for change; and
- where changes in travel costs caused by a new road scheme are high.

If one or more criteria are met, induced traffic must be taken into account. If one or more is partially met, simpler methods, including sensitivity testing for the worst case, should be undertaken. If none of the three criteria are met, induced traffic need not be considered.

The Criteria in Practise

What the Guidance does not say is what sort of scheme will actually be affected. This is, however, clear from the criteria.

First, schemes which are justified because they relieve congestion will have to be assessed in a completely different way. It is important to bear in mind that this congestion relief is not at present day levels of traffic. The key date for relief is the road's design year (15 years after it opens). For schemes at inquiry today, this will be after 2010. Many major road schemes are in areas which will be suffering congestion on major roads by this date.

At present, schemes rely on such a heavily congested future being relieved by a new road scheme, and rely equally on the new road not inducing traffic. It is difficult to

think of a recent road scheme which does not have a major part of its COBA value derived from congestion relief. This is why so many strategic routes are called relief roads. This justification will now be removed to a very large extent.

Secondly, the potential for change in travel behaviour (elasticity of demand) is related to many factors, and one given by the Guidance is where there are many available alternative ways of satisfying the desire to travel. These alternatives may be in the form of different destinations (for example shopping centres), or in the form of other modes. "Modes" always includes walking and cycling as well as public transport. These conditions are met in most urban settlements of any size: even where public transport is weak, walking will still be important.

The first two criteria mean that virtually no scheme which is within an urban area, feeds into an urban area, or bypasses an urban area, should use the old methodology. Induction must be included. The most likely effect will be a massive reduction in the COBA benefits. This is difficult to estimate precisely, but in the author's view the elasticity values given in the Guidance imply reductions for many schemes in excess of 50% of the present value. This causes an even greater reduction in value for money because the construction and maintenance costs will not reduce at the same time.

This situation is always likely when the road network is congested (or will become so in the first half of a new road's life). When a road is not congested, the cost of adding another vehicle to other users is close to zero. As capacity is approached, costs escalate more and more rapidly. A technical description of this effect is shown in Figure 8.6.

As SACTRA itself points out (11.21 & 22), any reduction in present value will have an even greater impact on value for money. For example, if a road costs £10 million to build, and the benefits over 30 years (called the Present Value, PV) come to £20 million, the scheme has a Net Present Value (NPV) of £10 million. Reducing the PV by half gives an NPV of zero. Urban road schemes usually achieve lower benefit to cost ratios in any case (often less than 1.5:1) and the implication must be that most of such schemes would have a severely negative COBA value - they would be a waste of money.

Thirdly, the size of change in travel cost, which should decide whether induction is

important, will be directly linked to the size of the COBA benefits. Any scheme with a significant time saving benefit should have a significant impact on travel cost by definition. Thus it must induce traffic.

Obviously this last criteria can be avoided if large schemes are split up into smaller parts, and never assessed together. This distortion was identified in the 1986 SACTRA Report, the Government agreed, and there is relevant material in the new Guidance. In 6.2, if the scheme is part of a "strategy", induced traffic can be assessed using one large scale model which includes the other schemes. In 6.15, the need to omit key neighbouring schemes is set out, in order to test their impact on the effectiveness of the local scheme being assessed.

These last two small pieces of advice will have a major impact on smaller schemes presented as bypasses which are in fact part of a wider strategy, and which depend on other road proposals which are linked to them. This particularly applies to those which need free flow at the ends of the scheme if their time savings are to be realised. Many recent objectors have argued precisely this case, and may wish to review their position if the scheme is not yet built.

Which Schemes are not Affected?

The implication of the above is that a completely different type of road scheme will be value for money in the future. City bypasses, urban radial links, major link improvements including motorway widening, or a series of schemes which effectively form a major link, will all be assumed to induce extra traffic. This must inevitably mean far lower COBA values, rarely justifying the environmental damage or the economic cost. Demand management and priority schemes will be the order of the day. Their relative cost benefit performance will be even better than it is now.

