

# World Transport Policy & Practice

ISSN 1352-7614

## Volume 7, Number 4, 2001

### **Mission Statement**

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

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

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

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

To help it to reach a wide readership, encompassing advocates and activists as well as academics and advisers, WTPP is available free of charge as PDF files on the internet at <http://www.ecoplan.org/wtpp/>

---

© 2001 Eco-Logica Ltd

ISSN 1352-7614

### **Editor**

John Whitelegg

Professor of Environmental Studies, Liverpool John Moores University, Clarence Street, LIVERPOOL, L3 5UG, U.K.

### **Editorial board**

Eric Britton

Managing Director, EcoPlan International, The Centre for Technology & Systems Studies, 8/10 rue Joseph Bara, F-75006 Paris, FRANCE.

Professor John Howe

Independent Transport Consultant, Delft, THE NETHERLANDS.

Mikel Murga

Leber Planificacion e Ingenieria, S.A., Apartado 79, 48930-Las Arenas, Bizkaia, SPAIN.

Paul Tranter

School of Geography and Oceanography, University College, University of New South Wales, Australian Defence Force Academy, Canberra ACT 2600, AUSTRALIA

### **Publisher**

Eco-Logica Ltd., 53, Derwent Road, LANCASTER, LA1 3ES, U.K.

Telephone +44 1524 63175 Fax +44 1524 848340

E-mail: Editorial: <[ecologic@gn.apc.org](mailto:ecologic@gn.apc.org)> Business Manager: <[pascal@gn.apc.org](mailto:pascal@gn.apc.org)>

# World Transport Policy & Practice

ISSN 1352-7614

Volume 7, Number 4, 2001

## Contents

- 3 Abstracts & Keywords
- 6 Editorial
- 7 Rough Crossing
- 8 The headloading & footpath economy – walking in Sub-Saharan Africa  
*John Howe*
- 13 Pedestrian infrastructure in the city transport system: a case study of Delhi  
*Geetam Tiwari*
- 19 Copenhagen on foot: thirty years of planning & development  
*Lars Gemzoe*
- 28 Making pedestrian facilities more usable & safer for all  
*Barbara McMillen*
- 33 Walking & health: making the links  
*Nick Cavill*
- 39 Prioritising policy & practice to favour walking  
*Mayer Hillman*
- 44 Unfulfilled aspirations: a review of the Select Committee Report on *Walking in Towns and Cities* in Britain  
*Rodney Tolley*
- 50 A traveller in time: Understanding deterrents to walking to work  
*Rachel Goodman*
- 55 Deconstructing the future: assessing new initiatives in transport, including demand management & walking  
*Ian Ker*
- 61 Increasing walking trips through TravelSmart® Individualised Marketing  
*Bruce James & Werner Brög*
- 67 Locking in the pedestrian? The privatised streets of gated communities  
*Matthew Burke & Christian Sebaly*
- 75 The role of public policies in promoting the safety, convenience & popularity of bicycling  
*John Pucher*
- 80 Letter in response to the special issue on cycling, Volume 7, Number 3 (2001)  
*John Street*
- 81 Author & Title Index to Volume 7, 2001
- 84 Notes for contributors

### **The headloading & footpath economy – walking in Sub-Saharan Africa**

*John Howe*

Walking dominates all measures of personal and household-level goods movement in Sub-Saharan African societies, but this is rarely evident in planned interventions in their transport systems. The capture of investment by elites is most apparent in cities without a network of safe walkways, yet where only a minority drive cars. Attitude is the most plausible explanation why walking is ignored, buttressed by a sense that it has little economic importance. The persistence of poverty with its obvious relation to immobility, and declining environmental conditions in cities, are the most likely issues to force a reassessment of the role of walking among decision makers.

#### **Keywords**

Accessibility, planning, safety, Sub-Saharan Africa, walking, walking cities.

### **Pedestrian infrastructure in the city transport system: a case study of Delhi**

*Geetam Tiwari*

Abstract

Walking and non-motorised vehicles are the principal modes of transport for most of the urban poor in Asian cities. For a large number of people even subsidised public transport (buses) and low cost bicycles are beyond their means, so that a significant proportion of the population falls into the category of 'captive pedestrians'. Captive pedestrians and public transport users together form the largest group of road users. Yet their need for a safe and convenient infrastructure continues to be ignored. This has two major impacts on city traffic and travel patterns. Pedestrian and public transport trips as a percentage of total journeys have declined over the years, though they are not expected to disappear in the near future. Pedestrians are present on the roads despite hostile infrastructure designs and motor vehicles are forced to share the road space with them; this creates sub-optimal conditions for all road users. A reversal of this trend is possible. It is possible to create pedestrian, bicycle and public transport friendly urban roads without increasing the right of way of existing arterial roads in Delhi. The guiding principle of such a design is re-assigning priorities to various road users and by meeting the needs of pedestrians, cyclists and public transport commuters in that order.

#### **Keywords**

Delhi transport, non-motorised vehicles, Pedestrian infrastructure, urban transport, walking.

### **Copenhagen on foot: thirty years of planning & development**

*Lars Gemzoe*

Each year Copenhagen has improved the quality of the inner city walking environment. Walking is seen as a pleasure, not just as a form of transportation. With the improvements in public space new forms of urban recreation have emerged. More and more people spend more time using car-free spaces for a multitude of different activities. Data on these changes of urban culture have been recorded since the 1960s in a series of surveys of the inner city and they show major changes in traffic culture and public life. Since 1968 such activities have quadrupled in the car-free spaces which show a development from just walking to other forms of urban recreation as part of the walking experience.

#### **Keywords**

Car-free, city bike, Copenhagen Inner City, public space, public life, walking, staying, urban recreation, data on activities in public space, climate and urban activities.

### **Making pedestrian facilities more usable & safer for all**

*Barbara McMillen*

Most developed countries are experiencing a change in the age and ability profiles of their populations. There are more older people and more people with a disability that limits major life activities. As people age, they are likely to develop more than one disability, and this can compromise a person's mobility for walking and using transportation systems. Traditionally, transportation systems and other built environments have not been designed to accommodate the needs of all users. The lack of accessible environments presents social and economic costs and issues of independence not only for the fast growing aging and disabled population but for most of society. There are many competing interests when designing and retrofitting infrastructure, and political will is essential to ensure that accessibility is part of policy, planning, design and construction.

#### **Keywords**

Americans with Disabilities Act, Americans with Disabilities Act Accessibility Guidelines, Building a True Community, Designing Sidewalks and Trails for Access, Federal Highway Administration, people with disabilities, Universal Design, U.S. Access Board, visual and hearing disabilities, wheelchair.

**Walking & health: making the links***Nick Cavill*

Walking is a healthy mode of transport, offering one of the most fruitful areas for collaboration between health and transport professionals for a number of reasons. Firstly, the research evidence on the health benefits of physical activity (including walking) is strong, notably in reducing the public health burden of coronary heart disease and obesity. Secondly, walking has specific benefits to health, and offers great potential to improve public health due to the ease with which it can be integrated into people's daily lives. Thirdly, the health promotion sector has valuable skills and experience to offer in the promotion of walking, which can make for fruitful collaborations. Finally, physical activity and public health professionals are increasingly focusing on environmental determinants of behaviour, leading them to embrace other disciplines including transport planning, town planning, environmental health and architecture. Health professionals are powerful allies for the transport professional aiming to promote walking, and both need to work together to build on the overwhelming evidence of the benefits of our most natural mode of transport.

**Keywords**

Walking, public health, transport

**Prioritising policy & practice to favour walking***Mayer Hillman*

A considerable body of research evidence is presented indicating that from social, economic and environmental viewpoints the wider public interest is better served when the proportion of journeys made on foot rather than by motorised means rises. For this reason, it could be expected that transport priorities would favour pedestrians. However, a brief examination of policy and practice influencing the attractions of walking over the years reveals the extent of discrimination against those making journeys in this way. The elements of a strategy aimed at reversing this process is outlined.

**Keywords**

Health, climate, equity, vulnerability, cost, network, walking

**Unfulfilled aspirations: a review of the Select Committee Report on *Walking in Towns and Cities in Britain****Rodney Tolley*

Walking in Britain is an important but currently declining mode of transport. In the winter of 2000-01 the Environment, Transport and Regional Affairs Committee of the House of Commons carried out an inquiry into the expenditure, administration and policy of Government towards walking in towns and

cities. The resultant Select Committee Report is uncompromisingly critical of the Government, arguing that the attention, action and priority accorded to walking failed to match its importance and were inadequate to reverse the longstanding trend of decline. Amongst many recommendations is a call for a National Walking Strategy. The paper reviews the process of the inquiry and discusses the relevance of the outcomes to the contemporary walking environment in Britain.

**Keywords**

policy, Select Committee, strategy, urban renaissance, walking

**A traveller in time: Understanding deterrents to walking to work***Rachel Goodman*

This paper derives from doctoral research funded by the Centre for Alternative and Sustainable Transport (CAST) and Staffordshire University. It reports on the qualitative aspect of research into attitudes towards walking to work of a group of public sector employees within Staffordshire. The key geographical concept of space/time is central to decisions about walking to work and this is particularly true for those who currently travel to work by car. In the past, the specific literature on deterrents to walking has treated time in a narrow and mechanistic fashion, which assumes an unquestioned commodified view of time of equal measure to all. This paper contributes to understanding walking as a potential mode of commuter transport through identifying a range of complex and interrelated temporal constraints that influence people's attitudes to, and decisions about, walking to work.

**Keywords**

Commuting, time, travel behaviour, walking.

**Deconstructing the future: assessing new initiatives in transport, including demand management & walking***Ian Ker*

Transport strategies have changed direction very substantially in the past decade or so, but the methodology of evaluation has not kept up, often because the linkages between new initiatives and outcomes are not clearly-enough defined or well-enough quantified. In addition, evaluation methodologies, in practice (if not always in theory), often assume that 'more is better' and have difficulty coping with change that includes changes in what we do (activity patterns) as well as how we get there (travel). Our tools favour the status quo and, consequently, new initiatives often have great difficulty in getting funding. The renewed emphasis on walking is a case in point, not only in respect to conventional evaluation issues, but also because of the importance of 'new' issues such as health and fitness,

energy economics, greenhouse gas emissions and new dimensions of road trauma.

The paper discusses issues that conventional transport planners are either not aware of or wish would go away, outlines a framework for incorporating these into assessment and evaluation, and presents an application of this framework to the marketing of a pedestrian strategy for Perth.

#### **Keywords**

Assessment, demand management, evaluation, externalities, pedestrian strategy, performance measurement, pilot projects, walking.

#### **Increasing walking trips through TravelSmart® Individualised Marketing**

*Bruce James & Werner Brög*

For many years walking as a mode of transport has received very little policy attention from transport planners in the Perth Metropolitan Region of Western Australia. The mode share for walking has declined over the last fifteen years in favour of an increase in car trips. The need to arrest the decline of walking and increase its mode share has been identified as a desirable outcome through a set of transport targets for 2029. The challenge to develop and implement interventions to increase walking without constraining mobility was set by the adoption of these targets.

The development of a predictive technique provided evidence of a behaviour change aligned with the policy direction adopted by the WA Department for Planning and Infrastructure. Testing in the Perth context provided the evidence to justify the large-scale application of Individualised Marketing under the TravelSmart® brand. The results showed that walking captured half of the car trips which converted to walking, cycling and public transport. For the 35,000 people in the City of South Perth, this meant an additional 4800 walk trips per day. This coupled with the 1200 walking legs of public transport trips provided an overall 6000 extra walk trips.

The success of the project has provided the evidence and justification for the expansion of the behaviour change approach to other areas of the Perth Metropolitan Area.

#### **Keywords**

behaviour change potential, Individualised Marketing, TravelSmart®, voluntary travel behaviour change, walking.

#### **Locking in the pedestrian? The privatised streets of gated communities**

*Matthew Burke & Christian Sebaly*

The paper outlines research into the travel behaviour impacts of residential estates with privatised and barricaded streets known commonly as 'gated communities'. Through investigations at two

particular estates in Brisbane, Australia, it is shown that this built form produces small but significant changes in behaviour, especially pedestrian behaviour, that bring into question whether local authorities should permit such developments if they are sincere about encouraging walking as a mode of transport.

#### **Keywords**

gated communities, pedestrian connectivity, street vitality, street safety, travel behaviour.

#### **The role of public policies in promoting the safety, convenience & popularity of bicycling**

*John Pucher*

In the special issue on bicycling of WTPP (Volume 7, Number 3), Heath Maddox questions the potential of public policies to encourage bicycling. This response to the Maddox critique argues that he seriously misinterpreted the concept of public policy, considering only a small subset of the many policies that can facilitate bicycling. He does not adequately examine the impacts of special cycling facilities. Moreover, Maddox ignores virtually all other transport policies as well as all land-use, housing, taxation, education, training, law enforcement and public relations policies. This counterpoint article re-emphasises the crucial importance of a wide range of public policies to increase the safety, convenience and attractiveness of cycling. In order to generate the necessary political support for such policies, this article recommends focussing on the enormous public health benefits that would derive from increased cycling.

#### **Keywords**

Bicycling, Germany, land-use, non-motorised transport, obesity, physical exercise, public health, public policy, traffic safety, travel behaviour, U.S.A.

#### **Letter in response to the special issue on cycling, Volume 7, Number 3 (2001)**

*John Street*

John Street responds to the special issue on cycling by presenting the pedestrian viewpoint.

Welcome to this special issue of World Transport Policy & Practice on walking.

Twenty years ago I had the very great pleasure of walking around Lancaster, a small city in the northwest of England, with 4 small children. The children were sometimes in a pram/pushchair/buggy but very soon were on foot and we walked everywhere. Trips to the park, to the museums, to the attractive riverside paths, were normal everyday occurrences. I should say at this point that these experiences were not entirely idyllic. Traffic and pollution was a concern but this concern was within acceptable bounds.

One of those children has now produced a child and after a 20 year gap I have once again taken up walking around town with a pram/buggy and a 4 month old grandson. The situation now is appalling. The experience is dreadful. The streets are an alien environment of noise, pollution, danger and obstruction. Our trips have to negotiate vehicles parked on pavements. Our attempts to cross roads are characterised by standing around in a swirling soup of cancer causing pollution aimed at the child's lungs and calculating the probabilities of another 20 year old male driver in baseball cap hurtling around the corner in a deliberately aggressive manner and in excess of the speed limit. This should not be interpreted as mere anecdote. We have a global problem of wilful neglect of the pedestrian. We cannot even think of the needs of our young children. Civilisation in our urban areas is in decline because of the psychological warfare waged by car drivers on anyone who is not in a car and, increasingly, on other car drivers whose skills and positioning on the roads do not meet the standards of angry, frustrated and selfish drivers.

The situation in Nairobi, Calcutta or any large city in Asia and Africa is much worse than in a UK city. In these cities pedestrians meet with the ultimate punishment for their deviant behaviour. They are killed (1000 each year in Calcutta). Millions of pedestrians in Asia and Africa struggle to walk to work along roads with inadequate or non-existent footpaths/sidewalks. When engineers do become involved in 'taking care' of the pedestrian they are more likely to erect steel barriers to stop pedestrians making a convenient crossing than they are to take account of pedestrian desire lines. They build subways and underpasses or send pedestrians over footbridges that are useless for those with prams/buggies and young children. They ignore the needs of the elderly and those with any mobility difficulty or handicap. In the USA walking is regarded as a deviant activity rather than something to be encouraged and journeys of even 100 metres from the parking lot to the diner will be taken by car.

This special issue on walking is intended to push this kind of transport right to the top of the policy agenda. It is far more important than flying or sorting out trains and yet it still produces massive indifference on the part of policy makers.

The articles in this special issue map out the degree of this indifference. Howe in the case of Africa and Tiwari for Asia show just how important walking is for these parts of the world and how little is done to recognise the needs of the pedestrian. The pedestrian environment is, moreover, not a static phenomenon. It gets worse every day as more cash and more policy goes into supporting car use in societies where this can only be accessed by the very rich and powerful. This damages the economy, damages health and damages the quality of the built environment. Cavill takes up the health point and shows how walking can positively improve health. The epidemic of obesity and diseases made more prevalent because of obesity is a drain on the health care systems of the USA and Europe.

James and Brög show that walking is excellent value for money. Once again we have strong evidence that reveals much of current transport policy pursuing costly options producing maximum (and costly) damage. Walking and cycling are capable of accounting for at least 30% of all journeys in a well planned metropolitan area and much more in densely populated and highly accessible cities like Calcutta. The fact that much of global performance in this area of modal share is so very bad is a damning indictment of the transport planning and engineering professions and the decision making systems that they feed into.

Finally in this special issue we run some commentaries on articles that appeared in the cycling issue (7,3). The letter from John Street gives us some new perspectives on cycling which will also be useful to try and understand walking. The Pucher-Maddox debate is very important indeed. We need to know the what, why and how of increasing the amount of cycling. We can learn lessons from this for walking and vice versa. Only by increasing the rigour and intellectual quality of our work will we be able to move into a 21<sup>st</sup> century re-interpretation of mobility so that we spend much more time walking and cycling and much less time increasing the levels of aggression, concrete pour and distance consumption.

*John Whitelegg*  
*Editor*

*World Transport Policy & Practice*

Rod Tolley is thanked for his efforts as Guest Editor of this special issue.

How did civil servants working at Eland House, the Department of Transport HQ, in London cross the road? Many dashed across when there was a break in the fast one-way traffic rather than walk to the signalled crossing at one end of Bressenden Place or the subway at the other. Today, there is a pedestrian-controlled crossing outside their building. Note the pedestrian refuge in the middle of the carriageway. It appears that car journeys cannot be delayed for too long by slow pedestrians.

In this issue of WTPP Rodney Tolley writes that:

'the Committee [on *Walking in Towns and Cities*] had been very critical of staggered crossings outside the Houses of Parliament and the City of Westminster (the relevant local authority) submitted a memorandum in their defence. The

gulf between pedestrians' desire for direct movement and the 'accident reduction' approach of engineers could hardly be better illustrated than in this reply. It said: *'Regrettably, pedestrians often misuse the crossing facilities provided for them and choose to risk the crossing of some of London's busiest roads away from the improved safety that many crossings provide and until such time as there is legislation against this practice the problem will persist'*.

We are grateful to Living Streets for permission to publish these photographs (by Suzanne Jansen and the Pedestrians Association) which first appeared *Walk* (Volume 9, Number 6, Spring 2001, ISSN 0144-2694), the journal of the Pedestrians Association. <http://www.livingstreets.org.uk>

# The headloading & footpath economy – walking in Sub-Saharan Africa

John Howe

Address for correspondence

John Howe

Independent Transport Consultant, Delft, The Netherlands.

<[jdhowe@planet.nl](mailto:jdhowe@planet.nl)>

---

## Abstract

Walking dominates all measures of personal and household-level goods movement in Sub-Saharan African societies, but this is rarely evident in planned interventions in their transport systems. The capture of investment by elites is most apparent in cities without a network of safe walkways, yet where only a minority drive cars. Attitude is the most plausible explanation why walking is ignored, buttressed by a sense that it has little economic importance. The persistence of poverty with its obvious relation to immobility, and declining environmental conditions in cities, are the most likely issues to force a reassessment of the role of walking among decision makers.

## Keywords

Accessibility, planning, safety, Sub-Saharan Africa, walking, walking cities.

## Introduction

The first part of the title of this article was used by World Bank economist Thampil Pankaj as a means of dramatising the importance of walking as a mode of transport in most of Sub-Saharan Africa (Lowe, 1989). He was referring to its rural areas, but – as will be shown subsequently – so far as the majority of their (poor) inhabitants are concerned a similar observation could have been made about many of its urban areas too. The recognition is belated and by no means the norm. To judge from actual investments the perspective of most transport planners and decision makers still largely excludes walking. Why is this? Is it the very ubiquity of walking, or simply that it lacks any sense of sophistication, or modernity, that many seem to yearn for? Is it perhaps because it has been, until comparatively recently, largely an unquantified phenomenon? Or is it simply because it is regarded as unimportant? This paper explores attitudes towards walking's role and its importance in current transport systems, both rural and urban.

## Transport system evolution

Most developing countries adopted the evolutionary direction as well as inheriting the essential structure of their transport systems from colonial administrations. In Sub-Saharan Africa road

transport increasingly dominated the early dependence on rail, which lost ground steadily from the end of the Second World War onwards. The popularity of road transport owed much to its most successful exponent, the U.S.A.. There the eminent economist Walter Rostow inferred that there was a causal relationship between the United States' prosperity and its road transport investment, and equated automobile-dependence with the highest stages of economic growth (Rostow, 1962). Similarly, and more generally, Wilfred Owen, in his seminal work, *Strategy for mobility* made a persuasive plea for the benefits of modern, and especially road, transport systems (Owen, 1964). He separated the world into the mobile and immobile nations, with mobility being defined entirely in terms of the stock of modern motorised transport. The mobile nations were all wealthy and the immobile all poor. The promotion of motorised mobility became the primary objective of the major development agencies and most governments. China and India were, until recently, the main exceptions to this trend (Howe, 1997).

Of course in one sense both Rostow and Owen were right; a modern transport system is indispensable to the process of social and economic development. But it is not the only requirement, and in the rush to motorise and accommodate motorised traffic an unfortunate side effect seems to have been the rejection of non-motorised means of movement as somehow inferior or backward. It is a view that still strongly prevails in many countries. Furthermore, many planners do not give cognizance to the downside of the U.S. model even though Rostow's term *automobile-dependence* is now used pejoratively in public opinion.

Over-expansion of the sector, made possible by huge, and generally hidden, subsidies to users, is seen to have created an unsustainable system with a large and increasing dependence on external energy supplies. More subtly, it has led to an extravagant pattern of land use in which living and employment locations are separated by considerable distances thereby further marginalising walking. This imposes high (commuting) costs on the international competitiveness of U.S. businesses. Lastly, many cities in the U.S.A. have experienced the 'doughnut effect' – the economic

collapse of the city centre due to retail and other business expansion on the urban periphery made possible by cheap car travel. Increasingly the legacy of the suburban society is decaying, crime- and drug-ridden city centres occupied by the immobile poor. When those with the power and influence moved away from the city centre, they took with them much of what had sustained the social support systems – education, health care and cultural activities.

In the immediate aftermath of independence the U.S. pattern of transport investment became the preferred policy model of most free market and many nominally socialist developing countries. The U.S. Inter-State Highway System was the 'idealised' model of a rural transport system and quickly led to grandiose plans for Pan-American, Trans-African and Asian Highway networks in which the International Road Federation, a Washington-based lobby group, played a major part. Energy and environmental considerations had not emerged to dampen enthusiasm about unrestrained growth in the use of motor vehicles, and global motorisation was seen as an attainable transport goal.

Most of these dreams are shattered. Much of the indebtedness of countries like Brazil and Nigeria can be traced to massive investments in road infrastructure that was supposed to trigger accelerated economic growth and did not. In Sub-Saharan Africa most countries are saddled with nominal road networks they cannot abandon for political reasons, but which they are unable to maintain. There is at the very least an equivalent length of local roads, tracks and paths in an even more deteriorated state. The acuteness of the maintenance problem was first recognised in the early 1980s and by the end of that decade the evidence was irrefutable (World Bank, 1988).

### **Re-thinking rural transport & walking**

The origins of a change in thinking towards walking in rural areas can be traced to the development in the mid-1980s of a method for quantifying household transport demands. The impetus to do so arose spontaneously among a number of international development agencies (GTZ, ILO, World Bank) that had become increasingly dissatisfied with the essentially top-down process implicit in road system development. Apart from the evident problems with maintenance, in many countries projection of this process indicated it would be several decades before it was possible to reach a significant proportion of the population. For example, in 1978 surveys in India showed that 70.7% of its 575,936 villages were not on an all-weather road and 54.6% were not on any road (Thomas, 1984). Moreover, improved road access did not necessarily mean either better provision of services or improved mobility for people too poor to afford the

fares. Gradually, the view developed that the deprived conditions experienced by many poor rural communities might need to be addressed by an array of unconventional transport sector and other interventions. Research was commissioned by the World Bank in the early 1990s with specific scientific hypotheses and rigorous sampling methods. The publication of the resulting report was a landmark because the evidence was conclusive and irrefutable (Barwell, 1996).

### **Transport & the village**

The overall image that emerges from the surveys in Burkina Faso, Uganda and Zambia. is one of rural isolation and unproductive use of limited resources.

'The African farmer largely inhabits a walking world. Access to rural transport services is poor. Only rarely do rural people visit the world outside their most immediate locality. Women are the principal transporters with the typical female's carrying effort in the survey areas being equivalent to carrying a 20 kg load over a distance of 1 km to 5 km daily. The average time rural adults spend daily on transport – between 1 and 2.5 hours – is, however, not more than many people in industrial countries devote to travelling to and from paid employment. The main differences are that (a) transport efficiency in Africa is very low with the time and effort invested achieving little more than meeting the household's needs for survival, and (b) transport is a drain on labour which is the principal factor of production of most rural households'.

(Barwell, 1996, vii).

The dependence on walking was held to be a major reason for the precarious nature of rural life. It is slow, burdensome and of limited capacity, necessitating numerous trips to move substantial loads. Head loading, in particular, is expensive in time and energy, taking two person-days in Ghana, for example, to move 1 tonne-km. In 1991 this was estimated to cost about US\$3 equivalent per tonne-km, as against 30 cents or less on a bicycle trailer, which takes about one hour. The asymmetry of load carrying, with culture dictating that women are the main carriers, further undermines the productivity of the household because of the multiple other productive and reproductive tasks they must undertake. The magnitude of the time used for household-level transport and its extreme gender asymmetry led naturally to two questions:

- (i) what interventions might be undertaken to reduce them; and
- (ii) what value could be attributed to any reduction in the time spent transporting as a means of justifying investing in the necessary interventions?

Making walking more efficient either means addressing the inefficiency of the process itself, or else

replacing it with faster or greater load capacity modes of movement. The efficiency of the process can be increased either by making routes more direct, or reducing the effort needed to traverse them. As with more efficient modes of transport this inevitably requires investment that needs to be justified.

The very invisibility of walking implies that it is held to have little intrinsic value. Those who do it are presumed to be poor, with very low cash incomes, which are translated into low valuation of their time. Such a line of reasoning uses income as a proxy for valuing time. However, valuations inferred from people's behaviour often result in higher figures. Whittington, using observations of the choices women made in selecting where to obtain water, has shown that households place a surprisingly high value on the time they spend and it can be equated to the wage rate for unskilled labour (Whittington *et al.*, 1990). This suggests that interventions to improve the efficiency of walking might result in economic rates of return on investment. Empirical research has indeed confirmed that this is the case. Investment in footpath improvement in the Makete District of Tanzania has been shown to produce a benefit to cost ratio of almost 12:1, approximately double that of investing in improvement of a feeder road (Sieber, 1999).

A further development resulting from the early consultancy studies was a fundamental re-thinking of the purpose of rural transport planning. The traditional (road) system-based, and essentially top-down, process was replaced by a bottom-up participatory perspective, with the household or village as the focus of a new 'needs-based' assessment. This led to the realisation that subsistence purposes dominated household movement needs that were essentially local in orientation. Long-distance trips necessitating modern motorised transport were a rarity and occasioned by health needs; those for social and cultural purposes – weddings, funerals, visits to relatives; or for circular migration by family members working away from home. Access was seen as the primary need and this could be effected more efficiently either by transport or non-transport interventions e.g. bringing services – such as grain grinding mills, schools, health facilities, sources of water or firewood – closer to the point of demand. Also, access did not necessarily mean road access: in some cases improved footpaths and tracks, or simple water crossings were all that was required. Honduras, Lesotho and Nepal are among the countries that have made major changes in the seasonal access enjoyed by rural communities by constructing footbridges across otherwise uncrossable rivers.

The first large-scale use of this approach was in the Philippines in 1990 where it became known as Integrated Rural Accessibility Planning. The process

has been adopted as a local-level planning tool and is used by the majority of provincial administrations. It has since been applied in Cambodia, Indonesia and Laos. However, little is known about how widely actual interventions have been implemented beyond pilot demonstrations. Proposals to initiate or strengthen Integrated Rural Accessibility Planning in Bangladesh, India, Indonesia, Nepal and Vietnam are currently being considered.

Recent research has also underlined the growing isolation and impoverishment of those who are dependent on walking. Studies of changing livelihoods show the declining returns to agricultural activities and the corresponding increase in importance to rural households of non-farm income. This is a universal phenomenon, but has been particularly dramatic in Sub-Saharan Africa. The need to seek off-farm sources of income means that enhanced personal mobility becomes of paramount importance so as to maximise the area of work-search. Those limited to walking have an inherently restricted horizon of employment opportunities.

### **Mapping urban transport & walking**

Recent surveys in East Africa have examined the position of walking and provided a detailed analysis of its role and the circumstances under which it is used (Howe & Bryceson, 2000). In general the expense of public transport and lack of safe alternatives (e.g. cycling) determines that walking is the only personal travel option for much of the population. For a growing proportion walking trips are becoming longer as the cities expand, and formal employment opportunities and the most important services remain centralised. Many peripheral settlements are in unattractive locations so income-generating activities and services are difficult to establish in their vicinity. The result is that some of the most poor are immobilised in remote slum settlements, dependent on a variety of informal sector activities. However, it is instructive to unbundle this general picture.

Studies were carried out in two metropolitan cities (Dar-es-Salaam and Nairobi), and two secondary cities (Eldoret and Morogoro), one each in Kenya and Tanzania. The population of the metropolitan cities was in the range 2-3 million, and the secondary cities around 300,000. In the largest cities walking dominates (46-47%) the modal split, followed closely by public transport (bus and share taxi). Public transport accounts for 82-88% of all motorised and 42-44% of all trips. Since a trip by public transport often starts and ends with a substantial walk, then the modal share for walking was actually much higher than stated. Further analysis of the data for Dar-es-Salaam suggests that up to 90% of all trips were wholly walking, or walking and public transport

(Nguma *et al.*, 1993). Bicycles made a relatively insignificant contribution to modal split (1-3%). This is in marked contrast to the situation prevailing 2-3 decades ago. Bicycle use was common and significant in many African cities, accounting, for example, for 55% of commuters in Lusaka in 1969. However, bicycles have become insignificant in the largest cities due to the increasingly hostile and unsafe environment created by motor vehicles and the absence of dedicated infrastructure at critical locations.

The order of magnitude difference between the populations of the metropolitan and secondary cities led to an important scale effect. The secondary cities are sufficiently small that they can be characterised as *walking cities*. Traffic conditions are much more benign: consequently walking was even more dominant (48-67% of all trips), and cycling (12-23%) equalled public transport (12-24%) in importance. There were important gender differences in modal split. For example, in Morogoro 83% of trips by women were walking and just 2% by bicycle. The corresponding figures for men were 52% and 33%, respectively. Cultural inhibitions restrain women's use of bicycles, and fear constrains their propensity to walk outside the immediate neighbourhood or at night.

The high proportion of people walking is primarily a result of poverty. Roughly half the urban population in all the cities lives in absolute poverty. Studies in Nairobi showed that for those with a household income of less than US\$60 per month walking was used for 57% of the first adult (work) trips each day and 68% of the second trips. For households with an income of more than US\$60 per month the trip shares were 24% and 29%, respectively.

Some people do walk long distances, with 9% of those walking exceeding 5 km, and trips are becoming longer as the cities expand. However, perhaps the most fundamental problem confronting the pedestrian is that many roads are only designed for motor vehicles. Sidewalks for pedestrians are non-existent or comprise the bare earth. If they do exist their condition is normally unsatisfactory due to lack of maintenance. Waste, parked vehicles, or informal businesses often obstruct walking routes making them generally unsafe and inconvenient. Consequently pedestrians are again forced to walk in the carriageway, or on unprotected road shoulders, exposing themselves to traffic hazards. There are few constructed footways and those that exist are generally filthy and in very poor condition, since they frequently are used as dumping grounds for solid waste or serve as drainage channels (Omwenga *et al.*, 1993, Nguma *et al.*, 1993).

Walking is especially difficult during rush hours when large numbers of people have to compete for the

restricted space. Many are forced to walk in the road or along the corridors between buildings in town. The end result is a congestion of human traffic that makes walking unpleasant, time consuming, tiring and dangerous. The deteriorated state of road, path and drainage infrastructure was viewed by respondents as a major restraint on the development of economic activities. With an increase in population expected in most settlements, the deteriorated infrastructure was also seen as contributing to an increasingly inaccessible and unhealthy environment. Open manholes and trenches, resulting from vandalism and the incomplete activities of various public utilities are recurrent complaints. Conditions are particularly bad during the rainy seasons when pools of water present a major problem to pedestrians.

Some pedestrian routes are greatly extended by detours. These may be due to the lack of footbridges across rivers and swamps, obstructing buildings, or access prohibitions across government or private land. Where road crossings are unavoidable there are few segregated places to prevent conflicts with motor vehicles. This is a major cause of accidents and discourages people from walking because it is too dangerous. Studies have demonstrated that heavy motor traffic on major roads gives rise to few gaps between vehicles that will permit a safe crossing on foot. Accident figures bear out user expressions of the prevalence of danger. In both countries accident rates are high in absolute terms and over the past few decades have been at over 60 fatalities per 10,000 vehicles compared with a figure of 1-10 per 10,000 vehicles for developed countries (Jacobs & Cutting, 1986).

As is commonly the case there is a disproportionate concentration of accidents in the metropolitan cities. Dar-es-Salaam with less than 10% of the nation's population accounts for more than a third of the national accident total. In both metropolitan cities, road accidents of all kinds have been on a rising trend for several decades. Pedestrians and cyclists usually account for about half of all accident victims. There also appears to be a concentration on the main roads where vehicle-pedestrian conflicts are most severe.

Children from low-income families normally walk the entire home-to-school journey, while those from middle or high-income households use either the car or public transport. Trip distances may be extra long for the children of low-income families, since they will gravitate to schools demanding the lowest fees, which may not be the nearest. Women are especially concerned with the security aspect of walking and the risk of attack. After concern for the cost of public transport this was the second most commonly voiced concern, especially in Nairobi. It was alleged that harassment came from thugs, council officials and the

police (Ambwere, 1993). To those who have to undertake long journeys to and from work, this is critical in the hours close to dark and at night. Lack of effective street lighting has jeopardised the whole issue of walking at night, as there are dangers from traffic and a risk of violence. The general perception was that such risks were increasing. As a result some women are forced to incur the expense of public transport, even for short distances, or take long detours. For most women mobility is severely restricted by insecurity, especially in and around the informal settlements. This even extends to inhibiting their use of bicycles, for fear they would easily be stolen.

### Conclusion

Recent studies have undoubtedly brought into prominence the issue of walking in Sub-Saharan Africa. The rural household is at the end of the supply and distribution system, and its dependence on walking is undoubtedly the weakest link in the chain and a significant cause of its poverty. Travel and transport on this link is inherently slow, expensive and burdensome, especially for women. For urban households the challenge is to prevent the benign transport state of the secondary cities becoming the hostile conditions associated with those located in the primary areas. Both rural and urban areas require a rational system of direct, secure and well-engineered walking routes connecting all the main residential, employment and service areas, which are separate from those used by motorised traffic.

It is also clear that investments to make walking more efficient, less hazardous and pleasant would bring substantial economic and social benefits. However, it would be a mistake to conclude that this knowledge is likely to lead to a switch in government-directed investments to favour walking. There is little evidence to suggest that official attitudes have abandoned the notion that motorised transport is the only worthwhile form of investment. The long decline in the role of the bicycle in African cities is testimony to the rigidity of much thinking. Unlike cycling, walking has yet to develop efficient international and national lobby groups. The issue of growing rural and urban poverty is one possible focal point for the promotion of walking, since it is the pre-eminent mode used by the poor. However, linking it to the generally deteriorating environmental conditions in cities seems the most likely way of touching a popular nerve.

### References

Ambwere, A.L. (1993) *Problems facing the urban low-income women in reference to non-motorised transport*. in *World Bank and UNECA non-motorised urban transport workshop working papers report* No. 4B October, World Bank, Washington, D.C.

Barwell, I. (1996) *Transport and the village: findings from African village-level travel and transport surveys and related studies* World Bank discussion paper No. 344 Africa Region Series, World Bank, Washington, D.C.

Howe, J. (1997) *Transport for the poor or poor transport? a general review of rural transport policy in developing countries with emphasis on low-income areas* International Labour Office, Geneva.

Howe, J. with Bryceson, D. (2000) *Poverty and urban transport in East Africa: review of research and Dutch donor experience* Report prepared for the World Bank, International Institute for Infrastructural, Hydraulic & Environmental Engineering, Delft.

Jacobs, G.D. & Cutting, C.A. (1986) 'Further research on accident rates in developing countries' *Accident Analysis and Prevention* 18, 2, 119-127.

Lowe, M. D. (1989) 'Ghana takes the low-cost road' *World Watch*, 2, 3, June.

Nguma, J.K., Rwebangira T. & Mbelle, A.Y.V. (1993) 'Problems and prospects for urban non-motorised transport in Sub-Saharan Africa, Part B: user perspectives of non-motorised transport in Dar-es-Salaam' *Proceedings 7<sup>th</sup> Velo-City Conference*, Nottingham, 6-10 September.

Omwenga, M., Obiero, S. & Malombe, J. (1993) 'Problems and prospects for urban non-motorised transport in Sub-Saharan Africa. Part A, Kenya, The Case of Nairobi' *Proceedings 7<sup>th</sup> Velo-City Conference*, Nottingham, 6-10 September.

Owen, W. (1964) *Strategy for mobility* The Brookings Institution, Washington, D.C.

Rostow, W.W. (1962) *The process of economic growth* Norton, New York.

Sieber, N. (1999) 'Transporting the yield: appropriate transport for agricultural production and marketing in Sub-Saharan Africa' *Transport Reviews*, 19, 3, 205-220.

Thomas, P.K. (1984) 'Rural roads and poverty alleviation in India' in Howe, J. & Richards, P. (eds.) *Rural roads and poverty alleviation* Intermediate Technology Publications Ltd., London.

Whittington, D., Mu, X. & Roche, R. (1990) 'Calculating the value of time spent collecting water: some estimates for Ukunda' *Kenya World Development*, 18, 2, 269-280.

World Bank (1988) *Road deterioration in developing countries – policies and remedies* World Bank Policy Study, World Bank, Washington D.C.

# Pedestrian infrastructure in the city transport system: a case study of Delhi

Geetam Tiwari

Address for correspondence

Geetam Tiwari

Transportation Research and Injury Prevention Programme, Indian Institute of Technology-Delhi, Hauz Khas, New Delhi-110 016, India.

<[gtewari@ee.iitd.ernet.in](mailto:gtewari@ee.iitd.ernet.in)>

## Abstract

Walking and non-motorised vehicles are the principal modes of transport for most of the urban poor in Asian cities. For a large number of people even subsidised public transport (buses) and low cost bicycles are beyond their means, so that a significant proportion of the population falls into the category of 'captive pedestrians'. Captive pedestrians and public transport users together form the largest group of road users. Yet their need for a safe and convenient infrastructure continues to be ignored. This has two major impacts on city traffic and travel patterns. Pedestrian and public transport trips as a percentage of total journeys have declined over the years, though they are not expected to disappear in the near future. Pedestrians are present on the roads despite hostile infrastructure designs and motor vehicles are forced to share the road space with them; this creates sub-optimal conditions for all road users. A reversal of this trend is possible. It is possible to create pedestrian, bicycle and public transport friendly urban roads without increasing the right of way of existing arterial roads in Delhi. The guiding principle of such a design is re-assigning priorities to various road users and by meeting the needs of pedestrians, cyclists and public transport commuters in that order.

## Keywords

Delhi transport, non-motorised vehicles, Pedestrian infrastructure, urban transport, walking.

## Introduction

Walking and non-motorised vehicles are the principal modes of transport for most of the urban poor in Asian cities. Walking and non-motorised vehicles provide access to economic opportunities, health services and other social services essential for their survival and well being. Unlike high income countries, walking is the only option for commuting to work, even for long distance trips in these countries. For a large number of people, even subsidised public transport (buses) and low cost bicycles are beyond their means. Therefore, a significant proportion of the population falls into the category of 'captive pedestrians'. This segment of the population is dependent on walking to

access various activities and facilities in the city. In addition, public transport users are walkers at least four times each day when they access and exit public transport systems. Captive pedestrians and public transport users together form the largest group of road users. Yet their need for a safe and convenient infrastructure continues to be ignored. In pursuit of development, cities continue to invest in infrastructure which makes the environment for the pedestrian even more hostile than at present.

## Socio-economic profile of captive pedestrians

In most Asian cities increasing numbers of poor, working class, people live in informal settlements or colonies without basic water supply, sanitation and transport services; they represent a large proportion of the population in cities. Many are migrant labourers from neighbouring states seeking better employment and higher income opportunities. Due to the acute scarcity of land, shelter and infrastructure, many construct their homes on public and other vacant land (termed 'Jhuggi Jhopri', 'JJ clusters' or 'Jhuggies'). In Delhi, it is presently estimated that there are at least 1500 unauthorised colonies and 1200 JJ clusters without civic amenities and as much as 60% of the population live in sub-standard housing. The population living in Jhuggies is estimated to be well over 3 million people

**Table 1. Modal shares of journeys to work by low income households in Delhi (1999)**

Mode	Shares of low income households (average monthly income Rs.2000-US\$40)
Cycle	38.87
Bus	31.43
Car	0
Scooter/Motorcycle	2.48
3 wheeler taxi	0.96
Taxi	0
Rail	1.79
Others	2.34
Walk	22.12
Total	100

Source: IIT-Sajha Manch(1999)

and is projected to increase to more than 6 million people by 2020 (Hazard Center, 2001). Captive pedestrians belong to the low income households residing in Jhuggies, slums and unauthorised residential settlements in Delhi. Table 1 shows the distribution of journey to work trips by different modes of people residing in JJ clusters and low income housing.

Table 2 shows the changing modal share of trips (excluding walk trips) in Delhi. It is noteworthy that the travel statistics do not have any record of walking before 1994. In 1994, nearly 32% of trips are walk trips. The share of public transport (road based), including chartered buses, is 42% of all trips. Of the total trips around 11% are by slow modes like cycles and rickshaws, 5% of trips are by car and 12% by two-wheeled motor vehicles (TWMV).

Table 3 shows the estimated average modal share for the whole city in 1999 which is very different to modal shares from 1957-1994. The two most important factors contributing to this change may be the rapid increase in poor residents along with major changes in the city bus system. The introduction of private buses, which are more expensive than public buses and may be beyond the means of many people, results in declining shares of bus trips and an increase in bicycle trips. The decline in walking trips, despite the increase in low income households, is noticeable.

JJ clusters and low income housing are spread all over the city so that captive pedestrians are on all major travel corridors. Since access to public transport requires a walking trip to the bus stop, all public transport users are also pedestrians. Despite large increases in private car and scooter ownership, 34% of all trips are by public transport. Therefore, public transport pedestrians together with other pedestrians form the largest group of road users. Yet road design and traffic management policies cater to the convenience of car users, often to the detriment of pedestrians, public transport users and other road users.

**The basic infrastructure**

The road network in Delhi is based on a notional hierarchy of roads, ranging from arterial roads designed to carry fast through traffic, to collector and residential roads. However, the lack of transport choices results in a pedestrian presence on all roads, regardless of the hierarchy and designated functions.

The existing road design does not cater for the needs of

pedestrians, cyclists, or other slow moving traffic. Service roads if present, are not well maintained. Footpaths are either not present or poorly maintained. Furthermore, there are no specific facilities, other than shelters, provided for buses. Approaches to bus shelters, bus priority lanes, continuous pedestrian paths, and lanes for slow vehicles like bicycles and rickshaws have not been included in the road network designs. Consequently, all road users have to share the carriageway. This often leads to unsafe conditions for pedestrians and slow moving vehicles and congested conditions for motor vehicles. The per capita availability of roads in Delhi in 1997 was 2.6 metres per person. It must also be noted that almost 66% of the vehicle fleet in Delhi consists of TWMV which (when parked) take up less road space than cars and buses. Despite this, average speeds have fallen over the years. Peak hour traffic on arterial roads (most of which are three-lane dual carriageways) crawls through bottlenecks at major intersections. However, the extensive road network has not been developed to serve the mixed traffic presently using the roads.

State authorities and ‘experts’ continue to plan infrastructure which ensures fast movement of car traffic at the expense of pedestrians and non-motorised vehicles. The basic needs of pedestrians are not recognised as a key part of the urban transport infrastructure. In a recent study, pedestrians were observed at selected junctions on a major arterial road in Delhi (IIT, 2000). The study shows that nearly 70% of pedestrians cross the road when it is safe for them to cross, i.e. either it is green for pedestrians or green for right turning vehicles which makes half the crossing safe. The number of pedestrians waiting at the median is more than those waiting on the side of the road, even though there is no pedestrian island in the median. The road median does not provide any convenient space for waiting and indeed restrictive measures for pedestrians are instituted such as high

**Table 2. Modal share in Delhi, 1957-1994**

Mode	1957	1969	1981	1994	1994 *
Cycle	36.00	28.01	17.00	6.61	4.51
Bus	22.40	39.57	59.74	62.00	42.00
Car	10.10	15.54	5.53	6.94	4.74
Scooter/Motorcycle	1.00	8.42	11.07	17.59	12.00
3 wheeler taxi	7.80	3.88	0.77	2.80	1.91
Taxi	4.40	1.16	0.23	0.06	0.04
Rail	0.40	1.23	1.56	0.38	0.26
Others	17.90	2.19	4.10	3.62	2.47
Walk					31.77
Total	100.00	100.00	100.00	100.00	100.00
Source: ORG(1994)					* including walk trips

medians (30-50 cm) and guard rails. Often, the construction of pedestrian subways and footbridges is to ensure that pedestrians do not obstruct motor traffic. These pedestrian subways continue to have low usage rates not only because of poor location, but also because they are often locked at night due to safety concerns. This leaves no option for pedestrians but to either break the median fences or run across at the risk of losing their lives.

The road improvement plan for the city includes the following:

- Construction of 40 new grade-separated junctions/flyovers;
- Construction of subways to facilitate pedestrians; and
- Widening of arterial roads.

Wide roads and grade-separated junctions divide the urban landscape into separate zones. It becomes very difficult for people to cross these arteries on foot or by other non-motorised modes. This has the effect of discouraging public transport use, as all commuters using buses have to cross the road at least twice for every round trip at the origin or the destination. The area occupied by grade-separated intersections is much greater than ordinary intersections and the location of bus stops at these intersections is often changed from the previous location (close to the intersection) to the foot of the flyover. Consequently, commuters have to walk a greater distance – at least 200 metres extra when changing bus routes. This can discourage those who own private motor transport from using public transport. In addition, because of the increase in walking distance and road widths, pedestrians and commuters are exposed to higher accident risks. This further discourages use of public transport by children, disabled people and other vulnerable road users.

Pedestrians have to contend with narrow pavements, often made narrower to increase the width of the road to reduce congestion for cars and other motor traffic. Pedestrians are expected to walk among parked cars, street furniture such as electricity poles, telephone poles, traffic signs, litter bins, redundant phone boxes and commercial waste. The situation is made worse as a result of poor public management of streets and public spaces, including litter and uneven pavements. It is not wrong to say that our urban streets are characterised by an absence of design.

The presence of diverse socio-economic groups in the city is reflected in the wide variety of transport modes present on all roads. This also results in the emergence of a range of activities by different road users.

**Roadside vendors & services for road users**

Bicycles, pedestrians and bus traffic attract street vendors. Often, the side roads and pedestrian paths are occupied by people selling food, drink and other in demand goods. If the wares on offer were not required at those locations, then the vendors would have no incentive to remain there. However, road authorities and city authorities view their existence as illegal. Often the argument is made that road capacity is reduced by the presence of street vendors and hawkers. If we apply the same principle that is applied for the design of the road environment for motorised traffic, especially private cars, then vendors have a valid and legal place in the road environment. Highway design manuals make recommendations on the frequency and design of service areas for motor vehicles. Street vendors and hawkers serve the same function for pedestrians, cyclists and bus users. As long as our urban roads are used by these modes, street vendors, inevitably, will remain.

**Pedestrian safety**

In Delhi, pedestrians, cyclists and TWMV constitute 75% of the total road traffic fatalities (Tiwari, 1993). Because cyclists and pedestrians continue to share the road space in the absence of infrastructure specifically designed for non-motorised vehicles, they are exposed to higher risks of being involved in a road traffic accident. Figure 1 shows road traffic fatalities in Delhi from 1990 to 1999. Pedestrians make up the largest share in total fatalities. The most alarming trend is that this share has been increasing over the years compared with those of other categories of victims, which have either remained constant or show a decline. Buses and trucks are involved in more than 60% of the fatal

**Table 3. Estimated modal shares for 1999**

Mode	low income population @ 60%		50%	
	Total trips	%	Total trips	%
Cycle	5.71	24	4.87	21
Bus	7.80	33	7.91	34
Car	2.65	11	3.32	14
Scooter/Motorcycle	3.09	13	3.72	16
3 wheeler taxi	0.30	1	0.32	1
Taxi	0.00	0	0.00	0
Rail	0.25	1	0.21	1
Others	0.33	1	0.27	1
Walk	3.26	14	2.78	12
Total	23.39	100	23.39	100

Source: Tiwari (2000)

Note: There are no reliable census figures for the low income population in Delhi. Therefore, the two columns show estimated modal shares when the low income population is 60% & 50% respectively

crashes. All modes of traffic use one, two and three lane roads. Traffic laws do not segregate bicycle traffic and speed limit enforcement is minimal.

A study of mid-block conflicts presents information about the use of road space by different road users. The fourteen sites studied show that maximum mixing of pedestrians and non-motorised vehicles with motor vehicles occurs at the stops (Tiwari *et al.*,1998). Their interaction with motor vehicles is minimal at other locations. Natural segregation takes place on three- and two-lane roads. On three-lane roads, motor vehicles use two lanes and the kerbside lane is used by non-motorised vehicles. Vehicles of one group tend to interact mostly with other vehicles of the same group. Though *de facto* segregation takes place on two- and three-lane roads, an unacceptable danger exists to pedestrians and cyclists because of the impact of motor vehicles.