Instead, a scheme which saves travel time between two places of low or fixed activity might be potentially more attractive. A link road to an industrial estate, or a bypass in a sparsely populated area are examples. The problem will be, where there is a low induction potential there will be low economic benefit, so any scheme will have to be low in cost. Secondly, this type of scheme is far more the province of local authorities, and should thus only be included in "package" bids.

It should also be added that the economic benefits of some rural schemes may be improved by small amounts of induced

traffic. This will be the case when the future is uncongested (for example see SACTRA Chapter 10). Whether this effect is substantial, and what exactly it means in transport planning terms, is so far unknown.

It is therefore difficult to predict exactly what the impact will be on the current roads programme, but an initial analysis indicates a massive re-ordering of priorities, all schemes of any significance will need to be reconsidered, and most of them are likely to lose a substantial amount of their COBA benefits.

SUPPRESSED DEMAND

There is one further complication in the picture of traffic generation/induction. If extra road space generates traffic, lack of it should do the opposite. Thus for every effect listed above, there will be an equivalent working in the opposite direction as congestion grows. This is known as traffic or trip suppression.

The DoT Guidance is admirably clear in drawing the distinction between the release of suppressed demand and traffic induction. If congestion grows, and no road is built, traffic will be suppressed. This is often done already in traffic models. What is never done is to release the suppressed demand if extra road capacity is provided. The key Government manual (Traffic Appraisal Manual or TAM) has been comprehensive, but essentially permissive, allowing various techniques to address such problems. However, in practice, traffic suppression has often been applied, but never released if more road space is provided. The new guidance addresses this anomaly directly, for example in paragraph 2.8,

"In the Do Minimum scenario, if growth leads to increasing congestion, some traffic growth will be suppressed. In the Do Something, the relief of congestion provided by the scheme will release some (or all) of the suppressed traffic."

In fact this is at least as important as any potential increases from induced traffic, partly because the release of suppression may happen very quickly.

The dividing line between suppression and generation is also made very clear. Traffic growth predicted by National Road Traffic Forecast, assuming no increase in congestion, is to be called the "reference case". If traffic is suppressed, the growth back to the reference case is the release of suppressed demand. If there is any additional capacity after this has been released, this may cause induced traffic (in

line with the methods given later in GIT). These two effects combined will provide the overall level of traffic induced by the scheme. A diagram is provided in paragraph 2.8.

> The point is reaffirmed in paragraph 3.3, *"where congestion already exists, or is expected to build up during the appraisal period, release of suppressed traffic can be as important as induced traffic, and must be taken into account in the appraisal of schemes."*

This unambiguous statement will affect many major road schemes, and directly addresses the serious anomaly of completely overloaded networks in the Do Minimum situation, which are then compared favourably to unrealistically smooth flowing networks in the Do Somethings.

LAND USE

At the beginning of this report, the capacity of road schemes to alter land use patterns was mentioned, and Audrey Lees' minority report also addresses this problem directly. In the DoT Guidance, clear distinction is drawn between local land use change which is expected and that which is caused by a new road. The former "should be allowed for in the underlying planning data". As regards the latter,

> *"Changes in land use which are entirely dependent upon completion of a scheme are likely to be limited in number." (GIT 2.5)*

There does remain, however one aspect to land use which is not covered in the Guidance. This is the number and location of depots and warehouses, and to an extent the catchment areas, and therefore the size and number of retail outlets. Audrey Lees draws attention to this in her report, saying that an assessment is needed "of the effect of new road space on communities and human activity, much of which involves land uses." In her covering letter to the Secretary of State she concludes that,

> *"At present, the essence of the test of the need for a trunk road improvement is one of mobility, that is how many vehicles the road is expected to carry, and so determine its economic justification and also the land take, the number of carriageways, the design of junctions and so on … Perhaps a test more suited to present circumstances would be "how well will the new road serve the needs for accessibility to land uses by road vehicles without unduly damaging the environment or the communities which it is designed to serve."*

Overall she is concerned by the lack of priority given to the interaction between land use and transport, particularly in the rather narrowly defined technical approach to induced traffic.