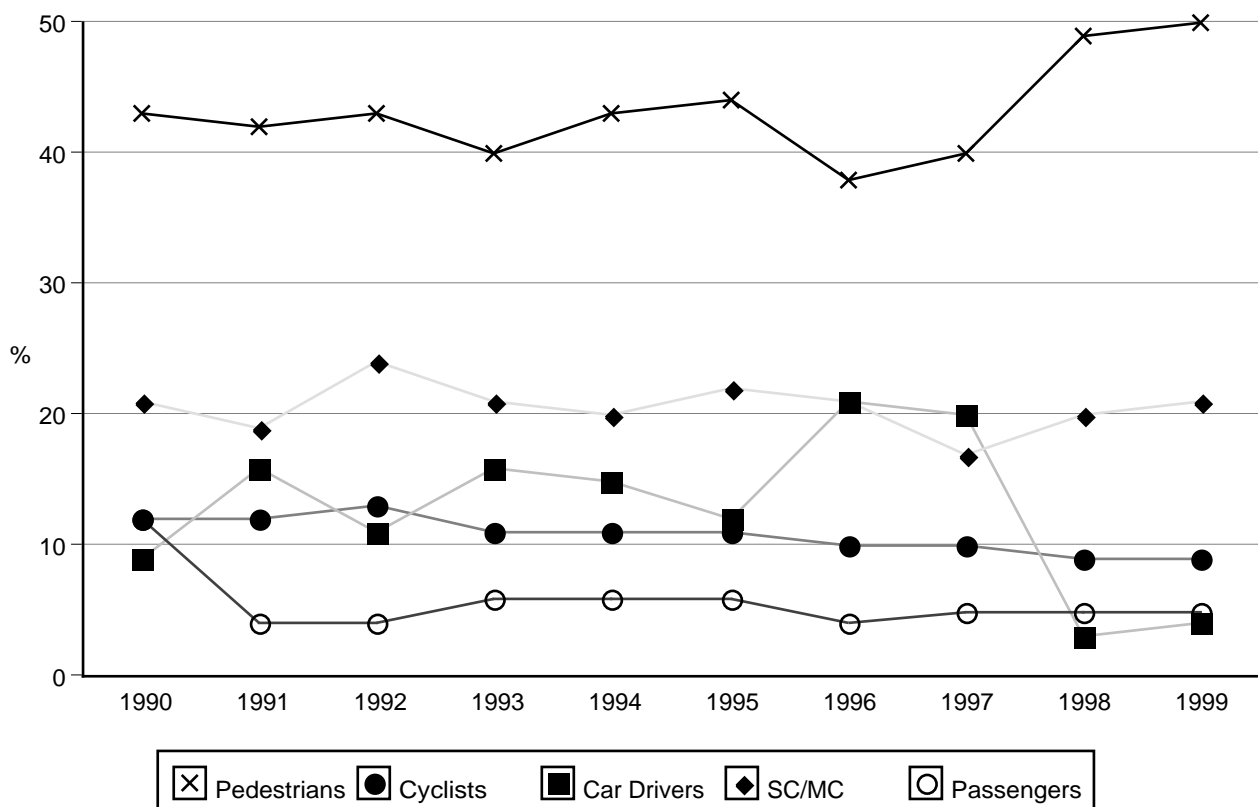
The data show that bicycle fatalities on two and three lane roads are relatively high when motor vehicle volumes are low, but the level of conflicts between motor vehicles and non-motorised vehicles shows little correlation with fatalities during peak flows. In these locations of 'integrated' traffic on two- and three-lane roads, fatalities during peak hours are low but not eliminated. On the other hand, during non-peak hours vehicles travelling at speeds around 50 km/h or greater kill a large number of pedestrians

and cyclists (Tiwari, 1993). The top ten locations for the highest number of fatal accidents in Delhi are on major arterial roads, comprising both mid-block and intersections and are predominantly pedestrian fatalities (Delhi Traffic Police, 1999).

Speed influences energy consumption, pollution, noise, vehicle and road maintenance costs, stress on road users and safety. In general, higher speeds have an adverse influence on all these factors. Increase in speed is associated with a disproportionate increase in the number of fatalities. Also, the safe speed for car occupants is much higher than for pedestrians and cyclists. Safety of road users is influenced both by the absolute speed of vehicles and by the variation in speeds among vehicles on the road (Noguchi, 1990). Other factors remaining constant, higher speeds increase the probability of a crash taking place and the severity of injury in a crash, whereas a greater variation in speeds of vehicles only increases the probability of the event. Small reductions in travelling speed result in large reductions in injuries and fatalities both in urban and rural areas because the stopping distance of a vehicle when braking is proportionate to the square of the original velocity and the damage to human beings is related to the square of the impact velocity.

In Delhi there seems to be a major conflict between speed and fatality trends. Average speed has been

Figure 1. Road traffic Fatalities in Delhi, 1990-1999



declining over the years. Congestion on Delhi roads is worsening despite several local road improvement programmes. Average speeds during peak periods range from 10 km – 15 km/h in central areas and 20 km – 40 km/h on arterial roads.

Delhi does not lack road infrastructure. However, problems arise as a result of the wide variety of vehicle types including bicycles, mechanical, human-powered and animal-drawn vehicles sharing the same road space. A much better picture can be expected only if the road space available can be used efficiently by all vehicles present. Reduced average speeds should result in fewer fatalities. The number of total fatalities does show a marginal decline; however, the share of pedestrian fatalities continues to rise. The decline in the average speed of motor vehicles and the increase in pollution levels in the city seem to be the two most important driving forces influencing the type of investment in road infrastructure. The safety and mobility needs of the majority of the road users, i.e. pedestrians and bus commuters, are not considered for future improvement plans. This has two major impacts on city traffic and travel patterns.

1 Pedestrian and public transport trips as a share of total trips have reduced over the years. In both cases the only people who continue to walk and use public transport, despite the hostile environment, are those who do not have any other option.

2 Given the socio-economic context of our cities, pedestrians are present on the roads despite hostile infrastructure designs and motor vehicles are forced to share the road space with them, which creates sub-optimal conditions for all road users.

Since pedestrians, bicycles and other non-motorised vehicles use the left side of the road, buses are unable to use the designated bus lanes and are forced to stop in the middle lane, often 4 m – 6 m away from bus stops. The carriageway between the bus and the bus stop is occupied by waiting commuters, parked rickshaws and hawkers. Not surprisingly, government surveys find 50% of the road space in Delhi 'encroached on' by non-traffic activities. This disrupts traffic in all lanes and makes walking and cycling even more hazardous. Motor traffic does not use the kerbside lane even when pedestrian and bicycle densities are low. Providing a pedestrian friendly path and separate bicycle track would make more space available for motorised modes and would make walking and cycling less hazardous. All modes of transport move in sub-optimal conditions in the absence of facilities for pedestrians and non-motorised vehicles.

#### **Future directions**

A well-functioning road infrastructure must fulfil the requirements of all road users. In the context of the present socio-economic realities in most developing

countries, pedestrians, cyclists and other slow moving vehicles cannot be eliminated from the urban landscape. The needs of pedestrians have been ignored in conventional planning strategies and have been assigned lower importance compared with other vehicles on the road. However, the experience from environments where 'captive pedestrians' are present makes a very strong case for re-thinking the conventional hierarchy of road users. It is clear that present investment patterns focussed on improving conditions for cars are not giving the desired results. Congestion continues to worsen along with a shift away from walking, bicycles and public transport – the desirable modes for sustainability. A reversal of this trend is possible. It is possible to create pedestrian, bicycle and public transport friendly urban roads without increasing the right of way of existing arterial roads in Delhi. The guiding principle of such a design is meeting the needs of pedestrians, cyclists and public transport commuters in that order.

The proposed network must enable direct and safe walking and bicycle travel within a coherent system. The proposed routes must guarantee a coherent network, minimise trip length (directness) and minimise encounters between cyclists and motor vehicles. The success of bicycle/non-motorised vehicle route design depends upon meeting not only the requirements and convenience of bicycles and non-motorised vehicles but pedestrians as well. Otherwise, all road users are obliged to share space with motor vehicles resulting in sub-optimal conditions for all.

### Conclusion

Given that there is not much space available to expand existing roads, future mobility needs are best met by increasing the capacity of the existing road network. This can only be achieved by encouraging modes which are more efficient in terms of space utilisation. If pedestrian friendly paths are constructed, together with a separate segregated lane for bicycles, the kerbside lane (which is currently used by cyclists) becomes available to motorised traffic. This relatively small investment in pedestrian and bicycle friendly infrastructure offers multiple benefits.

Motor vehicles benefit because of increased road capacity and speed improvements. Major beneficiaries of speed improvement are buses and TWMV because the kerbside lane becomes available to them without interference from pedestrians and slow vehicles. By providing an exclusive cycle track, estimates of a typical arterial road in Delhi (Tiwari, 1999) show increases in corridor capacity of 19% – 23%. Utilising the full capacity of the corridor (i.e. by providing a high capacity bus lane in the left-hand lane) can lead to a capacity increase of 56% – 73%. In terms of congestion, re-planning junctions to include separate

pedestrian paths, non-motorised vehicle lanes and bus priority lanes can bring an 80% improvement over the present level of delays. The cost of this measure is 25 times less than grade-separated junctions (Kartik, 1998) which are currently being constructed at an average cost of US\$2m – \$6m.

There would be safety benefits too. By creating segregated pedestrian paths and bicycle lanes and re-designing intersections, conflicts between motor vehicles and pedestrians and cyclists can be reduced substantially, leading to a sharp decrease in the number of accidents and fatalities for pedestrians, cyclists and TWMV. Safety benefits estimated for a typical arterial in Delhi show a 46% reduction in accident costs. This is because segregated facilities reduce injury accidents by 40% and fatalities by 50%.

Finally, there would be wider health benefits from the construction of pedestrian friendly paths and segregated cycle lanes. Motor vehicles are reported to be the single largest source of air pollution causing 67% of the total air pollution in Delhi (MOE, 1998). This is a serious concern to cyclists, pedestrians and motorists as air quality is worse in or near built up roads. A better pedestrian and bicycle infrastructure can play an important role in increasing the modal share of pedestrians and bicycles and thus in reducing the adverse health effects of pollution.

### References

- Delhi Traffic Police (1999) *Road accidents in Delhi* Delhi Traffic Police, Delhi.
- Hazard Center (2001) *Manual for people's planning: a view from below of problems of urban existence in Delhi* Hazard Center, Delhi.
- IIT (2000) *Road user behaviour and traffic violations in Delhi*, report for SIAM, TRIPP, Indian Institute of Technology, Delhi.
- Kartik, V. (1998) *Comparison of alternate measures at AIIMS intersection*, B.Tech Thesis, Department of Civil Engineering, Indian Institute of Technology, Delhi.
- MOE (1998) *White paper on pollution in Delhi with an Action Plan* Ministry of Environment and Forests (MOE), Government of India, New Delhi.
- Noguchi, K. (1990) 'In search of optimum speed: from the users' viewpoint' *Journal of the International Association of Safety Sciences*, 14, 1.
- Tiwari, G., Mohan, D. & Fazio, J. (1998) 'Conflict analysis in mixed traffic conditions' *Accident Analysis and Prevention*, 30, 2, 207-215.
- Tiwari, G. (1993) 'Pedestrians and bicycle crashes in Delhi' 2<sup>nd</sup> World Injury Conference, Atlanta, GA.
- Tiwari, G. (1999) 'Planning for non-motorised traffic – a prerequisite for a sustainable transport system' *IATSS Research*, 23, 2, 70-77.

# Copenhagen on foot: thirty years of planning & development

Lars Gemzoe

Address for correspondence

Lars Gemzoe

Senior Lecturer, Royal Academy of Fine Arts, School of Architecture, Centre for Public Space Research, Copenhagen

<[lars.gemzoe@get2net.dk](mailto:lars.gemzoe@get2net.dk)>

---

## Abstract

Each year Copenhagen has improved the quality of the inner city walking environment. Walking is seen as a pleasure, not just as a form of transportation. With the improvements in public space new forms of urban recreation have emerged. More and more people spend more time using car-free spaces for a multitude of different activities. Data on these changes of urban culture have been recorded since the 1960s in a series of surveys of the inner city and they show major changes in traffic culture and public life. Since 1968 such activities have quadrupled in the car-free spaces which show a development from just walking to other forms of urban recreation as part of the walking experience.

## Keywords

Car-free, city bike, Copenhagen Inner City, public s

pace, public life, walking, staying, urban recreation, data on activities in public space, climate and urban activities.

## Copenhagen on Foot

Copenhagen, the capital of Denmark with a population of about 1.3 million inhabitants has been improving its city centre year on year, turning it from a car dominated centre to a pedestrian and soft traffic-orientated place. Some of the most interesting aspects in the development of car-free streets and squares in Copenhagen are the major changes in traffic culture and in public life that have taken place during the last 30 years. Other important aspects are the incremental character of the whole process and the use of data on people on foot.

One of the fine qualities of Copenhagen is something that the inhabitants themselves are not so

aware of, because they take it for granted. This is the fact that the city is such a fine place to take a walk, to stay for a while or to sit and watch people passing by. Put simply, it is an ideal place to enjoy city life, a safe and peaceful city where walking is a pleasure.

In most cities cars are here, there and everywhere. Fear of accidents, high speed, the noise and the scale of the car make it very present in the city and in the minds of people. Cars intrude on all human senses, they are noisy and pollute the air, thus creating unattractive surroundings for people on foot. Where other cities have produced a series of inventive new designs of public space, spread out as pedestrian islands in a sea of traffic, Copenhagen has reduced traffic in the inner city and made it a pleasant place to stroll. The city has managed to calm vehicle traffic in the entire inner district and give priority to soft traffic, pedestrians and cyclists.

Copenhagen has also been lucky in having substantial data on pedestrian activities for many years. Researchers at the local school of architecture have published a series of major and minor studies of people on foot in the inner city in 1968, 1986 and 1995 thus giving planners, politicians and the general public important information on the changing use of public space in the city (Gehl, 1968; Bergdahl *et al.*, 1986; Gehl & Gemzoe, 1996).

### **There is much more to walking than walking**

Walking is not just transportation. One of the key factors in understanding the complexity of areas for walking is that there is much more to walking than walking. Pedestrians move with low speed where they can see all the small details, hear and even smell what is going on; pedestrians can use all their human senses. Car drivers on the other hand see fewer details and hear even less driving by at a higher speed. Pedestrians change from walking to standing or sitting without notice and they have no parking problems when stopping, staying or sitting down for awhile. It is all the things you tend to do, but did not plan to do, while you walk, that makes walking such a pleasure.

To judge the quality of the pedestrian environment it is not enough to look at how many people are walking, but to observe whether they are spending time in the city, standing about, looking at something, or sitting just enjoying the city, the scenery and other people. Numbers alone are not an indication of the quality of a place as any city can have heavy pedestrian traffic if for example the city's amenities are spread out.

To understand what is going on it is fruitful to observe two categories of activities in cities. One is the necessary activities, activities that people have to do



regardless of the quality of the physical environment. Most walking belongs in this category.

The second category is optional activities, which are all the things people do because they want to. Standing about, sitting on benches and in cafés and all the other urban recreational activities found in public space belong in this category. People only engage in optional activities when the place and the circumstances are right, when settling into squares and spending time in the city is distinctly pleasant. In addition, it is these recreational activities that are particularly appreciated. A fine city provides ample opportunities for visitors to engage in leisure activities and spend time enjoying themselves in the city. Accordingly, it is not enough to create good opportunities for walking as transportation, it has also to be a fine place for spending time for pleasure.

### **From walking to staying**

The development of car-free public space in Copenhagen shows that there has been a constantly growing need for places to stay after the necessary spaces for walking have been established. More people take a break, stop walking and stay for a while in the city centre. Before it all started in the 1960s there was no tradition of people using public outdoor spaces in Scandinavia. People would walk on the narrow sidewalks of the inner city squeezed between parked cars, so walking was not a great pleasure. In a series of steps the old main streets of the inner city have been changed from car streets to pedestrian streets so that a totally new picture has emerged. Walking is a good way of transporting yourself from public transit to work, shops or to a university classroom, but walking is now also a pleasure.

Copenhagen's first pedestrianised street, Stroegtet, has about 80,000 people walking through a rather narrow street (10 m – 12 m wide) during any nice summer day and night. Stroegtet was the old main street through the Inner City and when it was changed in 1962 from a street with buses, lorries and cars to pedestrian-only, the number of people walking surprised traffic planners. Indeed, pedestrian traffic was far greater than that on any of the wide streets for cars. Furthermore, only the most travelled of the national highways had as many or more movements per 24 hours. So the quantity of pedestrian activity alone was already suggesting how successful the first streets were from the pedestrian viewpoint. Stroegtet has been full to capacity on any good summer's day since. Here was space for walking – and so people did.

The 1968 study of public life showed that the activities in the pedestrian streets at that time were mainly walking and window-shopping (Gehl, 1968). When the next study was carried out in 1986 more streets and several squares had been turned into

pedestrian zones and the character of the activities had changed a lot (Bergdahl *et al.*, 1986). Now multitudes of activities were taking place. The whole scene had changed as music and other sorts of entertainment, political activities, small trade and a growing number of outdoor cafés had taken over. The



data on what people were doing when they stopped walking and were engaged in the many different activities that take place in pedestrian areas clearly showed that spaces that are of high quality in relation to locality, climate, furnishing and design were used more than spaces of low quality.

People walk as part of an urban recreation experience. They might have a purpose for their visit but they do a lot of other things while on foot. Studies of people walking in Copenhagen show that the number varies very much with the weather and the seasons. Only half as many people walk in the winter as in the summer. In the winter many limit walking to essential journeys and tasks, whereas in the summer people come just to enjoy walking. Staying activities are even more linked to climate as they drop to one-eighth of the volume of a summer's day.

Some of the streets in Copenhagen are 'summer streets' while others are 'winter streets'. In summer streets, the number of pedestrians more than doubles in the summer relative to the winter period, whereas winter streets are streets that have almost the same number of people summer and winter. Most winter streets are streets that are well connected to the major public transit terminals and thus linked to walking out of necessity, whereas the summer streets are used more for walking for pleasure.

As pedestrian streets have been established for walking, more squares have been set aside for people who want to stop walking and settle in to enjoy the city. The recreational use of the city has increased each year and this development is the most interesting feature of the transformation of the centre of Copenhagen. The city centre is not just a shopping centre, a workspace, a recreational area or an amusement park. It is a finely balanced combination of them all, neatly woven in and around public spaces.

The study in 1995 showed in comparison with the previous studies that the number of people staying in the pedestrian spaces in the inner city had multiplied by 3–4 times since the first study. Though the number of people walking through the streets had been fairly constant after the initial doubling when the first street was opened in 1962, the number of people staying in the spaces had been growing proportionally with the number of car-free square metres that had been made available to pedestrians. Every time Copenhagen has added another 14 m<sup>2</sup> for pedestrian use, a new person has come along and settled in to enjoy the city.

Besides the car-free areas established in the inner city there are other key policies for improving Copenhagen's pedestrian environment. For many years, it has been city policy to try to keep traffic volume stable. The policy proved successful, with total car traffic in the City of Copenhagen almost unchanged for

the past 30 years, whereas traffic in Greater Copenhagen as a whole has grown rapidly.

The policy of reducing the number of lanes on several major arteries into the city has contributed to the reduction in cars, as the space has been used for bus and bicycle lanes instead. Another factor is the policy of reducing through-traffic and limiting parking space in the city centre. These measures have been introduced gradually, in order to give users of the city time to get

accustomed to other means of transport.

The other means of transport are the suburban trains, the bus system and, by no means least, the bicycle. Copenhagen's overall traffic policies differ widely from those of most other cities. Car traffic is stable and traffic congestion is rare. It is also possible to find a parking space in the city centre, if you are willing to pay for it. Each year, the city centre has become more and more attractive, yet also less accessible to the motorist.

Instead of wide, noisy streets in and out of the city and underground garages parked all over the city centre, Copenhagen has opted for fewer cars and an extremely attractive city centre. So where Lyon, for example, has created impressive six-storey parking garages under most of its renovated new, elegant spaces, Copenhagen has taken another direction by reducing the possibilities for parking by 2%–3% annually over many years. About 600 parking spaces have been eliminated in the city centre and the aim of this reduction has been to give space to the continued increase in public life of people on foot. The number of parking spaces has been reduced as squares have been transformed and less parking has led to a reduction in the volume of car traffic. Today, the city centre offers about 3000 parking places, most of them on public streets. Parking tickets purchased from streetside machines are required and the system is effectively policed by municipal parking attendants. The price for parking in the various zones is adjusted from time to time, to ensure that there is always a space available for the next car that wants to park.

Over the last 35 years this has changed the whole concept and use of public space in the inner city. It has also changed traffic culture in Copenhagen. More bicycle lanes have been built. Bicycles have priority at many crossings with traffic lights and travelling through the central city districts is faster and easier on a bicycle than in a car. Today, more than one-third of people going to work in the Copenhagen municipality use a bicycle and only one-third use private cars. The high percentage of bicycle traffic is also making the inner city a better place for walking.

It is not even necessary to bring a bicycle to be able to bike in Copenhagen, as a new City Bike system was introduced in 1995 offering free bicycles for people to use in the inner city district. When you need to move faster or go further than you can by walking, you simply take a bicycle from one of the bicycle racks by depositing a coin – as you would with a supermarket trolley – and you can go anywhere and leave the bicycle anywhere in the entire inner city. The coin is returned when you put the bicycle back in any of the bicycle racks, of which there are more than 100. At the moment the system operates with 2000 bicycles which

are sponsored by firms that have their logos on the bicycles and through advertisements on the bicycle racks. The City Bike Foundation that runs the

bicycles in collaboration with the Copenhagen Municipality is planning to extend the system to 5000 bicycles and also cover more city districts.

The most recent transport innovation in the inner city is a new waterbus, introduced in 2000. The two bridges connecting the inner city districts across the harbour used to mean long detours for pedestrians who wanted to go from one side to the other, but now the waterbuses tie the city together across the water.

### **The process & the importance of data on pedestrian activities**

The changing use of public space has taken place in a long and slow process, where decisions have been made from one project to the next. The first pedestrian street was such a success that soon the next streets were changed too. In turn they were also well received, so one can characterise the development in Copenhagen as 'going from one success to the next'. Over more than 30 years Copenhagen has been through a process that has changed the use of public space fundamentally. In the 1960s the spaces were dominated by traffic, but to day they are used for a multitude of urban recreation activities. The inner city as a whole is dominated by pedestrian traffic as 80 per cent of all traffic is on foot. The incremental process has given people time to change traffic habits and time to find out what each new space was particularly good for. It has also given the politicians time for decision making. Instead of dedicating themselves to a grand scheme they could base their decisions on the success of the previous streets or squares.

Data on pedestrians have played an important role in the planning and decision making process by documenting the growing need for more high quality public space for people on foot. In traffic planning, as well as in cities, the problems of cars tend to dominate. One particular reason for this dominance in planning is the lack of information, data and knowledge on people on foot to balance the ever-present data on vehicular traffic. Whenever changes are being planned in the use and design of public space a lot of data on vehicular traffic will be available supporting the problem seen from the car perspective. Furthermore, pedestrians tend to be invisible in the planning process simply because there are no data on the pedestrian activities. Data on pedestrian activity give another perspective to the questions asked, on the solutions suggested, to the decisions made and on the design of public space.

In a long and slow process Copenhagen has reduced the access to the city centre by car, taking away traffic lanes and reducing parking in order to change public space from parking- and traffic places to people places. Data that documented the growing need for more space for people on foot – versus the never-ending need for more parking – have been important for the

technical and political decisions that had to be made. So behind the success of pedestrian planning in Copenhagen is the important lesson that there is a great need for data and knowledge on the activities of people in cities to be able to plan and design successfully for people on foot.

### **Conclusion**

To improve public space for walking it is important to design carefully for more than just walking out of necessity. Walking for pleasure is closely related to

the total quality of the environment. The Copenhagen studies show that good car-free spaces are an invitation to much more than walking. It is an invitation to have a fine urban experience while you walk and soon you will remain much longer than you expected enjoying the ever-changing scene.

#### References

Bergdahl, K., Gehl, J. & Steensen, A. (1986) 'Bylivet i Københavns indre by: Brugsmønstre og udviklingstendenser 1968-1986' *Arkitekten* 12-1986, Danish Architectural Press, Copenhagen.  
Gehl, J. (1968) 'Mennesker til fods' *Arkitekten* 20-1968, Danish Architectural Press, Copenhagen.

Gehl, J. & Gemzoe, L. (1996) *Public life – public space: Copenhagen 1996* Danish Architectural Press and the Royal Danish Academy of Fine Arts School of Architecture, Copenhagen.

\_\_\_\_ (2001) *New city spaces* Danish Architectural Press, Copenhagen.

\_\_\_\_ (1996) 'Urban Space in Europe and North America 1962-1996' in *Arkitektur DK – 1, 1996*, Danish Architectural Press, Copenhagen.

Skakke, J. (1996) 'Copenhagen's City Spaces' in *Arkitektur DK – 1, 1996*, Danish Architectural Press, Copenhagen.

# Making pedestrian facilities more usable & safer for all

## Barbara McMillen

Address for correspondence

Barbara McMillen

Federal Highway Administration, Room 4132, 400 7<sup>th</sup> Street SW, Washington, D.C. 20590

<[barbara.mcmillen@fhwa.dot.gov](mailto:barbara.mcmillen@fhwa.dot.gov)>

### Abstract

Most developed countries are experiencing a change in the age and ability profiles of their populations. There are more older people and more people with a disability that limits major life activities. As people age, they are likely to develop more than one disability, and this can compromise a person's mobility for walking and using transportation systems. Traditionally, transportation systems and other built environments have not been designed to accommodate the needs of all users. The lack of accessible environments presents social and economic costs and issues of independence not only for the fast growing aging and disabled population but for most of society.

There are many competing interests when designing and retrofitting infrastructure, and political will is essential to ensure that accessibility is part of policy, planning, design and construction.

### Keywords

Americans with Disabilities Act, Americans with Disabilities Act Accessibility Guidelines, Building a True Community, Designing Sidewalks and Trails for Access, Federal Highway Administration, people with disabilities, Universal Design, U.S. Access Board, visual and hearing disabilities, wheelchair.

### Introduction

The United States faces new challenges to provide a transportation system that meets the needs of all users. Recent transportation and civil rights legislation introduced obligations for the provision of a more balanced transportation system and opportunities for people with disabilities. The following outlines some of the various factors involved in the process of improving pedestrian access for people with disabilities in the transportation system.

Improved health measures have ensured that older

people and those with disabilities have a better quality of life and live longer than previous generations. Increased longevity also increases the chance of developing more than one disability. It is not uncommon for an older person to have a loss in vision and require the use of a walker or wheelchair for getting around.

Even though one in five people have a disability, it is rare to see a true representation of people with disabilities out and about conducting their daily activities. This is most likely due to many barriers that must be overcome to carry out these tasks. Environments all over the world have been built without much thought to how they should perform for people who can't walk, can't see, or can't hear. Consequently, people with disabilities have been isolated and segregated from the rest of the population.