It must be true that the life style effects of transport will intimately involve land use change. Equally, there are few direct modelling approaches which can be said to represent such change. Scenario building, and the recognition of more dynamic and interactive processes in the transport field, including the influence of related communication systems for teleworking, teleconferencing and teleshopping are examples of how such problems can be addressed using different tools.

Miss Lees calls for an urgent review of methodology, and draws attention to another gap in the study of induced traffic: access for goods. This is considered next in this report.

FREIGHT

As Audrey Lees observes, the treatment of freight traffic is not given the attention it merits. Whether it is possible to do anything other than subsume it within total traffic flow for modelling purposes must be a moot point. Nevertheless, parallel effects must occur for freight traffic, in particular the land use patterns (particularly warehousing) will be very sensitive to change in cost. In addition, "Just in Time" systems will be very sensitive to congestion. An example of this is retiming, where goods vehicles are capable of rescheduling into the early hours of the morning (and many do so) because of congestion. In technical terms, it may be that road freight traffic is more elastic in certain respects than car traffic, and less so in others. It must be true that patterns of warehousing and distribution can change faster than shopping, residential or industrial locations.

This is exemplified by the FTA's evidence, quoted in SACTRA:

> *"Many businesses have reduced factory and warehouse locations to take advantage of reduced journey times by motorways. Some industries and services, such as next day parcels services and express coaches, would not have been possible without the productivity opportunities afforded by motorways …"*

This is extremely interesting since it provides first hand examples of induction. First the cost savings from fewer depots have outweighed the extra costs of more road freight transport. Hence more vehicle kilometres for the same goods at the point of consumption. Secondly two services are

mentioned both of which are excellent examples of modal transfer (one partly and one wholly from rail). The FTA quote continues:

"One food industry company has reduced its distribution depots from ten to four during the past five years. These improvements have been made possible by the improved road systems between its factories and its customers ... The same company has been able to close all its depots in the South West and serve them from a West Midlands factory, as a result of the opening of the M5 motorway."

This provides two interesting examples. First is the relatively short time within which major change takes place in distribution patterns. The second is how new road infrastructure, so eagerly sought by some in peripheral regions, can have a devastating impact on local employment. At the same time the environment will suffer from the extra heavy vehicle traffic.

Such effects are only briefly considered in SACTRA and hardly at all in the Guidance. This is additional to Miss Lees' point that policy should start with goods access rather than mobility.

As regards the question of the same amount of goods travelling further, it is well documented that the weight of goods carried has grown at a far slower rate than the distance goods are carried, and even in years when fewer goods are produced, distances have still increased. This trend towards lengthening hauls is very likely to have been influenced by road capacity increases in the past twenty years, as evidenced by the FTA. Lack of capacity will give rise to suppression or retiming, just as with private cars and vans, or even to a greater emphasis on local production and distribution.

Overall, as long as freight is included in sensitivity testing for general levels of generated traffic, this may not matter too much. There should certainly be some separate consideration of freight effects in addition to the modelling. If more complex area traffic models are adopted it must be seriously doubted that any of the freight specific changes in traffic (either suppression or induction) will be modelled accurately.

This is not only because such flows are often considered to be fixed in terms of origin, destination and timing (they are patently not), but because the data collected for freight has to be very extensive in relation to the flows. This in turn is because of the varied nature of the origins, destinations and loads in relation to a relatively small proportion of traffic flow, often less than 10%.

Overall the treatment of road freight and its induction is brief, and this must be considered a weakness both in the main report and particularly in the consequent Government Response and Guidance.