Globally we are becoming aware that not only physical barriers must be removed, but also there is a need for providing information in alternative formats to people with visual and hearing disabilities. There are new technologies for providing text and symbol information on signs and signals in audible message and vibrotactile (vibrating message pad) formats that are usable for people who have visual disabilities. This technology can greatly improve the accessibility and safety of street crossings where signal phase information is crucial and interactions with cars bring higher risks. It is understandable that in these situations, where information is not accessible, it can have an affect on one's sense of safety and security.

### A new direction for research

There is one set of accessible design standards in the U.S. that is to be applied in both the architectural and pedestrian environments, and they are developed by

#### Table 1. The changing demography of the United States of America

- 20% have a disability that limits their ability to perform daily functions
- 70% will, at some time in their lives, have a temporary or permanent disability that can make stair climbing virtually impossible
- 19% are expected to be over the 65 in 2020, and as people age, there is a greater chance of developing disabilities; the current figure is 13%
- From years 2000 to 2030, the elderly population will double

the federal agency, the U.S. Access Board. These design standards, the Americans with Disabilities Act Accessibility Guidelines, are based on research that has been conducted in controlled architectural environments. New research is proving the need to develop separate standards for sidewalks and street crossings. This makes sense because of pedestrian interactions with motor vehicles, the faster pace of outdoor activity, the need for sign and signal information in alternative formats to cross the street, and weather and other outdoor elements that cause defects to concrete, asphalt, brick and other materials. Also, just crossing the street has become much more complicated for almost all pedestrians because of wide lanes, multiple lanes, and 'right turn on red' lights at intersections. Safety becomes a greater issue in this environment. If a facility is not accessible, it is probably not safe for most pedestrians, including people with disabilities.

The outdoor environment has common design problems not usually found in the indoor environment which create safety hazards, such as:

- The replacement of vertical kerbs with kerb ramps can make it difficult for persons who are blind to know where the boundary is for the street and sidewalk. Curb ramps are necessary for people who use wheelchairs but they create a safety problem for someone who cannot detect when they have left the sidewalk and entered the street; and
- Unlike building surfaces that tend to be in one plane, many outdoor surfaces are warped, causing one or two wheels of a wheelchair to lift off the ground. These situations can cause balancing and tipping problems for the user.

We are starting to understand what are the most useful designs and technologies for creating accessible pedestrian environments. Over the past few years, research has been conducted on wayfinding systems, underfoot detectable warnings, and audible sign and message formats for people with visual disabilities. Best practice designs are also being sought for people who have mobility disabilities.

### **Who are the users?**

Design standards need to change to encompass a wider range of people with disabilities. Most of the design standards were developed from research conducted with returning war veterans. These standards do not take into account the forward and side reach ranges for children and women, and the differences in upper body strength. There are also different degrees of mobility for stronger, younger males when compared with people who are elderly and have more frailties and incidence of multiple disabilities.

People over the age of 65 consider walking their

second choice of transportation in the U.S.A. Walking is often a necessity for older people when driving is no longer a safe activity and transit is not an option. Many elderly people want to continue living in their homes and remain independent for as long as possible, so this means services and infrastructure need to be made available for them. However, the lack of well-designed sidewalks or sprawling land use can make walking difficult and these issues can make walking virtually impossible if a person develops a disability. Good planning for future transportation needs is necessary to meet the needs of the older population.

It is important to ensure that people of all abilities can use the pedestrian transportation system. This is made possible when there is knowledge of how people use space. Care must be taken when planning, designing, and retrofitting facilities. It is important to ask and understand the answers to questions such as:

- Can this facility be used safely and easily by people with diminished eyesight and hearing, limited stamina, or wheelchair users? and
- Will young children or persons with limited cognitive ability be able to understand how to use the facility intuitively or with limited instructions? Are the instructions simple and easy to understand?

### **Solutions to addressing current & upcoming issues**

Walking is the oldest and most basic form of transportation and almost every trip includes a pedestrian element. Walking is also healthy for people and the environment. Considering this, it is surprising that very few universities offer curricula on pedestrian design in engineering and transportation planning programs. A basic knowledge of human factors and how pedestrian facilities must perform for a wide range of users is needed in order to provide truly usable facilities. There are also conflicting design issues among various users. A design that is useful for one user may be a problem for another. An example is a kerb ramp which facilitates wheelchair users yet is an impediment for people who are blind:

- *Competing interest:* Kerb ramps allow a wheelchair user to move easily from the sidewalk to the street, but the ramp may make it difficult for a person who is blind to detect where the street begins and the sidewalk ends.
- *Solution:* Add a detectable warning strip with a truncated domes pattern at the bottom of the ramp. Truncated domes are a unique pattern not duplicated by any other design patterns in transportation environments or facility defects, which makes the domes highly detectable by the user. The domes should run along the full width of the ramp.
- *Problem:* Wheelchair users may need a running start from the street in order to make it up the ramp and

the domes may slow the momentum of the wheelchair.

- **Solution:** The domes should be placed 153 mm to 200 mm away from the bottom of the ramp. By not placing the domes at the very bottom of the ramp, this allows the wheelchair to gain some momentum up the ramp. The domes should run along the full width of the ramp to allow detection by a white cane user. The length of the domes should be 610 mm only, which is approximately the distance between the front and back wheels of a wheelchair. Keeping the length of the domes at 610 mm will prevent the front and back wheels from traversing the dome strip at the same time. Also, if the domes are placed in a grid pattern the wheels of the chair may be able to straddle the domes.

Engineers and designers are trained to solve problems. Their expertise is greatly needed in finding solutions to these types of problems. Ultimately, for a design to be useful for a wide number of users, a combination of design solutions (such as the example above) may need to be applied. This concept of designing for all users is called Universal Design. Though Universal Design has been introduced into the architectural field for some time, it may be a new concept to many transportation providers and may require re-thinking how transportation facilities have been designed and implemented in the past.

Not only is knowledge required on how people with various abilities use space, but so also is attention to detail needed on how materials and design features fit together. For example, placing a strip of truncated domes next to a surface of exposed aggregate rock would make the domes far less detectable than if they were placed on a smooth surface. Combining two textured surfaces side by side defeats the good intentions of providing truncated domes.

Achieving a highly usable facility or system starts with the practice of laying out the minimum space and operational requirements, then overlaying best practices for optimum ease and safety. The end result is a Universally Designed system or facility that performs more comfortably for all users.

### **The social costs of inaccessible facilities**

Some may ask, 'Can we afford to build this way'? But looking past the human rights aspect, there are far reaching social and economic benefits to developing with Universal Design concepts. Eliminating barriers can provide opportunities for equal access to education, jobs, housing, transportation and health care services, and help resolve unemployment problems.

The question needs to be turned around to ask, 'Can we afford *not* to build this way'? The number of people over 65 years of age is rapidly increasing. Disabilities are more prevalent among older people and travel

options often diminish with age. What we build today must last for decades and provide the types of services and access needed for the future. Can we continue to design systems only for those that are fully able? The answer is an unambiguous no. Large segments of the population cannot be left out of socio-economic activity without serious consequences.

We live in an environment with a multitude of barriers for people with disabilities. In 1990, the U.S. enacted a comprehensive civil rights law, the Americans with Disabilities Act that prohibits discrimination against people with disabilities in all aspects of life such as employment, communication, recreation, health services, housing, education, transportation and access to public services. The lawmakers recognised that a disproportionate number of people with disabilities fall into a lower economic and education status and have a higher unemployment rate. It was also recognised that discriminatory practices and policies, and social, physical and information barriers were preventing a large segment of the population from participating fully in everyday life. These barriers created the lack of equal opportunity. The Act significantly awakened the consciousness of public policy. It brings to focus how infrastructures and attitudes must be examined for possible discrimination.

Historically, people with disabilities were not considered able to make significant contributions to society. President Franklin Roosevelt is one of the most beloved American figures despite being unable to walk in the last years of his presidency. His disability was hidden from the public for fear that social prejudice would prevent him from being given the opportunity to serve as president. Most people do not aspire to be president, but they have the ability to make significant contributions and often the ability to do great things. This ability is related to personal will and intelligence, and should not be related to the ability to walk, see and hear. Being denied the opportunity to contribute to society not only hurts individuals, but society as a whole, because it wastes valuable human resources. This issue goes back to the question: 'How can we afford not to build in a way that promotes opportunities for everyone?'

### **Creating accessible environments through changes in policy & funding**

In going about our daily functions we move through various built environments. They are inter-related, and the ability to move easily from one place to another is often taken for granted. The average work trip may take people from their front door, through sidewalks and street crossings, onto a transit system, through more sidewalks and street crossings and into a building to a workplace or service. The need for access

to all these environments is vital to perform daily activities regardless of the travel modes used and the activities performed. The authors of the Americans with Disabilities Act understood these relationships and created a law to eliminate the barriers in all environments. Access is the key to opportunity and the requirements of the Act open the door to opportunities that must be implemented on many fronts.

Knowledge and sensitivity to the issues of people with disabilities need to evolve into institutional changes in policy, funding priorities, training and education, and design practices and standards. Political will to implement the necessary changes and create opportunities will take time to cultivate. For example, older people develop a higher proportion of disabilities and this age group is growing significantly. Viable transportation for older people, who may have one or multiple disabilities, is a long-term proposition. There needs to be political will to implement policies and provide funding opportunities to meet the future transportation needs. This can be a challenge to politicians who are focused on issues pertaining to the next 4 to 5 years. It is also a challenge to transportation agencies that have more demands than funding resources. Often the focus is on quick solutions rather than sustained long-term goals of developing the type of community people want to live in. This can lead to missed opportunities for providing an adequate system that is usable by everyone. Some of the missed opportunities have resulted in separate and expensive paratransit systems designed for only one user group. Paratransit is necessary in some circumstances, but it should not be a substitute for a universally designed transportation system, as it often has been in the past.

In order for the Americans with Disabilities Act regulations to be implemented, almost every federal, state and local government agency needs to make shifts in policy and examine how funding is used. Transportation agencies must work together in exploring how conditions need to be improved and make sure that funding is not used in a manner that would discriminate against people with disabilities.

Many would agree that the U.S. has an unhealthy dependence on the car which dominates all other modes of transportation. However, in recent years federal transportation legislation has been enacted to provide funding incentives for pedestrian facilities and help balance transportation choices. The Federal Highway Administration is an agency of the Department of Transportation with a leadership role in providing expertise, resources and information to improve the quality of the highway system, which includes pedestrian systems. It has been developing research and best practices for making pedestrian environments safer and more convenient for all users.

This effort helps implement the policy and accessibility design provisions of the Americans with Disabilities Act.

### **Developing new standards for the pedestrian environment**

New minimum design standards were developed as part of the requirements for complying with the Americans with Disabilities Act. These standards are basic 'one-size-fits-all' design requirements that were originally developed for buildings and surrounding facilities, but are to be applied to all environments. However, the standards are evolving as research results emerge and new technologies develop. The standards continue to expand to encompass more appropriate designs for various environments. The pedestrian sidewalk and street-crossing environment is an area that has had extensive examination and research.

The U.S. Access Board formed a committee representing researchers, various transportation agencies, and disability rights organisations to develop recommendations for new design standards for the pedestrian transportation system. The committee recognised that the existing architectural standards may not necessarily take into account the safety risks, walking speed, pedestrian storage, and interactions with motor vehicles of the outdoor pedestrian environment. Careful thought went into developing the recommendations that would address these situations. The recommendations are being developed into a proposal that would add new pedestrian design standards to the Americans with Disabilities Act Accessibility Guidelines (PROWAAC, DATE). These standards will affect all local public government agencies and require them to build and alter facilities in a different way and provide alternative communication formats to some existing street signs and crossing signals. The process for adopting new standards is very democratic and allows the public an opportunity to make comments to the proposal before the standards become law. This adoption process may take up to two years before there is a final rule making.

Meanwhile, many local governments are considering the new recommendations and incorporating them into their local practices and policies. Consistency in the design and operation of the pedestrian environment is crucial for it to be functional – this is one of the reasons why standards are developed. Knowing what to expect is especially important for people with disabilities. It makes sense to apply the new recommendations now, rather than waiting for the legal requirements, when building and altering facilities. This will improve consistency throughout the pedestrian system.

## Conclusion

Sharing transportation innovations has always been a common practice throughout the world. The committee did not create the recommendations in a vacuum. International research and committee work were evaluated. Some of the recommendations were a compromise between conflicting issues of pedestrians and motor vehicles, and various needs that differ among people with disabilities. All things considered, PROWAAC's body of work represents the most up to date examination and recommendations for the *minimum* design requirements for laying the foundation for the pedestrian environment.

## References

- PROWAAC (2001) *Building a true community, final report of the Public Rights-of-Way Access Advisory Committee* United States Access Board, Washington, D.C. January 10. <http://www.access-board.gov/indexes/pubsindex.htm>
- FHWA (2001) *Designing sidewalks and trails for access, part ii, best practices design guide* Federal Highway Administration, Washington, D.C. September 2001. (Although finalised, this report is unpublished. However, it is available for free by faxing a request with your name, address & fax number to FHWA Report Center at +1 301 577 1421.)

# Walking & health: making the links

## Nick Cavill

Address for correspondence

Nick Cavill

Cavill Associates, 121 Penwith Road, London SW18 4PY

<[cavilln@aol.com](mailto:cavilln@aol.com)>

---

*'Walking is the exercise that does not need a gym... it is the prescription without medicine, the weight control without diet... Walking is as natural as breathin'* (Sussman & Goode, 1967).

### Abstract

Walking is a healthy mode of transport, offering one of the most fruitful areas for collaboration between health and transport professionals for a number of reasons. Firstly, the research evidence on the health benefits of physical activity (including walking) is strong, notably in reducing the public health burden of coronary heart disease and obesity. Secondly, walking has specific benefits to health, and offers great potential to improve public health due to the ease with which it can be integrated into people's daily lives. Thirdly, the health promotion sector has valuable skills and experience to offer in the promotion of walking, which can make for fruitful collaborations. Finally, physical activity and public health professionals are increasingly focusing on environmental determinants of behaviour, leading them to embrace other disciplines including transport planning, town planning, environmental health and architecture. Health professionals are powerful allies for the transport professional aiming to promote walking, and both need to work together to build on the overwhelming evidence of the benefits of our most natural mode of transport.

### Keywords

Walking, public health, transport

*'The way we travel is making us a less healthy nation'* (Department of the Environment, Transport & the Regions, 1998).

### Introduction

Everyone knows that walking is healthy. From ancient philosophers to modern day exercise scientists, there is a general agreement based on strong evidence that walking benefits physical and mental health. This gives transport professionals a potentially strong reason to favour walking as a transport mode, alongside the already sound justifications from transportation, environmental and social perspectives. It seems that the apparent health benefits of walking are frequently recognised within the transport sector – a quick scan of any transport plan including walking will usually reveal at least a cursory mention of the health benefits of this most ancient mode of transport. Yet this recognition of the potential links to health – and therefore the potential for cross-sectoral working – is often at a superficial level, which does not do justice to the strength of research in the health field. Perhaps the strongest example of this comes from the U.K. Government document *Encouraging walking* which contained the statement 'getting out for a walk occasionally is better for most people than sitting in an armchair all the time' – hardly the most vigorous endorsement of walking as a health-enhancing mode of transport (DETR, 2000).

Increasingly, public sector professionals are being directed towards cross-sectoral working to achieve

### Table 1. The benefits of regular physical activity (DHHS, 1996)

Regular physical activity improves health in the following ways:

- Reduces the risk of dying prematurely
- Reduces the risk of dying prematurely from heart disease
- Reduces the risk of developing diabetes
- Reduces the risk of developing high blood pressure
- Helps reduce blood pressure in people who already have high blood pressure
- Reduces the risk of developing colon cancer
- Reduces feelings of depression and anxiety
- Helps control weight
- Helps build and maintain healthy bones, muscles and joints
- Helps older adults become stronger and better able to move about without falling
- Promotes psychological well-being

broad social as well as environmental objectives (Davis, 1997). Transport professionals are no exception and a number of recent publications in the U.K. have advised on how to 'make the links' (Hamer, 1999). Walking may represent one of the most fruitful areas for collaboration for a number of reasons. This paper will provide an overview of the subject and draw upon the wealth of data in the public health and physical activity literature to highlight the main reasons why the time is ripe for cross-sectoral working on walking and why the health sector represents a particularly valuable partner.

### **Reason 1: the research evidence on the health benefits of physical activity is strong**

Evidence to support the role of physical activity in promoting health has been accumulating since the first study linking physical inactivity and an increased risk of coronary heart disease (Morris *et al.*, 1953). Since then numerous other studies have reported similar observations, which were reviewed in a landmark report by the U.S. Surgeon General (DHHS, 1996). The main health benefits of physical activity are summarised in Table 1.

Of particular note is the relationship between physical activity and coronary heart disease (CHD) – the leading cause of death in the West and a problem of increasing concern in many developing countries. People who have a physically active lifestyle are at approximately half the risk of developing CHD compared with those who have a sedentary lifestyle. For an individual, this level of 'relative risk' is at a similar level to other factors such as smoking or having high blood cholesterol. Of more relevance, however, is the 'population attributable risk', which estimates the true public health burden by multiplying the relative risk by the prevalence of the behaviour within the population. These analyses suggest that for CHD mortality the public health burden caused by a sedentary lifestyle is at least of the same magnitude as that caused by smoking and about three times as great as the burden caused by obesity and consumption

of excess saturated fat. This supports the case for increasing the level of investment in physical activity promotion compared to the traditional areas of smoking prevention and nutrition education.

Of note is the recent focus on obesity as a public health problem in many developed countries. In the U.S. the situation has been referred to as an 'epidemic of obesity' while in the U.K. a recent report identifies 1 in 5 adults as obese, a trebling in the last twenty years. This represents £0.5 billion annual cost to the National Health Service and £2 billion cost to the wider economy (NAO, 2001). The cause of this massive increase in obesity is clearly multi-factorial, but experts tend to agree that the decline in energy expenditure through physical activity lies at the heart of the problem.

Physical activity also positively affects mental health and psychological well-being, musco-skeletal health and promotes active ageing by enhancing independent living. Moving is clearly a natural part of human activity and our health suffers when we remove that movement from our lives. The impressive list of benefits shown by high quality research underlines what an important contribution physical activity can make to improving public health. More importantly, the large (and growing) proportion of the population that can be classed as sedentary makes this a leading public health issue. Many developed countries have similar levels of activity to the U.K., with around one-third of the total adult population who do virtually no leisure-time physical activity and only between a quarter and a third of adults who are active at recommended levels (Department of Health, 1995; DHHS, 1996).

### **Reason 2: walking has specific benefits**

While the physical activity literature covers all types of activity – from sport to planned exercise – walking has been the subject of many studies, as the most prevalent and most natural form of activity. A comprehensive review of the subject by the originator of the exercise/health relationship concluded that

**Table 2. Key priorities for transport & health professionals in promoting walking**

<i>Transport</i>	<i>Health</i>
Reduce car use	Improve health through physical activity especially reducing rates of coronary heart disease and obesity
Improve air quality	Reduce rates of respiratory diseases/asthma
Reduce traffic noise	Reduce stress
Reduce congestion	Encouraging independent mobility and development (especially children)
Improve road safety	Reduce mortality and morbidity from crashes
Increasing 'livability' of urban areas	Improve quality of life
Increase equity and access to transport modes	Reduce inequalities in health
Increase sustainability of the transport system	Build social capital and social cohesion

'Walking is the nearest activity to perfect exercise' and included the finding that walking just 15 km per week was found to reduce the risk of death in middle aged men (Morris & Hardman, 1997). While it is likely that any increase in the amount of walking over a sedentary lifestyle is likely to confer health benefits, through increased calorific expenditure, walking at a brisk pace will have a greater impact on cardio-respiratory fitness. For example improvements to fitness have been found to more than double with an increase in pace from 3 to 4 miles per hour, and double again when the pace was stepped up to 5 miles per hour (Duncan *et al.*, 1991).

Other research has shown that walking does not need to be done in one continuous 'bout', as was stressed in previous exercise recommendations. For a long time sports scientists had concentrated on the training effect of 20-minute bouts of vigorous exercise in increasing aerobic fitness – as seen in the jogging boom as people tried to raise their heart rates for at least 20 continuous minutes. More recently, scientists have been responding to the demand for an easier-to-swallow exercise prescription and have tried to define the smallest bout of exercise that will enhance cardio-respiratory fitness. Recent studies have shown that even 10-minute brisk walks can increase maximal oxygen uptake. One study at Loughborough University found that women walking continuously for 30 minutes 5 days a week had almost identical increases in fitness as women who split their 30 minutes into three 10-minute walks. Perhaps even more encouraging was that the short walkers lost more weight and reported greater decreases in waist circumference than the long walkers (Murphy & Hardman, 1998). More research is continuing to confirm this, but the findings are encouraging and strengthen the potential for improving health through walking for short journeys.

### Broader health benefits of walking

In addition to focusing on the reduction in the incidence of leading causes of mortality and morbidity, it is worth thinking a little more broadly about the ways in which walking may improve quality of life. These include 'the enjoyment of scenery which it makes possible, the escape from dull work and dreary surroundings, the mild adventure, good company and good talk' (Morris &

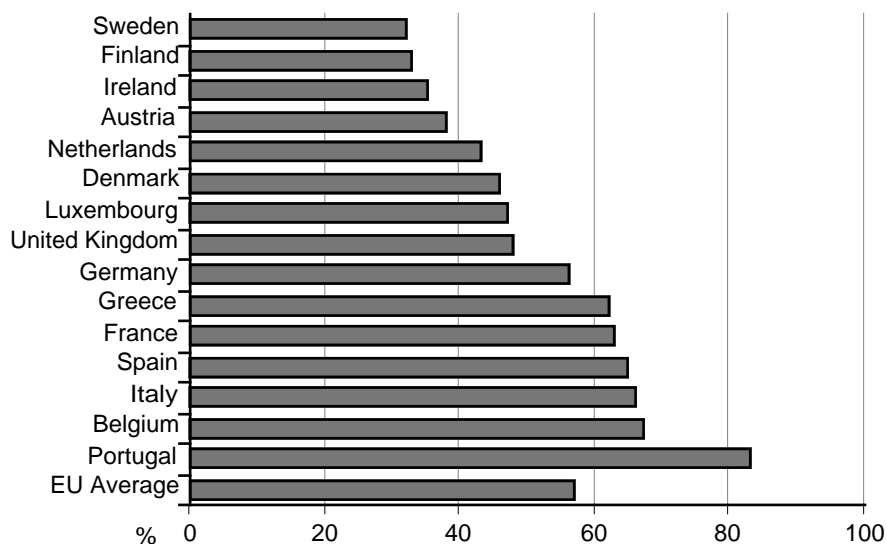
Hardman, 1997). These broader health benefits are important to consider in order to develop a more rounded view of the benefits of walking, and to think through the ways in which transport and health objectives complement each other. Table 2 shows some of the main priorities for health professionals in promoting walking and how they correspond to key transport objectives. These of course are not mutually exclusive areas – most public sector professionals are, after all, aiming to improve quality of life – but it does show the differing perspectives.

There is less research in this area, but it is clear that many people subjectively report an increase in well-being, reduced stress and increased relaxation due to walking. Walking allows 'thinking time' and facilitates sociability with other people and with the natural environment: this may directly improve health and is generally not available from within the confines of a car. There is also a growing literature on the notion of 'walkability', building on the older idea of 'livability'. Walkable communities tend to have higher measures of 'community health' and well-being, as they allow a higher level of interaction and 'social capital', reduced pollution, fewer crashes and greater space for children's play (Killingsworth & Lamming, 2001). Action in this area may in turn help to reduce inequalities in health.

### How much walking is enough?

As noted earlier, the consensus on recommended types and amounts of physical activity for public health has shifted considerably in recent years – to the advantage of the transport professional wishing to work in a coalition with the health sector. The previous focus on continuous bouts of vigorous exercise –

**Figure 1. The percentage of the population in EU states that do not achieve current minimum physical activity recommendations (30 minutes per day)**



Source: Institute of European Food Studies (1998)

the so-called 'no pain no gain' hypothesis - has given way to a consensus built around the evidence of the health benefits of regular, moderate, physical activity, as part of daily life. The major report in this area was the U.S. Surgeon General's report which contained two main recommendations:

- 1 Significant health benefits can be obtained by including a moderate amount of physical activity (e.g. 30 minutes of brisk walking, 15 minutes of running) on most, if not all, days of the week.
- 2 Additional health benefits can be gained through greater amounts of physical activity. People who can maintain a regular regimen of activity that is of longer duration or of more vigorous intensity are likely to derive greater benefit. (DHHS, 1996, p. 4)

So while vigorous exercise is seen to offer greater benefits, a parallel recommendation has emerged to support the accumulation of at least half an hour of daily moderate-intensity activity, similar to walking. This recommendation has been endorsed by many countries around the world, and marks a shift in public policy towards integrating activity into daily life (Department of Health, 1995). This is of course excellent news for the large majority of the population who do not want to take part in sport or planned exercise but who may be able to walk, cycle, climb stairs or play for a total of half an hour a day. Surveys have found that only around one in ten adults take part in regular physical activity at a vigorous intensity (Department of Health, 1995). The newer recommendation is thus seen to be easier, more achievable, and more applicable to the general population than previous advice, but (as Figure 1 shows) we still find on average 50% of adults in most European countries not meeting this level of activity (Institute of European Food Studies, 1998).

### **Reason 3: the health promotion sector has valuable skills & experience to offer to the promotion of walking**

Clearly a number of different professional groups can have a potential influence on rates of walking. Table 3 shows some of the main contributions that the transport and health sectors can make.

The transport sector has the most direct influence on creating and improving the surroundings and conditions for walking – especially 'functional' walking for transport, as opposed to leisure walking. Transport professionals develop transport plans, implement policies and programmes arising from central government legislation to allocate space to all users and oversee engineering works to build and maintain the infrastructure. In the U.K. this emphasis on the structural issues was seen most clearly in the example of the National Walking Strategy. Building on the success of a national cycling strategy, this document was originally intended to be a broad strategic plan for increasing rates of walking, drawing in all potential partners, including the health sector. Instead, following a lengthy political process, it was published as guidance for local authorities (DETR, 2000).

This sole focus on the structural issues, although vitally important, underestimates some of the broader behavioural and social issues which need to be addressed if people are to be encouraged to walk more. The two approaches clearly need to work in tandem: it seems unlikely that health promotion approaches will be successful in encouraging people to walk in a hostile environment. Similarly there is little evidence to show that simply installing new facilities leads to an increase in uptake. The public health/health promotion sector does however have valuable skills to offer – not so much in having a direct influence on the environment, but more in terms of access to core skills such as developing policy, re-orientating organisations and services, advocacy and lobbying, raising awareness and mobilising communities. It is likely that these skills will become increasingly useful as public authorities seek 'joined-up' solutions to our transport and environmental problems.

### **'Interventions' to increase walking**

As well as these indirect influences on walking, there is some evidence in the literature to support the role of health professionals in directly increasing participation in walking. A systematic review of physical activity promotion in 'free living populations' (i.e. not in laboratory conditions) showed

**Table 3. The potential contributions of transport & health professionals to increasing rates of walking**

<i>Transport</i>	<i>Health</i>
Understanding of the inter-relationship between the built environment and human behaviour	Knowledge of the data on health benefits of walking
Direct influence on the transport infrastructure – including sidewalks/ pavements	Understanding and experience of behavioural issues including interventions to increase rates of walking
Direct influence on planning including zoning laws	Substantial experience of social marketing
Understanding of transport data including trends and modal split	Experience in convening coalitions and mobilising communities e.g. Healthy Cities

that of all the randomised controlled trials to promote exercise (including walking, jogging, swimming, and exercise to music) those promoting walking had the greatest success (Hillsdon & Thorogood, 1996). They found that activity that could take place from home was likely to be more successful and that attendance at an exercise facility was generally not required. They concluded:

'Brisk walking has the greatest potential for increasing the overall activity levels of a sedentary population and meeting current public health recommendations' (Hillsdon & Thorogood, 1996).

Other approaches within the health promotion discipline have successfully targeted commuting to work and have increased rates of walking to work through behavioural interventions, stressing the health benefits of walking. Another example is the *Walking the Way to Health* project in the U.K. which is currently setting up 200 walk projects across the country. This was intended solely to increase leisure walking through a traditional health promotion approach, but organisers have also noted some evidence of a spin-off effect in terms of increased walking as transport.

There still appears to be a great deal of potential for cross-sectoral learning on techniques to increase actual participation in walking and in particular the combination of behavioural and environmental approaches. Some examples are now being seen where direct behavioural interventions, which had their roots in the health and addictions field, are being tried with some success in travel awareness disciplines. An example is the TravelSmart project in Perth, Australia, which has significantly altered the modal split in the city away from the car, through direct marketing and behavioural interventions.

### **The role of social marketing**

Finally, the health sector has a great deal of experience in the field of social marketing, building on experience in tackling complex behaviours such as smoking or HIV and more recently in physical activity promotion (Marcus *et al*, 1998). These campaigns have successfully raised levels of knowledge about health-enhancing behaviours but the complexity of the behaviour in question and the short term nature of the funding has often meant that campaigns have not led to behaviour changes in the short term. This contrasts with the key areas of expertise within the transport social marketing arena: road safety (notably seat belts) and drink-drive. These campaigns have seen a considerable degree of success but they have been backed up by strong legislation and long-term investment in marketing budgets. The area of walking promotion (or broader sustainable transport promotion)

has a lot to learn from health promotion. It is interesting to note that many of the techniques originally pioneered in health promotion campaigns are now being used in travel awareness social marketing campaigns, such as in the *Are you doing your bit?* or *TravelWise* campaigns in the U.K., or travel awareness campaigns across Europe.

### **Reason 4: physical activity & public health professionals are focusing continually on environmental determinants of behaviour**

Finally, it is important to note that there has been a considerable shift in recent years within the physical activity community towards embracing environmental disciplines and in particular to acknowledging the environment as a key determinant of behaviour. Historically, health promotion has acknowledged the importance of the environment, with the WHO's Ottawa charter recognising environmental interventions as being a key aspect of a multi-level ecological approach to promoting health (WHO, 1986). However, for many years this approach was not emphasised by physical activity professionals. As noted above, the emphasis was traditionally on vigorous exercise, which led to a focus on sports and leisure facility-based activities, a professional base within the exercise specialist and a research community led by sports scientists.

With the shift in focus towards everyday activities this is changing rapidly. Evidence for this shift is hard to find but some examples can be seen in the agenda of leading organisations. The annual meetings of the American College of Sports Medicine – possibly the most influential organisation of its kind in the world – now runs seminars and publishes papers about the influence of the environment on physical activity levels alongside its more traditional research from exercise physiology or psychology disciplines. In the U.K., the former Health Education Authority ran a major conference to discuss the interaction between transport, environment and physical activity behaviour and a review (Hamer, 1999) found increasing evidence of coalitions between health promotion and transport professionals. Increasingly, physical activity professionals are realising that they need to embrace other disciplines including transport planning, town planning, environmental health and architecture to avoid cycling and walking being turned into 'irrational modes of travel' through development patterns and road transport policies (Frank & Engelke, 2001).

### **Conclusion**

Health professionals – whether doctors, nurses, public health advocates, researchers or health promoters – are powerful allies for the transport professional aiming to promote walking. As we begin

the 21<sup>st</sup> century we move ever closer to a dominant 'car culture' where walking is the forgotten mode of transport, reserved for the shortest of journeys or for leisure. Multi-level and multi-sector solutions will be essential. We need to build on the overwhelming evidence of the benefits of walking to health and embrace health professionals and the valuable skills, experience and perspective they bring to the table. Walking is as natural as breathing: one of the first activities a child tries to do, and the last activity an adult wants to give up. We must not let the car take over, and lead us to forget the oldest, most basic and most natural mode of transport.

### References

- Davis, A.L. (1997) 'Developing a new consensus for physical activity in England: Evidence of the growing convergence of transport and public health policies' *World Transport Policy & Practice* 3, 4-10.
- DETR (1998) *A new deal for transport: Better for everyone* Department of the Environment, Transport and the Regions, TSO, London.
- \_\_\_\_ (2000) *Encouraging walking: advice for local authorities* Department of Environment, Transport and the Regions London.
- Department of Health (1995) *More people more active more often: physical activity in England – a consultation paper* Department of Health, London.
- Duncan J.J., Gordon, N.F. & Scott, C.B. (1991) 'Women walking for health and fitness. How much is enough?' *JAMA* Dec 18; 266(23): 3295-9.
- Frank, L.D. & Engelke, P.O. (2001) 'The Built environment and Human Activity Patterns: Exploring the Impacts of Urban Form on Public Health' *J of Planning Literature* (in press).
- Hamer, L. (1999) *Making the links. Integrating sustainable transport health and environmental policies* Health Education Authority, London.
- Hillsdon, M. & Thorogood, M. (1996) 'A systematic review of physical activity promotion strategies' *British Journal of Sports Medicine* 30, 84-89.
- Institute of European Food Studies (1998) *A pan-EU survey on consumer attitudes to physical activity, body-weight and health* Institute of European Food Studies, Dublin.
- Killingsworth, R. & Lamming, J. 2001 'Development and public health, *Urban Land*, July 2001; 12 -17.
- Marcus, B.H., Owen, N., Forsyth, L.H., Cavill, N.A. & Fridinger, F. (1998) 'Physical activity interventions using mass media, print media and information technology' *American Journal of Preventative Medicine* 15, 4, 362-378.
- Morris, J.N., Heady, J.A., Raffle, P.A.B., Roberts, C.G. & Parks, J.W. (1953) 'Coronary heart disease and physical activity of work' *Lancet* 2, 1111-1120.
- Morris, J.N. & Hardman, A.E. (1997) 'Walking to Health' *Sports Medicine* 23, 5 306-332.
- Murphy, M.H. & Hardman, A.E. (1998) 'Training effects of short and long bouts of brisk walking in sedentary women' *Medicine and Science in Sports and Exercise* 30,1, 152-7.
- NAO (2001) *Tackling obesity in England* National Audit Office, TSO, London.
- Sussman, A. & Goode, R. (1967) *The magic of walking* Simon and Schuster, New York.
- DHHS (1996) *Physical activity and health: a report of the Surgeon General* Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Atlanta, GA.
- WHO (1986) *Ottawa Charter for health promotion* World Health Organisation, Geneva.

# Prioritising policy & practice to favour walking

## Mayer Hillman

Address for correspondence

Mayer Hillman

Senior Fellow Emeritus, Policy Studies Institute, London

<[mayer.hillman@blueyonder.co.uk](mailto:mayer.hillman@blueyonder.co.uk)>

---

### Abstract

A considerable body of research evidence is presented indicating that from social, economic and environmental viewpoints the wider public interest is better served when the proportion of journeys made on foot rather than by motorised means rises. For this reason, it could be expected that transport priorities would favour pedestrians. However, a brief examination of policy and practice influencing the attractions of walking over the years reveals the extent of discrimination against those making journeys in this way. The elements of a strategy aimed at reversing this process is outlined.

### Keywords

Health, climate, equity, vulnerability, cost, network, walking

### Introduction

There is a strong case for re-ordering existing transport priorities to encourage walking, not least through the medium of road space allocation. However, central and local government politicians, advised by their transport and planning 'experts', have been and largely continue to be, on a different wavelength. For the last four decades, they have anticipated a future of 'universal car ownership' in which the geographical limitations of walking would be removed through the medium of technological advances enabling travel without physical effort and at relatively high speeds. It was assumed that the outcome would be access to a vastly increased catchment of opportunities leading to enrichment of the quality of life. Eventually, nearly everyone would be able to enjoy the benefits. For those unable to do so, public transport would be available.

### Research evidence

The findings of many of the research studies in which a number of colleagues and I have been engaged since two of us designed a pedestrian-oriented New Town 45 years ago (Hillman, 1957) – sadly neither the plan nor the concept behind it was adopted – reinforce the case for asserting that walking is deserving of far more consideration in public policy than it is accorded at present (Hillman & Whalley, 1979; Hillman, 1997a). National Travel Survey data for the UK show that, in spite of a continuing fall in the extent of

walking, journeys on foot account for between a quarter and a third of all journeys. These range from 80% of those made within a mile, two-fifths of children's journeys (though most children live in car-owning households), one in three of those of everyone over the age of 60, and a quarter of those of people of economically-active age. Moreover these proportions are much higher in inner urban areas.

Walking has scope for catering for significantly more journeys than can public transport. In marked contrast to travel by all forms of motorised transport, the more it can be used as a means of travel, the greater the social, economic, environmental, energy saving and health benefits. However, we have shown that careless interpretations of and misleading judgements on the available evidence stand in the way of a wider appreciation of the compelling case for allotting walking a more substantial role in transport policy and practice.

### Equity

What continues to be overlooked is that not everyone can enjoy the advantages of independent car use. Its prerequisites cannot be met by those unable to afford to own and run a car, adults without a driving licence and, of course, all children (Hillman, Henderson & Whalley, 1973). These three social groups, representing the majority of the population, have always relied heavily on walking but have been steadily disadvantaged not least by traffic growth and its numerous ill-effects. Their convenience and ability to get around has also been eroded by land use planning changes made in response to the wider availability of cars, resulting in an extension of the distances needed to travel. In the UK in the last 12 years alone, average journey length has increased by 25%.

### Public expenditure

In the sphere of the economy, examination of the cost-effectiveness of providing alternative forms of travel to the car has revealed that solutions do not depend on finding more funds for public transport. A major transfer from journeys currently made by car is far more likely to be achieved by constructing the relatively very cheap networks for walking (and cycling). It is worth noting that the National Travel Survey shows, on a door-to-door comparison, that

pedestrians take less time than bus passengers on journeys up to about one and half miles long. Provision to promote walking costs a small fraction of that for public transport – a fact perhaps overlooked because it is too cheap. The price of one kilometre of a light rail system is about the same as roughly 50 Safe Routes to School projects or 20 mph zones, and one kilometre of London's Jubilee Line extension is the same as 2000 of these other forms of spending which encourage walking. It is illusory, and therefore deleterious to the development of sound decisions on transport investment, to believe that pouring large sums into high quality public transport will cost-effectively attract people out of their cars (Hillman, 1996).

### **Road safety & road casualties**

On the issue of safety, we have highlighted significant reasons for questioning the validity for policy of casualty rates, even analysed by mode. Pedestrians are of course at a much higher risk of injury in getting about than are people travelling by car or public transport. But this is not due to any intrinsic danger in walking. It is due to the absence of continuity in the pedestrian network and of traffic calming measures to reduce both the volume and speed of traffic.

We have shown how essential it is to differentiate casualties according to whether the injured were 'inmates' (of vehicles) or 'outmates' (pedestrians and cyclists). Given that nearly all the injuries of 'outmates' result from a motor vehicle (mainly a car) colliding with them, the case can easily be argued that, far from it being unsafe to walk, it is unsafe to drive! Indeed, it is also salutary to note that there is a considerable level of under-reporting of pedestrian casualties. To compensate for this in analyses of strategies to meet the objectives of road safety policy, a Government Statistical Service report has calculated that an adjustment factor of 2.28 is needed for their serious injuries and 1.35 for their slight injuries. But this crucial multiplication factor is omitted from the decision-making process (Simpson, 1997).

Moreover, what is also overlooked is that the number of casualties is only a partial measure of road safety, particularly where pedestrians are concerned (Plowden & Hillman, 1984). Whilst these have fallen sharply in the UK in recent years, we have shown that road safety policy is deserving of only part of the credit. The reduction appears to be explained far more by the greater precautions that people getting around on foot have had to take and the effect of this process on the attractions and therefore incidence of walking, notably among children (Hillman, Adams & Whitelegg, 1991).

### **Physical and mental health**

Recent surveys show that most children and adults

are getting insufficient exercise and are therefore at greater risk of heart disease and other debilitating and life-threatening illnesses. They are effectively denied the enhancement that improved fitness brings to their well-being and quality of life. For many years, we have therefore questioned the advisability of determining transport policy, and the significance of walking within that, without relating it to its implications – both positive and negative – for the nation's health (Hillman, 1977 & 1997b).

From a personal viewpoint, there are clearly damaging consequences of feeding the addiction to car travel – even discounting issues of pollution – as it results in it being less likely that the exercise of walking (and cycling) occurs on a daily basis. For instance, the means of delivering casualty reduction among children by limiting their freedom to walk on their own appears to be retarding their physical, social and emotional development (Hillman, 1999/2000). Such an approach is also damaging from a community viewpoint in that the dangers posed by increased car use make it less likely that *other* people will derive the benefits of making their journeys on foot. Yet these wider benefits are excluded from the transport appraisal process.

### **Fossil fuel use and climate change**

In the sphere of the use of resources, our studies have identified a crucial failure in transport policy to recognise that the most effective way of minimising energy-wasteful patterns of travel, especially conserving finite fossil fuels, is not by achieving a transfer from the car to public transport: in the UK, at current occupancy levels, fuel use per passenger kilometre by public transport is only about 20% lower than by car. Nor is it by aiming for more efficient use of fuel in motor vehicles (which all too often leads to the generation of more energy demand as the unit cost is lowered). It is by promoting the non-motorised – nil petroleum-using – modes. This is particularly relevant to our current research on the implications of climate change for personal lifestyles, and transport's role in this.

In affluent countries, carbon emissions must be reduced by over 90% if the share of their populations is to be both equitable and preventative of serious damage to the planet's ecosystem (Hillman, 1998). If that target is not met, the disturbing consequences of climate change which we are beginning to witness are very likely to intensify and the costs of coping with them are very likely to rise sharply. Every aspect of our fossil fuel-dependent activity must come under scrutiny, including transport. It is very obvious that a sharp increase in the contribution that journeys on foot make would be beneficial.

## Discussion

This brief *tour d'horizon* of research we have carried out in policy areas affecting the attractions of walking and practices encouraging its wider adoption as a means of travel has attempted to cover the main reasons justifying prioritising transport policy in its favour. However, even a cursory examination of what central and local government in the UK have been doing on this subject could almost be interpreted as indicating a conspiracy to discriminate against those who engage in it by treating them as 'second class' citizens.

- 1 Road crashes are described as 'accidents' – an inappropriate euphemism given that the great majority of injuries among pedestrians result from insufficient attention having been paid to framing policy to minimise the risk of road injuries occurring. Using the injury rate by travel method as the indicator of relative danger inevitably leads to the conclusion that, rather than the car, which is associated with the majority of the deaths and injuries of pedestrians, walking is the 'dangerous' mode.
- 2 The unfortunate outcome of using casualties as *the* measure of road safety is reflected in the heightened parental perception of the risk of injury to children with the result that they are increasingly denied the freedom of getting about on their own on foot until they reach a relatively late age in their childhood.
- 3 The rising danger posed for pedestrians is largely attributable to the growth and speed of traffic: there are now 24 million licensed cars in the UK, nearly double the level just 25 years ago. On average, each is driven 45 kilometres daily. Most of these cars are capable of reaching speeds well in excess of the top limit. The extent of infringement of all limits is exceptionally high, but both the levels of their enforcement and the penalties for their infringement are derisively low.
- 4 Pedestrians are often blamed for paying insufficient attention to danger on the roads and debited in the courts with 'contributory negligence' when a vehicle collides with them. This overlooks the fact that carelessness on their part, especially that of children and old people, is a natural human failing. However, in marked contrast to the effects of drivers' carelessness, it rarely results in injury to other road users.
- 5 When a crash does occur, all traces are removed as quickly as possible. Any proposition that a permanent plaque be erected to mark the incident is considered too harrowing for the bereaved. The effect of this is to minimise its impact on public consciousness and the perceived need, as with rail crashes, to spare no cost in making it as unlikely as possible that the circumstances leading up the crash will recur.
- 6 The 'network' for getting about on foot is interrupted at every road intersection, with the result that pedestrians have to spend additional time waiting for a sufficient gap in the traffic to cross the road or detour to a specified safer location. Crossing points and bus stops are typically sited at some distance from pedestrians' desire lines by the device of using railings and 'cattle-pen' enclosures. These act as deterrents to walking due to the additional effort and inconvenience involved as well as, more obviously, the time spent by reducing still further very low average door-to-door walking speeds.
- 7 Street furniture is usually located in such a way that it restricts footway width. And the utilities – gas, water, electricity, cable for television and so on – run their services under footways often resulting in tripping on uneven surfaces following careless re-instatement. However, pedestrian injuries occurring on footways are not recorded in statistics on road casualties.
- 8 Local authorities seldom monitor the condition of footways in their areas. Similarly, levels of air pollution or noise are rarely recorded. Yet a national survey some years ago revealed that 94% of respondents were dissatisfied with the quality of their pedestrian environment (National Consumer Council, 1987). It is difficult to believe that there has been a significant change in the extent of this concern since then.
- 9 The great majority of exhaust pipes in the UK are positioned at the rear of vehicles on their *left*-hand side in such a way that the toxic, dirty and malodorous fumes are expelled at low level and in the direction of pedestrians. Cost savings to promote overseas sales are seen to be a more pressing consideration.
- 10 Planning proposals incorporating developments at low residential densities, and large scale facilities serving wide geographical catchments, are rarely considered from the viewpoint of their effect on the convenience of getting around on foot. The result of this has been that destinations, such as for school, shopping and medical treatment, have been effectively moved further away to achieve internal economies of scale for the 'suppliers'. In this way, the distances people need to walk to reach them have often been increased to an unacceptable length.
- 11 No figures on the costs of provision for walking compared with motorised travel are available so that the far greater cost-effectiveness of investment in the former is largely unrecognised. Such a grossly

misleading view is still prevalent: a recent Government-appointed *Commission for Integrated Transport* report containing advice to the former Department of the Environment, Transport and the Regions on European 'best practice' omitted journeys on foot on the grounds that they 'constitute a very low proportion of passenger kilometres'! That judgement reinforces a false image that the only realistic alternative to the car is public transport.

- 12 Similar distortion of the direction that transport policy should take is reflected in the subject of forecasts made in the process of determining future transport demand and expenditure to cater for it. Extraordinarily, these continue to exclude walking (and cycling) – only forms of motorised travel are considered relevant. As a consequence, no long-term strategy on the future role of walking has been proposed in the same way that it has been for car and public transport use.

Much of the decline in the attractions of walking are the outcome of these 12 errors of judgement and fallacious assumptions in the transport domain – albeit most of them unwitting. To a degree, they are reflected in the attitudes of successive governments' to its significance. For example, when advisory and working groups were appointed by the Government in 1997 to aid the development of the first policy document on walking, expectations were substantially raised: at last, a National Walking Strategy was to be produced. However, this long-awaited paper aimed at 'encouraging walking' was then relegated to the status of 'advice to local authorities'. As a result, there was an absence of any reporting of its publication in the national press or on radio or television. This was all the more disappointing as the consultation document that preceded it was impressive and concise, discussing most of the needed changes in policy and practice.

The corrective changes in policy and practice that are needed to compensate for past mistakes listed above go well beyond those solely appropriate to the transport sphere. Key ones can be suggested.

### **Reducing motor traffic impacts**

The first and most obvious means lies in the field of paying far more attention to reducing the volume of motorised traffic. At the same time, the speed with which vehicles are driven – and their performance in terms of acceleration – should be markedly reduced for all the reasons set out in one of our relatively recent reports (Plowden & Hillman, 1984 & 1996), and now being strongly advocated by two bodies – The *Slower Speeds Initiative* and the *Road Danger Reduction Forum* – set up, *inter alia*, to press government for the adoption of such measures. There is also a strong case to be made for more resources being put into the enforcement of speed limits.

### **The planning process**

The second means of encouraging walking lies in the realm of land use planning. A presumption should exist against large-scale facilities when more numerous, albeit smaller and less well endowed ones serving smaller populations, are a realistic alternative. Decisions in this field should be made with an awareness of their implications for the convenience and safety of pedestrians and the quality of their environment. For instance, a charge could be put on parking at shopping centres, with the revenue used both to subsidise delivery services to customers, and business rates for smaller local shops, a high proportion of whose customers reach them on foot and who therefore do not add to the adverse externalities of car traffic.

### **Broadening the appraisal process**

The third means that we have recommended is to enable local authorities to broaden the aspects that they take into account in their appraisal process for determining the most cost-effective strategies they could adopt on transport investment (CTC, Bاتب Group & Policy Studies Institute, 2001). It is in the form of a model that incorporates far more of the social, economic and environmental costs and benefits of different strategies. For instance, it incorporates the public benefits of promoting health through encouraging walking and improving the environment at the local and global levels by reducing air pollution and greenhouse gas emissions. Many of these are excluded in the current approach – therefore making it less likely that investment will be made in encouraging local patterns of activity based on walking.

### **The pedestrian environment**

The fourth approach for justifiably favouring pedestrian movement is concerned with the re-allocation of road space. As noted earlier, pedestrians are exposed to danger when they cross roads, their journeys are lengthened and restrictions on people's ease of getting about on foot, especially children and older people, are made worse. For this reason, perhaps the measure with the greatest scope for promoting walking is the concept of a pedestrian network.

This simple concept, if supported by central government, could be adopted by local authorities wishing to be in the vanguard of forward thinking on ways and means of giving pride of place to people getting about on foot. It would entail adopting a strategy to create an uninterrupted pedestrian network within their administrative areas (Hillman, 2001). The construction of such a network, consisting of footway-level linkages across the road, would be staged over say a ten-year period, starting first outside schools, park entrances, lesser shopping areas, bus

stops not on strategic routes, and road intersections in residential areas.

Improvement of the pedestrian environment would also require local authorities to invest far more in pedestrian-orientated measures. These include traffic calming, 20 mph residential zones; Safe Routes to School initiatives; and the creation of safe routes for children to reach leisure facilities (as recently implemented by the London Borough of Ealing in its SALSA project – Sustainable Access to Leisure Sites and Amenities). The focus would reflect recognition of the impact that the use of motor vehicles has on amenity, the outcome of which has been the import into the UK of the highly successful Home Zone concept.

Regular monitoring by local authorities of the condition of footways in their area to reduce the likelihood of tripping and the level of air pollution so that action can be taken to prevent these injuries would be beneficial too. Much benefit would also be derived from legislation to require motor manufacturers to site exhaust pipes on the right-hand side of vehicles in the UK.

### Conclusions

At the heart of the matter in this domain of transport policy lies the difficulty for decision makers of considering radical alternatives to the conventional approach. So far their actions appear to reflect a desire to enable people to travel 'further and faster', if not by car, then by public transport. They have pandered to the public's addiction to the car and the illusory belief that where there are problems of congestion, better public transport will deliver the solution to the clear limits on feeding the addiction. They need to be informed by objective evidence of the unsustainability of this process, not least that stemming from the implications of climate change. A strategy to advance this would contain measures to substantially reduce both the volume and speed of traffic over a predetermined number of years. Not only would many of the objectives of transport policy be delivered – and at low cost – but so also would a wide range of other social, health, and local and global environmental objectives.

### Acknowledgement

This paper is largely based on the Memorandum submitted by its author to the House of Commons Environment, Transport and Regional Affairs Committee Enquiry on Walking in Towns and Cities which was held in 2001.

### References

CTC, Babbie Group & Policy Studies Institute (2000) *Modelling and appraisal of cycling and walking* Unpublished report for the DETR & the Rees Jeffreys

Road Fund.

Hillman, M. (with Lehrman, J.) (1957) 'Project for a linear new town' *Community Planning Review* VII, 3, September, 136-40.

Hillman, M. (1977) 'Some implications of transport and planning policies for preventive medicine' House of Commons Social Services Sub-Committee, *Inquiry on Preventive Medicine*, First Report from the Expenditure Committee, 1976-77, Appendix 58, HMSO, London.