NEW MODELLING

There is a significant discussion in SACTRA on elasticities and economic theory (in particular supply and demand and consumer surplus). Much of this is used to underpin the finding that induced traffic is significant, and to suggest new ways of measuring what the traffic benefits and disbenefits of road schemes really are. This is the focus of Chapters 8 to 10.

What is not quite so clear cut in the SACTRA Report is what methods should be used to produce the traffic predictions for these new economic assessments. There appear to be two strands of thought. First is the desire for a simple, affordable approach which answers questions like "will a plausible level of induced traffic remove a significant part of the benefits?". This is in line with previous advice in the Traffic Appraisal Manual not to produce complex models for their own sake. Methods are already available which, with some development, could be used more widely.

The second line of thought is that more elaborate Land Use and Transportation models could be developed or, at least in major urban areas, are already available and could be revised.

In simple terms, the traditional version of such models starts with predicting land uses, then predicts the number of journeys that will be made to and from those land uses. This is called the "Trip Generation" stage. Next, origins and destinations are matched using a "Distribution" model. This allocates journeys to different locations according to the cost of getting there. After this, modal transfer can be estimated, and then the road journeys are allocated to the road network in the "Assignment" model. If modal split is included, the model is known as a four stage model, if not, it is a three stage model. In addition, the use of simpler "strategic demand" models is described as a cheaper alternative, but one less well suited to producing reliable flows on a single stretch of the road network. This is of course a requirement for scheme appraisal. The DoT Guidance also contains some detailed advice on how to approach each stage of the modelling procedures.

What conclusions can be drawn from the approach to modelling?

The main concern must be with the resurrection of large scale transportation models. This may be a case of absence making the heart grow fonder. Some of the older models were cumbersome, needed huge quantities of data (and were therefore expensive, or had to combine different sources of traffic data from different years), but most important of all they divided up the models for Generation-Distribution-Modal Split-Assignment very rigidly, mainly for reasons of computing complexity. Thus the very feedback from changes to the journey times on the network (from the Assignment box) which is essential to meet the SACTRA recommendations, is absent or very weak. The Distribution box is targeted towards reproducing present day journey lengths, not to dynamically predicting the interaction between more trip making, modal transfer and future journey length. Some of these problems are referred to in GIT 6.4-6.8.

This raises another issue about such complex models. It is virtually impossible to check their validity without a large amount of technical work. It must be said that the submission of a local model validation report (sometimes even these are missing) is not enough. The lack of monitoring and regulation of modelling at local scheme level has led to errors which some of the central parts of the DoT are only now beginning to come to terms with. The form of the Guidance is interesting in this respect: it is much more definite about what should and should not be done than relevant sections of the current Traffic Appraisal Manual. This is in turn with the draft advice note "Traffic Appraisal in Urban Areas", which is referred to several times in the Guidance.

Parallel to this is the question of accessibility to the intelligent lay person - if these models cannot be vetted by such people, and there is no independent vetting, the more complex the model the less accountable the modellers will be. It is of course a matter of opinion as to whether the persistent refusal to recognise traffic generation or induction by the DoT was finally reversed by the fact that every professional knew that it did exist (and would admit to this outside public inquiries into trunk roads) or whether the M25 finally brought traffic forecasting into the realm of common sense. After all, when the SACTRA Report was published, *The Sun* complained that it did not need a team of experts to know

that new roads generate traffic.

The serious question of accessibility and thus accountability is not considered in SACTRA. Miss Lees seeks a widened brief to consider exactly how the technical methodology fits with policy development and its implementation. In view of the comments on modelling above, it is difficult to argue that this problem should not be addressed.

Although the Guidance is an improvement in terms of clarity in some places, there is still some way to go both for public and technical consumption. For example, having been clear that they are important, it is vague about how to model the "slow" modes of walking and cycling. In most models these journeys are not surveyed, and if they were the structure of the model is so geared towards longer journeys that they could not sensibly be included in it. The Guidance suggests that they might be put in as part of trip induction. This is certainly better than nothing, but no clear guidance is given as to how to vary the quantity of trip induction if walk and cycle are to be included in the particular effect.