\_\_\_\_ (1996) 'Curbing car use – the dangers of exaggerating the future role of public transport' in Terry, F. (ed.) *Transport in transition* 17-24 CIPFA, Public Finance Foundation, London.

\_\_\_\_ (1997a) 'Public policy on the green modes' in Tolley, R.S. (ed.) *The greening of urban transport: planning for walking and cycling in western cities* John Wiley & Sons Ltd., Chichester.

\_\_\_\_ (1997b) 'Health promotion: the potential of non-motorised transport' in (Fletcher, A., & McMichael, A., eds.), *Health at the crossroads: transport policy and urban health*, John Wiley & Sons Ltd., Chichester.

\_\_\_\_ (1998) 'Why climate change must top the agenda' & 'Carbon Budget Watchers' *Town and Country Planning* (special issue on Climate Change edited by Hillman, M.), 67, 9, 287-88 & 305-6.

\_\_\_\_ (1999/2000) 'Curbing children's social and emotional development: an unrecognised outcome of parental fears' *Journal of Contemporary Health*, 8, winter, 38-42.

\_\_\_\_ (2001) 'A continuous pedestrian network' *Proceedings*, Australia: Walking the 21<sup>st</sup> Century – An International Walking Conference, Perth, Western Australia.

Hillman, M., Adams, J. & Whitelegg, J. (1991) *One false move... a study of children's independent mobility* Policy Studies Institute, London.

Hillman, M., Henderson, I. & Whalley, A. (1973) *Personal mobility and transport policy*, Political and Economic Planning, London.

Hillman, M. & Whalley, A. (1979) *Walking is transport* Policy Studies Institute, London.

National Consumer Council (1987) *What's wrong with walking?* and an associated Action Guide on Walking, London, HMSO

Plowden S. & Hillman, M. (1984) *Danger on the road: the needless scourge* Policy Studies Institute, London.

\_\_\_\_ (1996) *Speed control and transport policy* Policy Studies Institute, London.

Simpson, H. (1997) 'National Hospital Study of Road Accident Road Casualties' in DETR (1997) *Road Accidents Great Britain: 1996 – The Casualty Report* Government Statistical Service, London.

<http://www.roads.dtlr.gov.uk/roadsafety/>

# Unfulfilled aspirations: a review of the Select Committee Report on *Walking in Towns and Cities* in Britain

Rodney Tolley

Address for correspondence

Rodney Tolley

Director, CAST – The Centre for Alternative and Sustainable Transport, Staffordshire University, College Road, Stoke on Trent, ST4 2DE, U.K.

<[r.s.tolley@staffs.ac.uk](mailto:r.s.tolley@staffs.ac.uk)>

<http://www.staffs.ac.uk/geography/cast>

---

## Abstract

Walking in Britain is an important but currently declining mode of transport. In the winter of 2000-01 the Environment, Transport and Regional Affairs Committee of the House of Commons carried out an inquiry into the expenditure, administration and policy of Government towards walking in towns and cities. The resultant Select Committee Report is uncompromisingly critical of the Government, arguing that the attention, action and priority accorded to walking failed to match its importance and were inadequate to reverse the longstanding trend of decline. Amongst many recommendations is a call for a National Walking Strategy. The paper reviews the process of the inquiry and discusses the relevance of the outcomes to the contemporary walking environment in Britain.

## Keywords

policy, Select Committee, strategy, urban renaissance, walking

## Introduction: walking, transport policy & the Select Committee process

Since the early 1990s local authorities in Britain have been increasingly encouraged by central Government to re-orientate their transport plans away from catering for cars and towards sustainable modes. In 1996 a discussion document was released by the Walking Steering Group with the aims of reversing the decline in walking and encouraging it as a serious mode of transport (DoT, 1996). It recognised that to be successful, walking must be considered as part of an overall strategy and not just in isolation. In July 1998, the Government published the White Paper on Transport which set the framework for transport policy in the UK and provided the context within which the Government's detailed policies were to be taken forward. The 'New Deal' for walking was to make it more attractive, safer and therefore a more viable alternative mode of transport (DETR, 1998a). The primary instruments for this were Local Transport Plans (LTPs), through which the Government expected better provision for walking. In parallel, policies,

strategies and advice in the fields of air quality, sustainability, health, the countryside, tourism, social inclusion and town centre management are incorporating a recognition of the importance of good walking conditions or high levels of pedestrian activity to meet their goals.

Although recent policy statements on walking indicate a new commitment to improving conditions for pedestrians, in reality there has been little strategic dimension or attention to specific policies. At one stage it seemed likely that walking would have its own Transport White Paper 'daughter' document and a National Walking Strategy was expected. However, media criticism of the Secretary of State's ill-judged 250-metre car journey from his hotel to the Labour Party conference venue in 1998 undermined the Government's stated view of the importance of walking. The promised Strategy was repeatedly delayed and eventually replaced by an advice document '*Encouraging walking: advice to local authorities*' (DETR, 2000a).

Moreover, in the ten-year plan for expenditure on transport there was a decided bias towards large rail and road projects and little evidence that the changed climate for encouraging walking was to be reflected in expenditure plans (DETR, 2000b.) This gap was a contributory factor to the Environment, Transport and Regional Affairs (ETRA) Committee deciding to examine the Government's record on walking, the first time that it had done so in the current Parliament. The ETRA Committee was a 'Select Committee', appointed to examine on behalf of the House of Commons the expenditure, administration and policy of the then Department of Environment, Transport and the Regions (DETR). It had the power to require the submission of written evidence and documents, to examine witnesses and to make reports to the House. The terms of reference that the Committee set were as follows:

- The contribution of walking to Urban Renaissance, healthy living and reducing dependency on cars;
- The reasons for the decline in walking and the main obstacles to encouraging walking;

- What should be done to promote walking;
- What can be learnt from good practice;
- Whether the relevant professionals have the appropriate skills and training;
- Whether all Government Departments and local authorities are taking appropriate measures;
- Whether greater priority should be given to measures to promote walking, including a greater share of the Government budget and the re-allocation of road space; and
- Whether national targets should be set and a National Strategy published.

Over 100 memoranda of evidence were submitted, which the Committee thought to be 'an impressive number for an often-neglected subject'. Around a third were from concerned individuals, but over a half were from professional bodies and NGOs – testament to the way that walking is important to many constituencies. Some groups though were poorly represented, including local authorities, academic institutions, Government departments, health authorities and public transport operators. No retailers contributed. Altogether some 40 witnesses were called from 20 organisations to give evidence at the 6 evidence sessions held in the Palace of Westminster between January and April 2001. The Committee was advised by Tim Pharaoh and Rodney Tolley and its Report, together with the minutes of evidence and the submitted memoranda, was published on 30<sup>th</sup> June 2001 (ETRA, 2001a; 2001b; 2001c). This paper reviews the process of the inquiry and discusses the relevance of the outcomes to the contemporary walking environment in Britain.

### Reversing the decline in walking

Since the mid-1980s the proportion of all journeys made on foot in the UK has fallen from 34% to 27% (DETR, 1998b) and the Committee heard and read much evidence on why this was happening. Explanations were very wide-ranging. However, criticism of the conditions for pedestrians dominated and set the tone for the Committee, which argued that pedestrians have been treated with contempt:

'We are corralled behind long lengths of guard railing, forced into dark and dangerous subways and made to endure long waits at pedestrian crossings. Conditions are poor for all of us, but for the vulnerable, for the young, for the disabled and for the elderly they can be all but impossible... For once all that has to be done to see the difficulties is to step outside the Palace of Westminster... Here in the heart of our largest and richest city, by the nation's best known buildings, it is impossible to cross some of the roads.' (ETRA, 2001a, ix).

The Committee's view was that much more needed to be spent on walking and indeed, it was very positive

in recommending a range of measures. Broadly speaking these were, firstly, measures concerned with planning policies to promote high density, mixed use, compact cities which keep distances short and secondly, recommendations for transport strategies which give priority to and promote walking, produce better conditions for pedestrians, restrain traffic and more effectively manage public space.

However, more surprisingly, there were also recommendations for a changed conceptualisation of the use of the road system. Firstly, the Report criticised the prevailing philosophy of accident reduction, which had led to restrictions on the movement and opportunities for pedestrians in order to lessen conflict with vehicles and therefore reduce injuries and deaths. Instead it embraced the concept of danger reduction at source (for example by reducing the speed and volume of traffic), recognising that this can be more effective in reducing pedestrian casualties, leads to better urban design (for example by removing guard railings) and is more convenient for pedestrians.

Secondly, the Committee was persuaded by evidence that the present road classification system was outdated and inappropriate. Most road classifications are concerned only with vehicle traffic (for example Primary and Local Distributors) yet streets have many other functions as places for social interaction and community life. It argued that the current traffic hierarchy should be replaced with a new road use hierarchy, to take account of all the functions which roads and streets should fulfil, including shopping, social exchange and children's play.

### National targets & a National Strategy

Although walking is the second most common mode of transport, it is the only one for which there is no prediction or target in the Ten-Year Transport Plan. This brings with it the danger that achieving other targets in relation to say, bus use, could be at the expense of walking, so long as there is no target for it. Accordingly the Committee recommended that there should be a national target for the percentage of trips to be undertaken by each form of transport: walking, cycling, public transport and car travel. The key target should be to increase the share of walking trips and reduce the share of car trips. This would then be articulated at the local level by the use of local targets, which should be set as part of all local transport plans.

In considering the responsibilities of various bodies to reverse the decline in walking, the report made a number of recommendations to be taken up by local authorities and various Government departments, such as those with responsibility for health and education, crime and social exclusion. They noted that there was

much guidance in the health sector but less in the way of tangible achievements. The Social Exclusion Unit was criticised for its belated realisation that poorer households walk more than others, are more likely to be killed by motorists and lack access to many facilities including shops and medical services. It was felt that tackling these problems in deprived areas could utilise urban regeneration funds, a timely reminder of the cross-cutting nature of many walking issues.

However, the Report was clear that the primary difficulty was the attitude to walking held by politicians with responsibility for transport. The Committee noted the widespread criticism in many memoranda of the Government for giving inadequate attention and priority to walking and failing to provide a lead. A large number of witnesses commented on the issue of a National Walking Strategy and virtually every one said that the Government should publish one in the near future. It was felt that the Government in producing an advice note rather than a strategy had diminished the importance of walking in the eyes of local authorities, other organisations and professionals. In particular, a National Walking Strategy would have acted as a trigger to the production of local walking strategies in the same way that the National Cycling Strategy had spurred publication of local versions.

Persuaded by these views, the Committee recommended the establishment of a National Walking Strategy which would indicate:

- the criteria against which local strategies would be examined for the purpose of funding;
- a shift of priorities in respect of policies and spending in its overall transport strategy; and
- how different Government departments will co-ordinate policies to facilitate and promote walking.

Guidance should be issued under the headings of:

- changing priorities
- funding;
- planning;
- conditions for walking;
- quality of design;
- campaigns to promote walking; and
- research.

Such guidance would allow local authorities to publish local walking strategies and these should determine funding allocations. The establishment of a National Walking Forum was also recommended, which would exchange best practice, advise on Government policy, examine local transport plans, monitor progress and publish a training strategy.

The exchange on the matter of a National Walking

Strategy between one Committee member and Lord MacDonald of Tradeston, the Minister of Transport, illustrated the disappointment of the Committee over the Government's stance on walking policy. It believed that the Minister was 'confused and poorly briefed'. After he said that it was 'overblown to say that we must have a national walking strategy' the exchange proceeded as follows:

*Member:* Why a national cycling strategy. What is the difference?'

*Minister:* 'Because... cycling... is a mode of transport; you get on a machine, you need rules of the road and you need green lanes painted in the road at considerable cost...'

*Member:* Surely for walking you need pavements to walk on.'

*Minister:* Absolutely, and at a local level that is fine. I do not share the belief that somehow we would transform either individual activity or local authority activity if we had a shining national target.'

*Member:* 'But you do believe that for cycling?'

*Minister:* 'Yes, I think it is out of scale.'  
(ETRA, 2001c, 71)

Part of the lack of support from Government felt by professionals related to the perceived understaffing in this area – and the Committee pursued this issue with some vigour. It was told that despite walking accounting for nearly one-third of trips, DETR had only *two* staff in post to deal with walking and these were relatively junior officials with a limited budget. In response to this, they recommended that DETR should ensure 'that its staffing for this policy area is commensurate with the importance of walking as a mode of transport'. These staff should be expected to:

'publish and monitor a national strategy, commission research into walking, issue consolidated guidance on street design, replace existing guidance about guard railings and staggered crossings, help local authority officers with preparing walking strategies and ensure that development plans are consistent with local transport plans.' (ETRA, 2001a, xxxii).

Though the Committee did not feel able to say how many staff would be required for these tasks, it is safe to say that it did not think that two would be enough. The Minister was asked whether he thought that the numbers of civil servants who worked on walking was appropriate. He said that:

'I suspect it is about right... because most of us know how to do it... I just think that you can therefore take a lot for granted when it comes to walking.'  
(ETRA, 2001a, xxxiii).

The Report tartly observed that 'On this basis a large part of the Government machine could be wound up tomorrow' (ETRA, 2001a, xxxiii).

The test of the Government's priorities is its spending plans. Of course it is very difficult to identify exactly how much is being spent on walking, because road maintenance, lighting installation or speed reduction measures, for example, may benefit walkers. However the majority of the submissions on this issue claimed that walking was not being made a priority for expenditure. Indeed the opposite appeared to be the case. When it was put to him that the Government puts emphasis on large-scale schemes, Lord MacDonald agreed and explained that this is not because they were more cost effective. Instead it is because their 'impact' and 'value for money' are more easily measured through the methodology 'that is available to the Treasury'.

This is an extraordinary statement. It implies that building large schemes with measured positive value is more worthwhile than building small-scale schemes because their value cannot be measured. Of course this is nonsense. It is simply untrue that small-scale schemes cannot be measured: indeed there are plentiful examples of such schemes returning very high rates of return in their first year, such as the 526% first year rate of return for the pedestrian priority signals installed in Hull in 1997 (RDRF, 2001). More accurately, it seems that Treasury methodologies are being used to conceal the fact that, as the Report comments, 'the Government is simply not interested in appraising small schemes', an issue which it said 'must be addressed'. The Committee concluded that the Government should ensure that in future funds commensurate with the importance of walking as a mode of transport be spent in Local Transport Settlements on the measures put forward in the National Walking Strategy. The source of this funding was clear: 'there should be a corresponding reduction in the sums spent on new national roads' (ETRA, 2001a, xliii).

#### **From staggered crossings to the urban renaissance**

Given the great volume of evidence submitted that was critical of the physical infrastructure provided for walking, it is not surprising that the Report dealt with this at some length. There was a particular concentration on staggered crossings, whereby a road is crossed in two stages using steel-railed 'cattle pens' in the centre of the road for protection. These are designed to maintain vehicle flow and effectively trade pedestrian safety for pedestrian convenience. The Committee had been very critical of staggered crossings outside the Houses of Parliament and the City of Westminster (the relevant local authority) submitted a memorandum in their defence. The gulf

between pedestrians' desire for direct movement and the 'accident reduction' approach of engineers could hardly be better illustrated than in this reply. It said:

'Regrettably, pedestrians often misuse the crossing facilities provided for them and choose to risk the crossing of some of London's busiest roads away from the improved safety that many crossings provide and until such time as there is legislation against this practice the problem will persist' (ETRA 2001c, 207).

However, this focus on infrastructure does tend to divert attention from wider issues. There is very little money in the ten-year plan that is likely to be spent on walking and it is clear from the Minister's responses that walking is very low on the political agenda at present. This has prompted a debate on how, in this situation, resources may be targeted in order to improve the public environment for walking. In its editorial on the Report, Local Transport Today observed that

'whilst the public and media are unable to connect with the issue of walking per se, paradoxically, they are very concerned to see the conditions that are conducive to walking improve... the way to winning the public's heart and encouraging people to step out on the footpaths... may be... through... programmes such as Home Zones or crime reduction strategies, which hold resonance in their everyday lives and make walking the natural thing to do' (Local Transport Today, 2001, 2).

The thrust of this argument is that the way to promote walking is to stop talking about walking. Rather than promote walking as transport to get somewhere, it is more effective to focus on the things you can do when out walking - window-shopping, strolling, people watching, playing and so on. The focus effectively shifts from the activity of walking to the creation of high quality environments in which walking becomes a natural and pleasurable activity. However, in Government, because walking is seen in official circles as a transport issue, there is almost no link between officials working on urban regeneration and neighbourhood renewal and those working on walking in the Charging and Local Transport Division. Moreover, this problem is repeated in local authorities, where walking is seen as a sub-set of road safety, missing the obvious links with town centre management or urban regeneration. In other words, we continue to deal with a set of infrastructure issues and miss the wider political and institutional barriers that need to be overcome in order to create walkable communities. Interestingly, the Pedestrians Association (the principal lobby group for pedestrians in Britain) has reinforced this change in perspective by undertaking a major re-branding exercise, in which it is changing its name to 'Living Streets' (Pedestrians

Association, 2001).

The Committee recognised this problem, though there is a danger that the strong focus on physical infrastructure in the Report may conceal its concern with the urban renaissance agenda. It stressed that a pleasant environment which is conducive to walking is essential for a city to be successful and for urban renaissance to take place. It also recognised that professionals need to pay much more attention both to the needs of pedestrians and to the aesthetics of the street. They were seen to be incapable of producing beautiful street spaces. Much of the problem stemmed from unco-ordinated street management and the involvement of a plethora of different agencies and professionals. Accordingly, the Committee endorsed the recommendations of the Designing Streets for People Inquiry, which proposed the adoption of a single unified public realm strategy to co-ordinate the many other plans and strategies that impinge on public space (Urban Design Alliance, 2000).

### Conclusions

The Report accurately reflected the widespread concern over the state of the contemporary walking environment in Britain and was relentlessly critical of the Government. The Committee flatly contradicted the Government view, set out in *Encouraging walking*, that although walking could be made easier, more pleasant and safer, 'none of this is going to have a major impact on total vehicle mileage, air pollution or global warming'. It cited recent research and the Government's own Air Quality Strategy in arguing that the impact of walking on air pollution and congestion can be considerable in urban areas. Its frustration with the lack of leadership was palpable. There was a sense of incredulity over the Minister's defence of existing staffing levels and a fundamental disagreement with his view that cycling needed a National Strategy but that walking did not. The view was that the Government was not only frightened of being seen as 'anti-car', but that it also thought that supporting walking would bring it into ridicule, especially with the popular press. The contrast between the recognition of the importance of walking expressed by DETR officials and the complete lack of political interest drew a plaintive observation from the Committee:

'DETR officials know what should be done.

However, as things stand we see little likelihood of progress because Government has not willed the means to do it. As a result the excellent suggestions in its advice to local authorities, *Encouraging Walking*, are likely to remain pious but unfulfilled aspirations' (ETRA, 2001a, xxxiii).

The Report of the Select Committee has been widely welcomed by professionals and advocates. The

Pedestrians Association described it as the 'missing chapter in the Government's ten-year transport plan'. As a compendium of latest thinking on barriers to and opportunities for walking it is an invaluable resource. Awareness has been raised of the extraordinary number of stakeholders with interests in walking and of the inter-connectedness of their views. Moreover, in calling for memoranda, in assembling such a range and volume of evidence, in the cross-examination of key officials and the publication of a hard-hitting report, the actual process itself has created a focus on walking issues unprecedented in recent times.

However, what is less clear is whether anything is going to change as a result. Many witnesses stated that the failure to produce the National Walking Strategy was a major setback – and not only in terms of symbolism. Support for a Strategy was also based on the way in which it was believed that it would assist the diffusion of best practice and keep walking high on the professional and technical agenda. The existence of a national policy goal to create walkable environments would inform policies in many other relevant departments and agencies apart from transport. Critically, these would of course include the Treasury. Many had nurtured hope that a Strategy would eventually emerge, but the Minister's statement to the Committee now makes that politically more difficult in the short term. The Government's formal response to the Report is awaited, but it does not seem likely that there will be a concession on this key issue.

The current position of walking promotion in the UK is thus in a confused and somewhat contradictory state. Understanding of walking issues has deepened throughout the country in recent years and walking is significantly placed in local transport plans. The profile has been raised by those dealing with other issues besides transport, such as crime, health, education and air quality. There are countless successful projects with walking components such as home zones, travel plans, safe routes to school, walking buses, car free days, walk to work days and much more. At the local level, without any doubt, the promotion of walking is more important and walking is being recognised as an enormously valuable weapon in the fight against car dominance. But the work of the Committee has shown us very clearly that though these isolated projects are valuable, in the wider sense there remain very real political and institutional barriers preventing the creation of walkable towns and cities in Britain.

### References

DoT (1996) *Developing a strategy for walking* Department of Transport, London.

DETR (1998a) *A new deal for transport: Better for everyone* Department of the Environment, Transport

and the Regions, TSO, London.

\_\_\_\_ (1998b) *Transport Statistics Great Britain*  
Department of the Environment, Transport and the  
Regions, TSO, London.

\_\_\_\_ (2000a) *Encouraging walking: advice to local  
authorities* Department of the Environment, Transport  
and the Regions, London.

\_\_\_\_ (2000b) *Transport 2010 – the 10 year plan*  
Department of the Environment, Transport and the  
Regions, TSO, London.

ETRA (2001a) *Walking in towns and cities, 11<sup>th</sup> Report*,  
Environment, Transport and Regional Affairs  
Committee, London,

<http://www.parliament.uk/commons/selcom/etrahome.htm>

\_\_\_\_ (2001b) *Walking in towns and cities, 11<sup>th</sup> Report,  
Volume II Memoranda submitted to the Committee*  
Environment, Transport and Regional Affairs  
Committee, London,

<http://www.parliament.uk/commons/selcom/etrahome.htm>

\_\_\_\_ (2001c) *Walking in towns and cities, 11<sup>th</sup> Report,  
Volume III Minutes of evidence and appendices*  
Environment, Transport and Regional Affairs  
Committee, London,

<http://www.parliament.uk/commons/selcom/etrahome.htm>

Local Transport Today (2001) *Editorial* July 12<sup>th</sup>, 2

Pedestrians Association (2001) *A manifesto for living  
streets* Pedestrians Association, London.

RDRF (2001) *Safe Roads for All: A Guide to Road  
Danger Reduction* sponsored by the Institute of  
Highway Incorporated Engineers, Road Danger  
Reduction Forum, York.

Urban Design Alliance (2000) *Designing Streets for  
People Inquiry: consultation report* Urban Design  
Alliance, London.

# A traveller in time: Understanding deterrents to walking to work

Rachel Goodman

Address for correspondence

Rachel Goodman

Department of Environment and Transport, City of Stoke-on-Trent, U.K.

<[rachel.goodman@civic2.stoke.gov.uk](mailto:rachel.goodman@civic2.stoke.gov.uk)>

---

## Abstract

This paper derives from doctoral research funded by the Centre for Alternative and Sustainable Transport (CAST) and Staffordshire University. It reports on the qualitative aspect of research into attitudes towards walking to work of a group of public sector employees within Staffordshire. The key geographical concept of space/time is central to decisions about walking to work and this is particularly true for those who currently travel to work by car. In the past, the specific literature on deterrents to walking has treated time in a narrow and mechanistic fashion, which assumes an unquestioned commodified view of time of equal measure to all. This paper contributes to understanding walking as a potential mode of commuter transport through identifying a range of complex and interrelated temporal constraints that influence people's attitudes to, and decisions about, walking to work.

## Keywords

Commuting, time, travel behaviour, walking.

## Introduction: time as a deterrent to walking

Walking as a mode of commuter transport is declining rapidly in the UK. Finding ways to reduce car travel and increase the use of sustainable modes for the journey to work is a key transport policy objective. Encouraging walking for the journey to work is a realistic aim and journeys of up to two miles have been suggested as feasible for walking (Sissons Joshi & Senior, 1998). This distance is a function of the time taken to walk, as time is seen as a cost in terms of travel time, with the reasonable assumption that travellers prefer to reduce it as much as possible (Pas & Harvey, 1997). However, time in relation to walking can be conceptualised much more broadly than this. An exploration of different constructions of time under which decisions about walking are made, contributes to understanding deterrents to walking by uncovering a level of complexity and inter-relatedness in travel behaviour decisions that is not normally considered in the specific literature on deterrents to walking.

Hillman (1990) asserts that one of the primary deterrents to walking is change in the availability of

destinations within reasonable walking distance and hence, travel time. He points to the growing trend towards rationalisation of public and commercial facilities, a lowering of housing densities and a tendency towards peripheral location of facilities. The consequences of this are dispersed patterns of activity and lengthening journeys often beyond reasonable walking distance and acceptable travel times. In contrast, in cities with high urban densities, levels of car ownership are lower and levels of public transport use, cycling and walking as ways of travelling to work are much higher (Newman & Kenworthy, 1989).

The time and effort taken to walk are significant factors in people's travel time budgets. Distance is probably the most important factor in decisions about walking to work (DETR, 1998a) and saving time and it being too far to walk influence why people choose to drive (Mackett, 1999). Increases in journey time are a key deterrent to walking on the journey to work and hence walking is not perceived as a relevant alternative to driving (WALCYING, 1998). Living closer to the work place, and hence reducing travel time, was cited as the most important factor that might encourage drivers to walk to work (Sissons Joshi & Senior, 1998). Research suggests that walking is an important mode of transport but there is no consensus on the distance or time over which people consider it acceptable to walk.

The emphasis on time in the specific literature on deterrents to walking is on travel time as the main conceptualisation of time in people's decisions about walking. Time tends to be treated as a one-dimensional, uncomplicated, mechanistic and measurable concept. However, the concept of time is potentially much more complicated than this, particularly when operationalised by individuals. Time impinges on people's lives in ways that provoke multiple constructions of time.

## Sophisticating concepts of time

Broader conceptualisations of time are used to explore time by other authors. Each concept of time is related to other conceptualisations. They do not exist in an environmental vacuum separate to other spheres

of people's lives (Nowotny, 1994). Defining them as separate entities is for organisational purposes only as

'there is no single time, only a multitude of times which interpenetrate and permeate our daily lives' (Adam, 1995, p.12).

Of the seven constructs of time in see Table 1, four suggested themselves as particularly useful in understanding deterrents to walking and travel to work behaviour: work time, necessary time, lifecycle time and travel time.

### Exploring multiple constructions of time

As part of the research, thirty interviews were conducted with employees in the public sector. The interviews enabled in-depth conceptualisations of time and the implications for walking to work to be drawn out. They specifically allowed time to be de-constructed to demonstrate the multitudes of times that worked simultaneously in influencing whether people considered walking to work. A discussion of the results relating to these times now follows.

#### Work time

The discussion of work time considered the commodified Western Capitalist notion of time that revolves around the clock and the daily schedule of paid time at work (Adam, 1995). The driving force behind attitudes to walking for work purposes was a fixation with a commonly held work ethic centred around a commodified concept of time that values time as a commodity *per se* and not necessarily what time enables. Time becomes a valuable resource not to be wasted (Helman, 1992). As one interviewee noted:

Josh: 'I don't know why time is so important, but it does drive us. We try and keep on top of the job, but there are never enough hours in the day! You try and make this so-called timesaving by driving! Whether or not you actually achieve anything, I don't know, but in your mind you do.'

The nature of employees' work time had a significant influence on attitudes to walking and whether walking was a viable option for travel during the course of work. Employers want tangible work from their employees not travel, reinforcing the idea that travel-time is wasted time. Employees are socialised into this mutual understanding of acceptable conceptualisations of time (Starkey, 1988). Clear and pervasive cultural pressures were exerted from within organisations resulting in employees feeling coerced into travelling by the most time-efficient mode, which usually meant travelling by car.

Tommy: 'It is fairly clear that if using the bike or walking was meaning that you were spending an extra hour or so out of the office as opposed to being in the car, I don't think that would be encouraged by the management.'

While those who had walked for work purposes valued the time spent walking as this enabled them to do their job more effectively, the predominant persuasion was against walking for work purposes.

The effect of working hours on attitudes to walking was significant for women in particular. As more women than men worked shifts considered outside normal working hours *and* reported feeling afraid of crime, attitudes towards walking to work were disproportionately negative for women. Travelling to and from work before 0800 or after 1800 increased the likelihood of travelling in darkness and/or isolation. Female participants avoided walking due to their fear of crime. Public transport services are less frequent outside the main commuting periods and bus stops and train stations can be isolated and threatening places to those feeling vulnerable to crime. Thus, the predominant effect of women working outside normal hours for attitudes to walking was negative.

Brenda: 'Nothing would encourage me to walk to work because my shift pattern often starts and ends in darkness and I consider it too dangerous to be walking alone.'

The flexitime system also had a negative impact on walking by locking some employees into patterns of unsustainable travel. For example, public transport and walking were generally perceived as taking longer than driving, and car travel was thus reinforced as the

**Table 1. What time is it? Concepts of time.**

- 1 Clock-time: the dominant approach of Western industrialised nations to time as a quantitative measure by the clock on the basis of a diurnal cycle (Adam, 1993).
- 2 Calendar-time: the longer-term basis for quantitative measurement of time based on seasons in an annual cycle (Bellaby, 1992).
- 3 Work-time: essentially linked to clock-time and the commodification of time. The daily schedule of paid time at work (Adam, 1995).
- 4 Leisure-time: inextricably linked to the concept of work-time, as outside of the economic framework leisure-time remains a meaningless concept (Adam, 1993). Leisure-time is that time outside paid work-time that is not orientated towards domestic tasks.
- 5 Necessary-time: a cyclical view of time, focused on events with a short time-scale, such as the diurnal cycle of routine domestic tasks (Allatt, 1992).
- 6 Lifecycle-time: a more linear view of time, which is marked by the progression of certain long-term events that occur along the route such as leaving school, getting a job, moving home, getting married and starting a family (Allatt, 1992).
- 7 Travel-time: the time it takes to travel between two locations, such as home and work (Pas and Harvey, 1997).

most time-efficient way to accrue the maximum benefits of flexitime.

Josh: 'We work flexi here, so the sooner I get to work, the sooner I start clocking up credit. To come to work on the bus I would have to catch two buses. I'm not sure how long it would take but, I would guess it would be around three-quarters of an hour, whereas coming by car it's ten minutes! So, there's no incentive for me to use the bus, I don't think I would ever do it!'

It is clear from the discussion of issues surrounding work time that many of them had negative consequences for attitudes to walking to work. Conceptualisations of time other than work time also influence attitudes to walking to work and these are discussed below to illustrate time's multiple, complex and simultaneous nature.

### **Necessary time**

The discussion of necessary time considered events on a diurnal time scale, which revolved around the routines involved with childcare and family commitments and the effect of these on attitudes to walking to work. Gender was a key variable in this discussion. More women would be encouraged to walk were it not for dropping off or picking up children on their way to and from work as it was the mothers who were primarily responsible for their children's travel.

Incorporation of a dependent's travel was an important explanatory factor for the high levels of car use on the journey to work. This was often despite mothers' dislike of travelling by car and recognition of the potentially harmful effects of doing so on their children. The mothers generally valued the quality time with their children that walking enabled and their children often enjoyed walking. However, the time pressures they perceived as working mothers tended to override any feelings of guilt about the detrimental physical, social and psychological effects of travelling by car on their children. In this way, the mothers were caught in a 'social trap' where the promise of short-term personal gain, in terms of getting through the daily necessary time tasks, outweighed any future and possibly unpredictable penalties. Consequently, walking was rarely considered a viable alternative by working mothers.

Shelia: 'I do genuinely wish there were more opportunity to walk. I'm quite uncomfortable about taking my daughter to school in the car. I read this article recently saying that children see the world through a car window all the time and are detached from it. I'm sure there is some truth in that as they jump in the car for almost every journey; it's so different from when I was young.'

The extension of mothers into paid employment

outside the home has not led to an equal distribution of domestic necessary time tasks. Instead, in line with other research, women extended their roles to incorporate work and responsibility for childcare rather than achieving gender role equality (Hamilton & Jenkins, 1992). The car was seen as facilitating the multiple and complex roles women assumed to incorporate motherhood and work, and walking to work was generally seen as a hindrance to achieving these goals.

### **Lifecycle time**

Lifecycle time is a more linear concept of time than necessary time marked by the progression of certain long-term lifecycle events. These included changes in job, marital status, house location and the family structure. The general trend evidenced in a progression through these events was towards individualistic and motorised modes of transport.

Lifecycle events influenced participants' attitudes to walking, the relative priority that they could give to walking on a journey to work and how walking was constructed. Interviewees perceived that they had different amounts of time available to them at different stages in their lifecycle. Walking was perceived as a viable mode of utilitarian travel in interviewees' student days, for example, when they had relatively few lifecycle-related time commitments. However, with the addition of partners, children, home and a job, walking was constructed as a discretionary leisure activity rather than as a utilitarian mode of transport suitable for the journey to work.

Bert: 'I know in my dim and distant past when I was a student, I used to walk a good two miles, to and from college each day... I think as you get older, your priorities change and your leisure time is reduced.'

Being able to work flexible hours and having greater access to a car should theoretically enable people to feel less time pressured. However, this was not the case for driving interviewees. The purchase of a car tended to be a one-way lifecycle event with important space/time implications for travel. Once a car was purchased, life began to revolve around it and was duly altered. Spatial decisions were made as part of lifecycle time events such as where to live, where to work and where to send children to school that accommodated the increased spatial range the car enabled. It is perhaps not surprising that the majority of participants felt trapped into lifestyles that ruled out the possibility of walking to work.

Josh: 'Cars are much more readily accessible, they are no longer a luxury, they are a way of life these days. As soon as you get the car it all changes, your lifestyle revolves around where

you go, who you're going to see and all these sort of things. You make your life around the car, it's a part of family life.'

### **Travel time**

Work time, necessary time and lifecycle time pressures effectively focused attention on travel time as a cost and minimisation of that cost influenced mode choice and attitudes to walking. Travel time represented a paradox, as it was the least valued yet simultaneously most valuable aspect of time. As a derived demand, travel arose as a consequence of participation in a range of activities. The transit between these activities was not generally viewed as valuable because it was the activity at the end of travel that was the desired goal not the travel itself. This made travel time very valuable as the time involved in travelling could have been used in other ways.

Helen: 'I'm sitting in the car thinking 'come on I've got to get home, I've got loads to do.' Rather than taking a fifteen-minute drive home to calm down, gather myself and think about the things that I am going to do, it is rush, rush, rush constantly.'

Travel time concerns were linked to perceptions of convenience, independence and spontaneity of travel, which signified a sense of 'independent autonomy' (Stradling *et al.*, 1999) and this was a significant explanatory factor for car use. Convenience in terms of comfort, ease, suitability, availability and accessibility described travel by car for all interviewees regardless of chosen mode. The car as a convenient mode overrode any negative feelings associated with car travel. Feeling independent of others and restrictive public transport timetables that lengthened travel time was an important incentive for car use. Without such obligations or restrictions, car drivers felt they could travel more spontaneously and the combination of independence and spontaneity engendered feelings of freedom.

Marjorie: 'I think it's a lot to do with independence actually! If you've got your car at work you think 'I'll go and visit a friend after'. If you want to go somewhere you're not restricted. You've not got to consider what time the next train is, what time the next bus is, or anything like that.'

Walkers perceived walking as the most effective method to minimise travel time. For those currently walking, convenience, independence and spontaneity of travel were determining factors in decisions to walk. Drivers also perceived walking positively if the travel time on foot was equivalent or quicker than driving. Walking was then considered viable provided there were no other significant deterrents.

Sid: 'You are almost in your own little world when walking. It is similar to being in a car really, you are not sharing your space with anybody else and you can come and go when you like. You've got a lot of the same benefits as you have as a car driver.'

### **Implications for policy**

Thinking on walking has changed radically over the past decade. Recent policy statements on walking suggest a new commitment to improving conditions for pedestrians, although this is set against a history of neglect within planning and transport policy, and skepticism about the future. There is now recognition of the potential of walking as a mode of transport in its own right, as a vital part of other transport modes, and as a contributor to easing traffic congestion and pollution – particularly for short journeys that increasingly are being made by car (DETR, 2000). The New Deal for Walking is that it is to be made more attractive, safer and, therefore, a more viable alternative mode of transport (DETR, 1998b).

Distance and time considerations are paramount for those currently using the car to travel to work. An emphasis on reducing distance between locations, and thus the time needed to travel between them, is an important consideration for policy. There is a need for integration of land use and transport policy through the implementation of recommendations in Planning Policy Guidance (PPG) note 13 (DETR, 2001). This emphasises the importance of walking at the local level and its potential to replace car journeys for short trips, particularly those under two miles. It also acknowledges the importance of walking in all longer journeys as the link mode. A key planning objective is to ensure that the locations of employment, retail, leisure and services are highly accessible by walking, cycling and public transport. By emphasising that development should be focused on locations which facilitate access by all transport modes, people will be able to access more of their everyday needs locally and, therefore, these journeys are more likely to be made on foot.

However, there are a substantial number of research participants who currently live close to their work place and yet still chose to drive even though those workplaces are accessible on foot. In order that planning frameworks may recognise this sort of behavioural complexity (i.e. that travel behaviour is inextricably linked to lifestyle and hence work time, necessary time and lifecycle time constraints), there is a need for planning frameworks to be better integrated with other policies in a complementary manner. One example might be the range of possible initiatives that can be included in workplace Travel Plans. The Government recognises the potential contribution that

Travel Plans can make to traffic reduction and has suggested that travel demand management work-based strategies should be integral to the process of reducing peak-hours travel by car (DETR 1998b).

Through workplace Travel Plans provision can be made for some of the necessary on-site infrastructure to encourage walking, such as lockers, showers, changing rooms and pedestrian-friendly site design. To complement these 'hard measures', employers can encourage walking by providing information on the health benefits of walking, on local safer walking routes and by setting up walking clubs in the style of bicycle user groups (BUGs). A range of incentives can also be provided such as free umbrellas, prizes for those who walk, arranging emergency rides home for those who walk and active encouragement to walk for local business purposes. Senior management in leading by example can also help to raise the cultural status of walking in the workplace. This status shift, in combination with infrastructure measures will have the greatest success in encouraging walking in the workplace.

For the decline in walking to work to be arrested, there is a clear need for integration of policies. This integration needs to take place on a structural and socio-cultural level, so that walking routes are both provided *and* perceived as coherent, direct, attractive, safe and comfortable and that walking is perceived as an acceptable *and* credible utilitarian activity. These descriptors will also need to apply to the integration between walking and public transport interchanges. Without such an integrated understanding of the complexities of travel behaviour, policies that attempt to encourage people out of their cars and onto their feet will have a limited effect.

### Conclusions

Clearly, travel time is an important determinant of mode choice. However, limiting the analysis to a consideration of travel time over-simplifies and decontextualises the reality of the travel to work experience. Travel time represents the culmination of time constraints operating within people's lives, but it would not be as prominent without the effects of work time, necessary time and lifecycle time pressures. It is a combination of these times that influence people's attitudes to walking and this combination can be 'multiple, composite, simultaneous, open-ended and changing' and thus not reducible to a single mechanistic concept of time (Adam, 1995, p.5).

### References

Adam, B. (1993) 'Within and beyond the time economy of employment relations: conceptual issues pertinent to research on time and work' *Social Science Information*, 32, 2, 163-184.  
 \_\_\_\_\_ (1995) *Timewatch*, Polity Press, Cambridge.

Allatt, P. (1992) 'The disease of social change: time and labour markets in the lives of young adults and their families' Frankenburg, R. (ed.) *Time, health and medicine*, Sage Publications, London, 139-152.  
 Bellaby, P. (1992) 'Broken rhythms and unmet deadlines: workers' and managers' time-perspectives' Frankenburg, R. (ed.) *Time, health and medicine*, Sage Publications, London, 108-122.  
 DETR (1998a) *Transport statistics report: walking in Great Britain* TSO, London.  
 \_\_\_\_\_ (1998b) *Integrated transport White Paper: A new deal for transport, better for everyone* TSO, London.  
 \_\_\_\_\_ (2000) *Encouraging walking: advice to local authorities* Department of the Environment, Transport and the Regions, London.  
 \_\_\_\_\_ (2001) *Planning Policy Guidance Note 13: Transport* DETR Free Publications, Wetherby.  
 Hamilton, K. & Jenkins, L. (1992) 'Women and transport' in Roberts, J., Cleary, J., Hamilton, K. & Hanna, J. (eds.) *Travel sickness, the need for a sustainable transport policy for Britain* Lawrence & Wishart, London.  
 Helman, C. (1992) 'Heart disease and the cultural construction of time' in Frankenburg, R. (ed.) *Time, health and medicine*, Sage Publications, London, 31-55.  
 Hillman, M. (1990) 'The role of walking and cycling in transport policy' Discussion Paper 8, Rees Jeffreys Road Fund, London.  
 Mackett, R.L. (1999) 'Reducing the number of short trips by car' *Proceedings European Transport Conference*, Cambridge, 87-98.  
 Newman, P.W.G. & Kenworthy, J.R. (1989) *Cities and automobile dependence: an international sourcebook* Gower, Aldershot.  
 Nowotny, H. (1994) *Time, the modern and postmodern experience* Polity Press, Cambridge.  
 Pas, E.I. & Harvey, A.S. (1997) 'Time use research and travel demand analysis and modelling' in Stopher, P. & Lee-Gosselin, M.E.H. (eds.) *Understanding travel behaviour in an era of change*, Kidlington, Pergamon 315-338.  
 Sissons Joshi, M. & Senior, V. (1998) 'Journey to work: the potential for modal shift?' *Health Education Journal*, 57, 212-223.  
 Starkey, K. (1988) 'Time and work organisation: a theoretical and empirical analysis' Frankenburg, R. (ed.) *Time, health and medicine*, Sage Publications, London, 95-117.  
 Stradling, S.G., Meadows, M.L. & Beatty, S. (1999) *Factors affecting car use choices*, Transport Research Institute, Napier University, Edinburgh.  
 WALCYING (1998) *How to enhance walking and cycling instead of shorter car trips and to make these modes safer* Project funded by the European Commission under the Transport RTD Programme of the Fourth Framework.

# Deconstructing the future: assessing new initiatives in transport, including demand management & walking

Ian Ker

Address for correspondence

Ian Ker

Principal Planner/Economist, ARRB Transport Research Ltd., PO Box 512, Leederville, WA 6903, Australia.

<[iank@arrb.com.au](mailto:iank@arrb.com.au)>

---

## Abstract

Transport strategies have changed direction very substantially in the past decade or so, but the methodology of evaluation has not kept up, often because the linkages between new initiatives and outcomes are not clearly-enough defined or well-enough quantified. In addition, evaluation methodologies, in practice (if not always in theory), often assume that 'more is better' and have difficulty coping with change that includes changes in what we do (activity patterns) as well as how we get there (travel). Our tools favour the status quo and, consequently, new initiatives often have great difficulty in getting funding. The renewed emphasis on walking is a case in point, not only in respect to conventional evaluation issues, but also because of the importance of 'new' issues such as health and fitness, energy economics, greenhouse gas emissions and new dimensions of road trauma.

The paper discusses issues that conventional transport planners are either not aware of or wish would go away, outlines a framework for incorporating these into assessment and evaluation, and presents an application of this framework to the marketing of a pedestrian strategy for Perth.

## Keywords

Assessment, demand management, evaluation, externalities, pedestrian strategy, performance measurement, pilot projects, walking.

## Introduction

Transport strategies have changed direction very substantially in the past decade or so, but the methodology of evaluation has not kept up, often because the linkages between new initiatives and outcomes are not clearly-enough defined or well-enough quantified. In addition, evaluation methodologies often implicitly assume that 'more is better' and have difficulty coping with changes in what we do (activity patterns) as well as how we get there (travel). Consequently, new initiatives often have great difficulty getting funding. The renewed emphasis on walking is a case in point, in respect of conventional evaluation issues, and the importance of 'new' issues such as health and fitness, energy

economics, greenhouse gas emissions and new dimensions of road trauma.

Demonstrating and evaluating the effectiveness of transport programmes depends critically upon being able to determine whether the outcome changed significantly, and whether the programme or something else caused the change (Higgins & Johnson, 1999). Both of these issues are problematic in the context of Travel Demand Management and pedestrian strategies.

In the absence of the unknown, the future is predetermined. Without a concept of different (and unknown) ways of doing things, there will be no change except that thrust upon us from elsewhere, which forces us to be reactive rather than promoting the ability to choose our own future. The very fact that we choose to change direction demonstrates a high level of concern about the known future and a desire to create an alternative future, which inevitably contains elements of the unknown – in terms of the destination or the journey.

It is rare for changes in the direction of transport policy and strategy to be matched by changes in methods for developing and assessing transport initiatives, whether they be infrastructure investments or more 'radical' options such as demand management. In the few instances where funding paradigms *have* been changed to reflect the new directions (e.g. TEA-21 in the USA), practice is largely driven by formula rather than by project or programme assessment.

Models may be 'adapted' to new questions, but rarely satisfactorily. More commonly, existing models and methods are applied to new problems (i.e. to answer questions they were not designed for). Even the *New approach to appraisal* (DETR, 1998), whilst requiring identification of a range of options to address an identified problem, relies on traditional models for estimating impacts of those options. Most such models do not address cycling and walking, many are limited in respect of public transport – and few, if any, allow assessment of potential changes to *how* people make decisions about transport use.

The basis of the standard methodology is projection

of future land use from which, in turn, the projected volumes, types and directions of transport movements are derived. Over 30 years ago, Troy (1967) argued that the estimates of future land use were predicated on the very transport developments that they were designed to serve. 'One effect of the transport plans, if implemented, would be that they would virtually ensure the development of the trend town plans on which they were based', he noted.

### **Understanding the unknown: pilot projects**

Demand management is a relatively new concept in transport, although not in some areas of commercial activity. Until very recently, demand management in transport was seen almost entirely in supply-side terms – high occupancy vehicle lanes, congestion pricing, van pools and the like. More recently, initiatives have successfully changed people's travel behaviour through 'soft' measures using information, opportunity and incentive aimed at individuals and households, such as TravelSmart (Perth, Australia) and Travel Blending (Adelaide, Australia).

There are significant differences between TravelSmart and Travel Blending, but both have demonstrated their effectiveness through conventional models. Both TravelSmart and Travel Blending proceeded through pilot projects (James, 1998; Ampt & Rooney, 1998) to establish the level of impact that could be achieved. These pilot projects were then evaluated (Ker & James, 1999; Tisato & Robinson, 1999) using conventional benefit–cost frameworks. In both cases, using highly conservative approaches and assumptions, very high returns were demonstrated – between 13:1 and 17:1 for TravelSmart and around 6:1 for Travel Blending.

The effectiveness of learning declines over time unless the message is continually reinforced. With individualised marketing to change travel behaviour, the experience of changed travel behaviour, itself, was thought to be an effective reinforcing mechanism, provided the quality of the experience does not deteriorate. This has since been reinforced by follow-up surveys, but at the time of the pilot project evaluation was supported only by limited evidence. One consequence is that the benefit–cost ratio is now estimated to be >30:1. Travel Blending, in Adelaide, adopted the alternative approach of developing maintenance activity and cost scenarios to ensure that there was no decay in the benefit stream over time.

The South Perth pilot project of TravelSmart was constructed according to a rigorous experimental design, to ensure that the true effectiveness of the intervention were being measured, uninfluenced by extraneous factors. It was not publicised and all changes in travel behaviour amongst the 'experimental group' were checked both before and after against the behaviour of

a 'control group' that had no information about the project.

Preliminary results from the broadscale application of individualised marketing to the City of South Perth, with no such restrictions on information, indicate that the shift from car to public transport (one of four key behaviour changes in TravelSmart – the others being shift to cycling and walking, and travel to local rather than regional destinations for some trips) could be as much as twice that in the pilot.

Because pilot projects are small in scale, relative to the total system, it is tempting to assert that the impacts on the overall users of the network are small and can be ignored. However, where costs are non-linear and increasing functions of activity (as with congestion), the unit benefit from a small change is greater than that from a larger change, as Tisato and Robinson recognise in their prospective evaluation for Adelaide, where 'as road traffic volume approaches capacity... network benefits begin to swamp other benefit components' (p. 700).

It is important to be comprehensive in pilot project evaluation to ensure that the results properly reflect the true impacts. Even where scale and network effects might not be obvious, a comprehensive evaluation of the pilot is necessary to minimise the risk of important factors being excluded in putting the case for larger-scale programmes.

### **Understanding the unknown: prospective evaluation**

Circumstances are not uniform across a city and pilot projects in particular areas are not necessarily representative of what would happen in other areas. Nor do we have models that enable us to translate the impacts to different circumstances. Using results of pilot projects for evaluating proposals for larger-scale implementation will underestimate the benefits of the larger project, for reasons of information, feedback, scale and network effects. It might also overestimate the costs where set-up and development costs can be amortised over a greater number of participants. There might also be factors that will make a programme more or less effective in other areas. These factors can be critical in determining whether a pilot project gets translated into a broadscale application.

In the case of the South Perth TravelSmart, extension from the pilot to the full project was straightforward, since the pilot had been undertaken through a random sample of the whole population of South Perth. Extending beyond South Perth to the full 10-year proposed programme (covering over 40% of the total Perth metropolitan population – Transport WA, 1999) was more difficult, for a number of reasons, including differences in:

- the physical pattern and density of activities and associated transport systems that make

alternatives to the car less (or more) suitable;

- the extent to which additional capacity (mainly public transport) is required to accommodate the additional non-car trips in a way that provides a self-reinforcing experience to new users *and* maintains the level of service for existing users;
- the extent to which new public transport trips will be bus or rail (or, in some cases, ferry), which have very different cost structures and, hence, financial impacts.

In most cases, the direction can be identified but the absolute magnitude cannot. However, it is possible to identify the key elements that contribute to the success of the pilot (socio-demographic, land use, transport systems, densities in the case of TravelSmart) and rate prospective locations according to these criteria. Inevitably, the range of values will have a high degree of professional judgement ('Is A 50% or 75% of B?'), but the order is likely to be robust ('A is less conducive than B which is less conducive than C'). If necessary, the judgemental component can be reduced by the application of sensitivity analysis. This has been used, successfully, to persuade the Western Australia Government to fund a substantial part of the 10-Year TravelSmart program.

The Perth Metropolitan Transport Strategy (Transport WA, 1995) sets out objectives and targets for greater sustainability of transport in the Metropolitan Region for the period to 2029. One is to reverse the decline in walking for transport, so that the proportion of trips wholly on foot increases from 10% (1991) to 12.5% (2029). Continuation of recent trends would see walking reduce to 5.8% of trips by 2029.

A pedestrian strategy has been developed (Transport WA, 2000), to guide the implementation of the Metropolitan Transport Strategy and achieve its objectives in respect of walking. In the absence of specific costs for implementing the walking strategy and of information on the effectiveness of measures that will form part of the strategy, it is not possible to carry out a comprehensive evaluation of the proposed pedestrian strategy. However, a benefit assessment can provide guidance on how much expenditure is justified to achieve a given level of impact. This narrows the area of uncertainty to how effective expenditure on a given strategy is likely to be.

### Hypothetical evaluation of the Perth Pedestrian Strategy

The benefit assessment follows the framework established for the evaluation of the individualised marketing trial in South Perth (Ker & James, 2000), although not all elements are applicable here. In all cases, the direction of the omitted impacts will be beneficial and the assessment is, therefore, conservative. The values attached to those assessed impacts are the same as for the 'central' evaluation of the individualised marketing trial in South Perth. For discussion of key aspects of the derivation and application of these values, see Ker and James (2000), Section 4.