Overall the modelling gives some cause for concern, particularly if induction is treated as though it is amenable to a technical fix. Reliance on modelling for the wrong purpose is arguably one of the most serious flaws in British transport planning. For comparative purposes, and for exploring different futures, models can be very useful. The trouble is they are used as though they provide absolute predictions of future desires and behaviour. Used in this way the only certainty is that they will be wrong. The more complex they become, the longer it will be before these and other mistakes are uncovered.

CONCLUSIONS

There are a wide range of findings and recommendations in SACTRA and the associated documents. A subjective list of the most critical is given below.

From the SACTRA Report:

- Induced traffic can be sensibly defined and is a major effect in certain circumstances.
- These circumstances are widespread and can be clearly defined.
- The various components of induced traffic are difficult to separate out and quantify.
- Overall, in many cases about half the time savings from new road capacity will be consumed by induced traffic when it

opens, most of them will have been consumed by the design year.
• Varying traffic forecasts according to the new capacity provided (variable matrix forecasting) should become the norm.

The Government Response:

• Broadly agrees it must be included in appraisal and has issued Guidance.

From the Guidance:

• The distinction between suppression, generation and "reference" forecasts (NRTF) addresses a key problem and represents a major advance.
• Walking and cycling are modes of transport relevant to trunk road schemes.
• "Do Minimum" futures should have lower traffic forecasts if they will suffer congestion at that date (even if there is little now).
• "Do Something" futures should have higher traffic forecasts if they relieve congestion, cause significant reductions in travel time between places, or cause a shift in the balance of modal competition (these effects can occur in combination).
• Overall, the main Guidance provides the clearest statement yet on modelling issues, but calls for more research.
• Further detailed advice is to be found in the draft "Traffic Appraisal in Urban Areas".
• Sensitivity tests can be done quickly and cheaply and should be undertaken.
• Complex modelling is recommended for complex schemes.

A CLOSING COMMENT

Overall, the SACTRA Report, and the Government's response, represent a major change in appraisal. It is likely to have a huge impact both on the roads programme,

but more subtly on the balance between demand management and road building. Certainly five out of the six recent schemes that the author has worked on would have been seriously affected and it seems doubtful that they should have been in the Government programme.

It also seems the case that the initial response is to change the detailed techniques, but not the overall assessment process. Whether the roads programme will move towards an objectives led value for money appraisal, as the package approach to Transport Supplementary Grant has done, is not yet clear. Such a move would help to assuage Audrey Lees' profound unease with the "technical fix" approach to induced traffic.

Two more detailed concerns remain. The first is the way in which freight is treated, although it clearly has great potential for induced traffic, in particular the land use changes are faster than those for the passenger modes.

The final question is should a move back towards massive regional land use and transportation modelling be welcomed? The following questions remain unanswered:
• Have we got the data?
• Have we got the skilled experienced teams?
• How do we avoid the fact that older 4 stage models were notorious for NOT feeding back journey times into generation and distribution models?
• Can we prevent them becoming even more obscure to the intelligent lay person?
And finally, echoing the comments in Audrey Lees' minority report:
• Do we need a root and branch rethink on land use and transport?
• Is it all far too expensive?
• Will it distract attention from much more important issues?

Notes

1   This article was original produced as a report for the Transport 2000 Trust by the author, Keith Buchan who works for the Metropolitan Transport Research Unit.

2   The full references for the three key documents considered by this article are: **Trunk Roads and the Generation of Traffic** by the Standing Advi-

sory Committee on Trunk Road Assessment (published by Department of Transport, HMSO, Dec 1994, price £24.00); the **Government's Response to SACTRA** - **on Trunk Roads and the Generation of Traffic** (published by the Department of Transport, HMSO, Dec 1994, price £7.25); and the **Guidance on Induced Traffic** (Dept of Transport).