The direct financial benefits to the user (i.e. the person who previously drove a car) are equivalent to 17.2 cents per kilometre (Table 1). These are based simply on the savings in variable running costs for a car. Some households might then be able to do without a second car, in which case there would be additional

**Table 1. Benefits of walking: per 1000 kilometres transferred from car to walk**

Item	Per 1000 km AUS\$	Present Value @ 7% discount (per 1000 km p.a.)	
		10 Years AUS\$	30 Years AUS\$
<i>Financial Benefit to Individual</i>			
Private Vehicle Operating Costs	172		
<i>Socio-economic Benefits</i>			
Private vehicle operating costs (net of tax)	113	819	1446
Improved health and fitness due to exercise – reduced mortality	84	607	1071
Road trauma (increased walking)	(95)	(687)	(1212)
Road trauma (reduced car use)	34	246	435
Air pollution costs to community	20	145	256
Greenhouse gas emissions	20	145	256
Traffic noise	3	22	38
Water Pollution	2	11	19
Total Socio-economic Benefits	180		
Net Present Value (NPV)		1308	2309

Notes: All values are in Australian dollars. Totals may not agree due to rounding.

Figures in brackets indicate disbenefits or increased costs.

fixed cost savings (vehicle registration, depreciation, interest on capital). However, other changes in travel behaviour would then be likely and a simple benefit-evaluation of limited use. The socio-economic benefits are of a similar scale, 18.0 cents per kilometre (Table 1).

Within this overall value, there is only one negative and that is the increase in pedestrian road trauma. It is important to note, however, that:

- the net mortality/injury impact on individuals who change from car to walking is small, after taking into account the health and fitness benefits. (Note also that the estimated health and fitness benefits relate only to mortality, not to other improvements in well-being as a result of exercise through walking.)
- the net mortality/injury impact for society is a benefit, taking into account health and fitness benefits and the reduction of road trauma through reduced car traffic.

The benefit assessment is based on a straight transfer of travel from car as driver to walking. Other outcomes of effectively encouraging walking include:

- increased use of public transport, as people become more willing to walk to bus stops, train stations or ferry terminals;
- change of trip length, where people substitute walking to local facilities for driving to distant ones; and
- change in number of trips, if people substitute more frequent shorter trips to buy smaller amounts of groceries each time.

These additional effects can be brought into a full evaluation, but would be unlikely significantly to change the overall conclusions.

The MTS targets require an increase in 2029 of 449,000 walk trips per day compared to the trend value. Assuming that:

- the increase is achieved progressively over the period from 2000 to 2029;
- walk trips are transferred from car driver and car passenger in proportion to the current levels of use

(i.e. 5 car driver trips for every one car passenger trip);

- walk trip lengths remain unchanged at 0.75 km per trip; and
- the present value of the benefits of achieving the MTS targets is around AUS\$57 million.

If there is a requirement for public expenditure programmes to provide a benefit–cost return of 4:1, this justifies expenditure of nearly AUS\$2 million a year for the next 10 years – over and above the current expenditure on pedestrian-related programmes such as footpaths. Some part of the achievement of the walk trip target will result from other initiatives (such as TravelSmart), but it is clear that investment of AUS\$1 – million – AUS\$2 million per year in the walk strategy itself is warranted if it can achieve the desired mode share. Since the Perth Walking strategy does not include major infrastructure elements, this level of expenditure is significant.

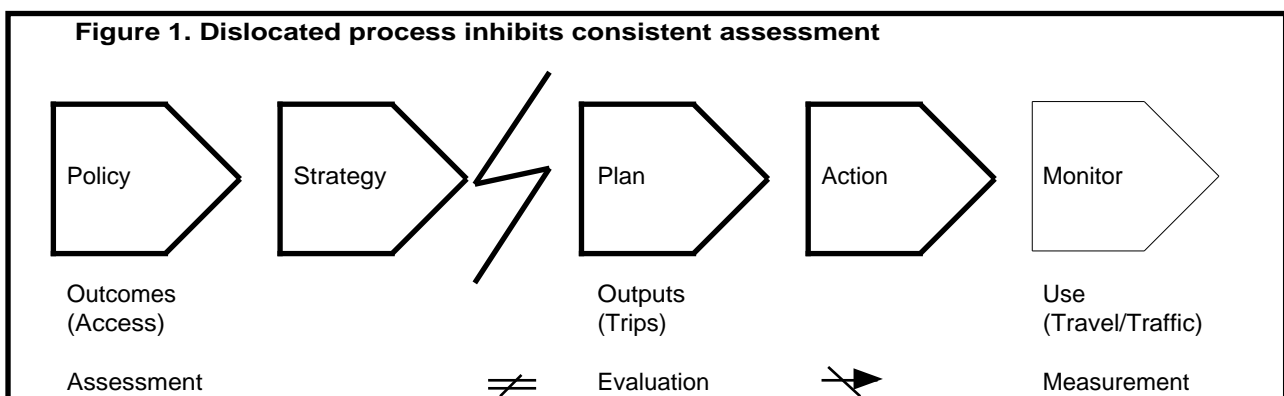
### Some methodological issues

#### *Abolishing the concept of externalities*

An externality may be defined as an unintended consequence impacting on others rather than the decision-maker. The very name ‘externality’ implies that it is peripheral to the decision being taken, but these are very real consequences for society as a whole. The treatment of externalities, in turn, places boundaries around evaluations. In the private sector, except where bound by regulation, the focus is on direct financial consequences – everything else is an externality. In the public sector, the boundaries are broader (hence we carry out socio-economic, as well as financial, evaluations), but we still tend to ignore impacts that spill over State or national boundaries. If we all do this at the project level, irrespective of high level principles that might be adopted, then impacts that transgress institutional boundaries will never be effectively addressed.

#### *Numerator or denominator*

The evaluation of Travel Demand Management (and, by extension, walking initiatives) throws into clear focus the issue, sometimes regarded as of



theoretical interest rather than practical importance, of what is counted in the numerator (as positive or negative benefits) and what in the denominator (as costs) in calculating the benefit–cost ratio. The common convention is for capital costs to be included in the denominator, with all other impacts, including changes to operating costs and so-called ‘externalities’, in the numerator. It has been argued, on theoretical grounds, that the denominator should include all those items that are in limited supply and therefore are ‘capital’ by nature. For example, does it really matter whether public funds are ‘capital’ or ‘operating’ in calculating the return on public finance from a project? (Transfund, 1999). However, the argument has less often been extended to externalities yet many ‘externalities’ represent finite resources in the short to medium term (e.g. air quality) and impacts might not be reversible (e.g. death from traffic crashes).

The issue is of no importance for calculating Net Present Value. Nor is it of obvious importance for benefit–cost ratios when the comparison is between similar projects or projects that have a similar range and level of impacts – for example, different ways of increasing road capacity to meet demand. It is, however, critical when the comparison is between alternative ways of addressing a problem with widely-different, or even opposite, impacts on externalities.

#### *Caveats: ranges, thresholds, discontinuities and non-linearities*

It is important to recognise that, whatever approach to evaluation is adopted, there will be exceptions to the ‘linear extrapolation’ hypothesis. Indeed, we should take this as a ‘given’, since it is the linear extrapolation of current models and evaluation paradigms that force us to adopt innovative approaches in the first place. These will also be limited, but should be less so than current ones. One of the most common errors in evaluation is failure to recognise when models are being extrapolated beyond valid bounds. Models are based on sample data from a particular range of circumstances; within this range, error bounds on estimates of future values are manageable. Beyond that range, error bounds widen and estimates become less reliable – yet it is rare for this to be acknowledged at either the modelling or the evaluation stage. The numbers take on a life of their own.

This error is even greater when there are qualitative as well as quantitative changes to the travel experience or where the changes are so great that they significantly alter user expectations and the basis for user choices. For example, going from a run-down, very basic diesel suburban rail system to a modern electrified system (as happened in Perth in the

late 1980s/early 1990s) involves many changes other than the most obvious (to planners) one of changes in travel time. From the potential user’s perspective, it might matter much more whether you get a seat in a smooth, fast train than in an slower, rough-riding one – because you can do something while seated. Similarly, shorter travel times and higher train frequencies will change expectations, so fluctuations in performance become more critical.

In walking terms, changing the nature of the pedestrian space from a largely movement-orientated one to one that genuinely facilitates and encourages exchanges between people (e.g. by providing places for people to gather and to sit) will affect the whole basis of the walking activity and, hence, people’s willingness to walk (Gehl, 1994).

#### *A final note: dislocated processes*

It is difficult for transport professionals to acknowledge that unforeseeable impacts might be significant. It is even more difficult to acknowledge that impacts might be intrinsically unmeasurable – so we measure what can be easily measured (activity) rather than what is important (outcomes) (Ker, 2001).

This is usually reflected in a dislocation in process (Figure 1), characterised by:

- *assessment* of policy and strategy with regard to what the community wishes to achieve through transport – often expressed as access or ‘accessibility’ (the ease of obtaining goods or the benefits of an activity (work, recreation, education, shopping, medical services, etc.) (Transport WA, 1995)
- *evaluation* of network and project planning and implementation with regard to system efficiency – usually expressed in terms of trips or ‘mobility’.
- *measurement* of performance, on the relatively rare occasions it happens, in terms of use or ‘traffic’.

When we try to measure performance in transport there is rarely agreement on *what* should be measured, never mind *how* it should be measured.

#### **Conclusion**

*The innovator makes enemies of all those who prospered under the old order and only lukewarm support from those who would prosper under the new.*

Niccolo Machiavelli (quoted in Lyons, *et al.*, 1999)

Change, except where the status quo is threatened by cataclysmic pressures, is almost always more difficult than continuing as we are, bringing uncertainty and the unknown. Most people are, by and large, risk averse. In transport and evaluation, the ‘old order’ is supported by 50 years of intensive research and data collection. This has, in turn, established a particular way of approaching solutions to problems, sometimes known as ‘predict and provide’.

The 'new order' must rely on limited information and often has difficulty competing for policy decisions and, even when this hurdle has been cleared, for funding. By judicious use of small-scale pilot projects, prospective evaluation and 'hypothetical' evaluation, conventional evaluation tools, such as benefit-cost analysis, can demonstrate the real value of alternative approaches to transport issues. On this basis, Travel Demand Management in Perth has shown socio-economic returns much higher than those from infrastructure investment, and the Perth Walking Strategy has demonstrated the justification of investing c. AU\$2 million a year on top of existing programmes. Since the Perth Walking Strategy does not include major infrastructure elements, this level of expenditure represents a substantial programme.

#### Acknowledgement

The work reported in this paper was undertaken while the author was Director, Integrated Policy, Department of Transport, Western Australia

#### References

Ampt, E. & Rooney, A. (1998) 'Reducing the impact of the car: a sustainable approach' *Proceedings 22<sup>nd</sup> Australasian Transport Research Forum*, 805-822.  
DETR (1998) *A new deal for trunk roads in England: Guidance on the new approach to appraisal* Department of the Environment, Transport and the Regions, London.  
Gehl, J. (1994) *Public spaces and public life in Perth* Government of Western Australia and City of Perth, Perth.  
Higgins, T.J. & Johnson, W.L. (1999) 'Evaluating transport programs: neglected principles' *Transportation* 26, 323-336.

James, B. (1998) 'Changing travel behaviour through individualised marketing: application and lessons from south Perth' *Proceedings 22<sup>nd</sup> Australian Transport Research Forum*, 635-647.  
Ker, I.R. (2001) 'Making the links: intentions, outcomes and performance measurement' *Proceedings, Performance measurement for policy advice*, Canberra 29/30 May.  
Ker, I.R. & James, B. (1999) 'Evaluating behaviour change in transport: a case study of individualised marketing' *Proceedings 23<sup>rd</sup> Australian Transport Research Forum*, 703-719.  
\_\_\_\_ (2000) *The benefits of driving less: evaluation of the TravelSmart Pilot Program in South Perth* Report 396, Transport WA, Perth.  
Lyons, G., Chatterjee, K. & Marsden, G., (1999) 'Transport visions: a young professionals' perspective'. <http://www.soton.ac.uk/~trgwww/research/TVNetwork/intro/paper.pdf>  
Tisato, P. & Robinson, T. (1999) 'A cost benefit analysis of travel blending' *Proceedings 23<sup>rd</sup> Australian Transport Research Forum*, 687-702.  
Transfund (1999) *Evaluation procedures for alternatives to roading* Manual PFM5, Transfund, Wellington, New Zealand  
Transport WA (1995) *Metropolitan Transport Strategy* Transport WA, Perth.  
\_\_\_\_ (1999) *TravelSmart 2010: A 10 year plan* Transport WA, Perth.  
\_\_\_\_ (2000) *Perth Walking: The Metropolitan Region Pedestrian Strategy* Transport WA, Perth.  
Troy, P. (1967) 'Transportation studies, anyone?' *Australian Planning Institute Journal*, 5, 1, 13-17.

# Increasing walking trips through TravelSmart® Individualised Marketing

## Bruce James & Werner Brög

Address for correspondence

Bruce James

Manager Balanced Transport, Department for Planning & Infrastructure, Transport WA, PO Box S1400, GPO Perth WA 6001, Australia

<[bjames@transport.wa.gov.au](mailto:bjames@transport.wa.gov.au)>

<http://www.travelsmart.transport.wa.gov.wa>

Werner Brög

Socialdata Australia, Socialdata GmbH, Hans-Grässel-Weg 1, D-81375 Munchen 70, Germany

<[socialdata@socialdata.de](mailto:socialdata@socialdata.de)>

---

### Abstract

For many years walking as a mode of transport has received very little policy attention from transport planners in the Perth Metropolitan Region of Western Australia. The mode share for walking has declined over the last fifteen years in favour of an increase in car trips. The need to arrest the decline of walking and increase its mode share has been identified as a desirable outcome through a set of transport targets for 2029. The challenge to develop and implement interventions to increase walking without constraining mobility was set by the adoption of these targets.

The development of a predictive technique provided evidence of a behaviour change aligned with the policy direction adopted by the WA Department for Planning and Infrastructure. Testing in the Perth context provided the evidence to justify the large-scale application of Individualised Marketing under the TravelSmart® brand. The results showed that walking captured half of the car trips which converted to walking, cycling and public transport. For the 35,000 people in the City of South Perth, this meant an additional 4800 walk trips per day. This coupled with the 1200 walking legs of public transport trips provided an overall 6000 extra walk trips.

The success of the project has provided the evidence and justification for the expansion of the behaviour change approach to other areas of the Perth Metropolitan Area.

### Keywords

behaviour change potential, Individualised Marketing, TravelSmart®, voluntary travel behaviour change, walking.

### Introduction

The need to change the mode share for travel in the Perth Metropolitan Region is clearly enunciated as a set of targets in the region's Metropolitan Transport Strategy. In many transport strategies there is often little in terms of interventions designed to increase

walking specifically as a mode share. This had been the case when the first pedestrian strategy in Perth was released in 2000 (Transport WA, 2000). The development and implementation of behaviour change techniques that increase walking trips is also new.

This paper outlines the potential of converting car trips to walking trips, the effectiveness of the TravelSmart® Individualised Marketing programme and provides an analysis of the car trips converted to walking trips. The research and results presented in this paper are an integral part of the TravelSmart® behaviour change programmes being undertaken and continuously improved by the WA Department for Planning and Infrastructure.

### Transport policy setting

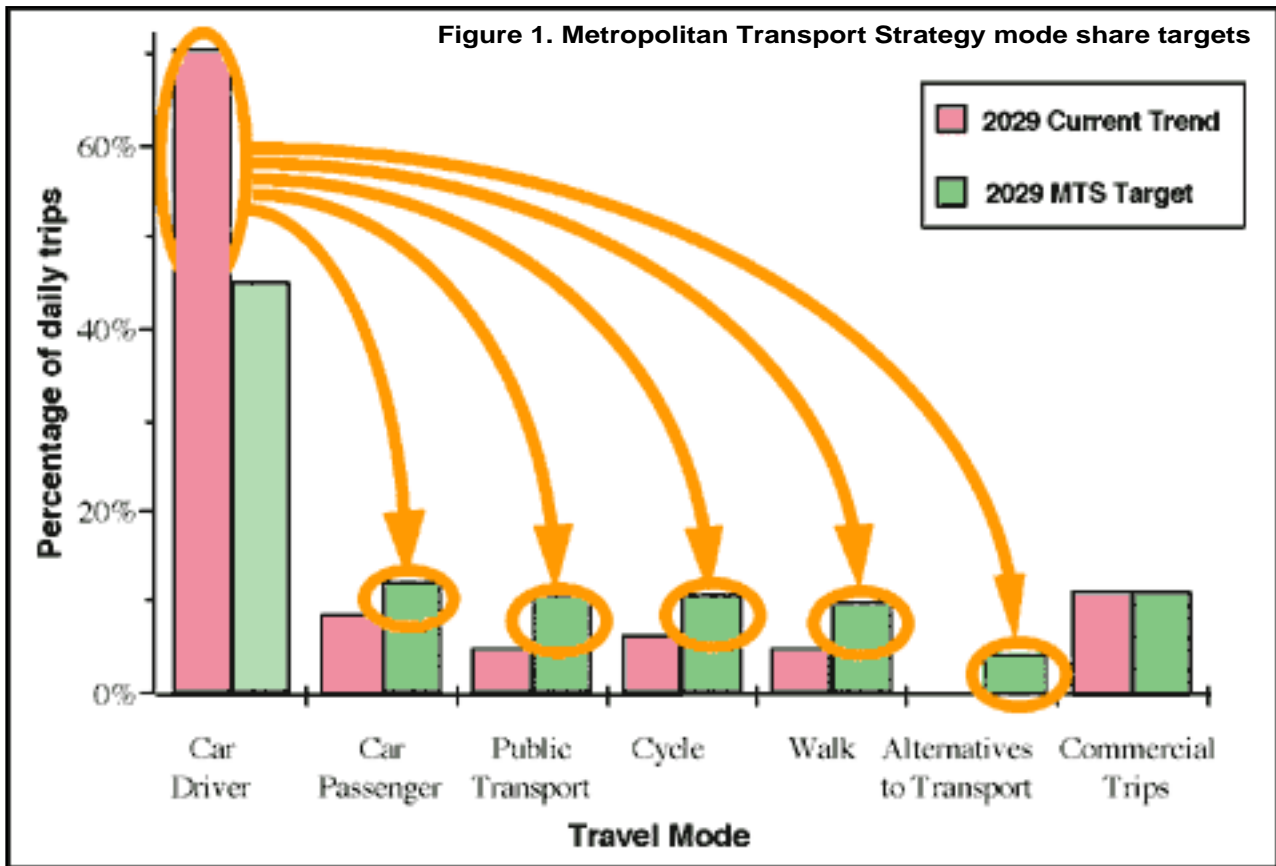
The Metropolitan Transport Strategy provides the overall policy setting for the need to achieve a better balance in the use of the motor car (Transport WA, 1995). The relevant Strategy targets for the travel behaviour change approach are:

1. The car occupancy target is to increase from 1.21 in 1991 to 1.25 by the year 2029 (the trend is 1.13 by 2029).
2. The trip length target for personal trips is to reduce from the 1991 average of 8.4 km to 7.2 km in 2029 (the trend is to 10.7 km in 2029).
3. The mode share targets, shown in Figure 1, clearly illustrate the aim of redistributing car driver only trips across the alternative modes. This is the primary target for behaviour change programmes.

The walking target is to capture 6.7% of all trips undertaken by car as driver in 2029 and convert them into walking trips. It is worth noting however that the aim of the TravelSmart® programme is to change car trips not only to walking, but also to public transport, cycling and tele-access.

### Walking behaviour

Analysis of the available travel survey data in 1986 and 2000 for the inner, middle and outer suburban



areas, show consistently a decline in the mode share for walking trips. Table 1 clearly shows that the trend for walking is in the opposite direction to the Metropolitan Transport Strategy targets. The challenge is therefore to stop the trend and turn it around.

**In-depth research rationale**

We all perceive the world around us in a subjective fashion. This leads to incomplete and distorted views of the world, but regardless of how wrong these subjective worlds may be, these views determine our behaviour. A situational research technique was developed to analyse and understand individual behaviour patterns (Brög, 1982). Every individual is given a specific amount of personal freedom by their environment within which they can act; this is their objective situation. The personal freedom of the individual to travel is affected by:

- the transport infrastructure and services they can access;
- the constraints and options of the individual and their household which can be socio-demographically deduced (e.g. age, stage in life cycle); and
- their social values, norms and options which are pertinent to travel behaviour.

Each individual experiences these objective situations differently, thus creating individually different subjective

situations. The subjective situations differ from objective situations due to perceptions being incomplete or distorted consciously or unconsciously. The extent of deviation depends upon the individual person and their specific experiences. Individual decisions are made in these subjective situations, and these are responsible for determining behaviour.

To determine the possibility for replacing car trips it is necessary to test each individual trip to see if there was an objective reason for using the car (e.g. business use of the car, car trip within a longer transport chain, distance is too far to walk, etc.). The interactive approach of the in-depth technique, coupled with each individual’s travel diary provides an avenue clearly differentiating between people’s subjective and objective situations, unlike traditional market research that relies solely on determining people’s subjective situation. Therefore, behavioural change measures should not just be based on ‘hard

	Inner suburb		Middle suburb		Outer suburbs	
Main mode	1986	2000	1986	2000	1986	2000
Walk	17	15	14	10	16	12
Bicycle	3	3	2	2	1	2
Car as driver	54	57	58	60	55	55
Car as passenger	19	19	21	23	23	25
Public transport	7	6	5	5	5	6
	100	100	100	100	100	100

**Table 2. Car trips replaceable by walking**

Percentage of car trips	Constraints	Objective	Subjective	Current mode share			100%
				Walking	Cycling	Public transport	
	8%	57%	15%	12%	2%	6%	

Source: Socialdata Australia, 2001

policies' like system improvements, but also on 'soft policies' like communication, motivation and – last but not least – information.

### Potential for behaviour change

The implementation of the in-depth research methodology requires an intensive dialogue with each household (up to one hour) with each member having previously completed a travel diary (Brög & Erl, 1980). A detailed outline of the study used to derive the following results has been provided by James, John and McKaskill (2001). The in-depth research technique explores the options a person could have chosen for each trip they complete in their travel diary. Trips already made by public transport, walking or cycling have been excluded from this analysis on the basis that walking trips should not be captured from cycling and public transport trips. Reasons why an alternative mode was not chosen by respondents were grouped into three categories. The three categories are:

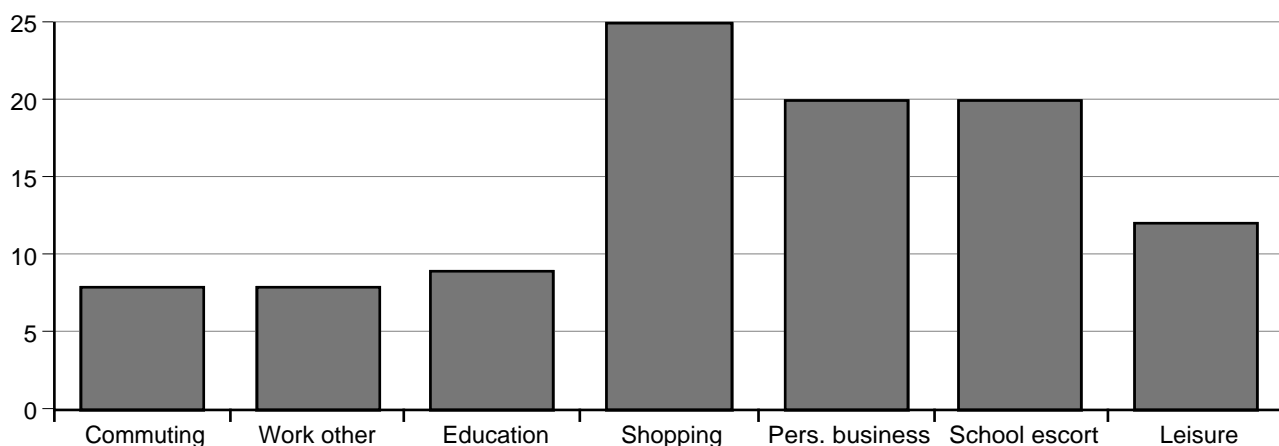
- 1 Constraints – had to carry luggage.
- 2 Objective reasons – distance too far to walk – greater than 2 km.
- 3 Subjective reasons – negative community climate towards walking, couldn't be bothered, etc.

The subjective category is considered changeable to walking. The quantified results are shown in Table 2.

The in-depth research identified that up to 15% of car trips are 'in principle' changeable to walking without the need for additional infrastructure. The Metropolitan Transport Strategy target for walking seeks to capture 6.7% of car trips. The in-depth research shows that theoretically it is possible to achieve the walking target through effective 'soft' measures alone by capturing half the subjective car trips that could have been walked instead.

Quantification by journey purpose would provide direction in which to focus limited TravelSmart® Individualised Marketing programme resources to achieve the greatest effect. The focus of Individualised Marketing is on influencing people's trips, rather than the traditional marketing focus on people with different characteristics (e.g. age). The in-depth research is able to provide this quantification, as shown in Figure 2.

The key finding is that shopping trips followed by personal business and escort (to school) have the greatest potential for change to walking. It is worth noting that for shopping trips those that involve large items, such as many bags of groceries, have been excluded. Discussion is often centred on the journey to work, which in this case has the least potential (6%).

**Figure 2. Potential for changing car trips to walking trips**

**Results of Individualised Marketing**

Individualised Marketing is a proven travel behaviour change intervention developed and implemented by Socialdata. The application of the technique in Western Australia is unique in that it was the first occasion on which it included walking. For greater information on how the technique works and the results of the pilot project undertaken in 1997, consult the TravelSmart® website at

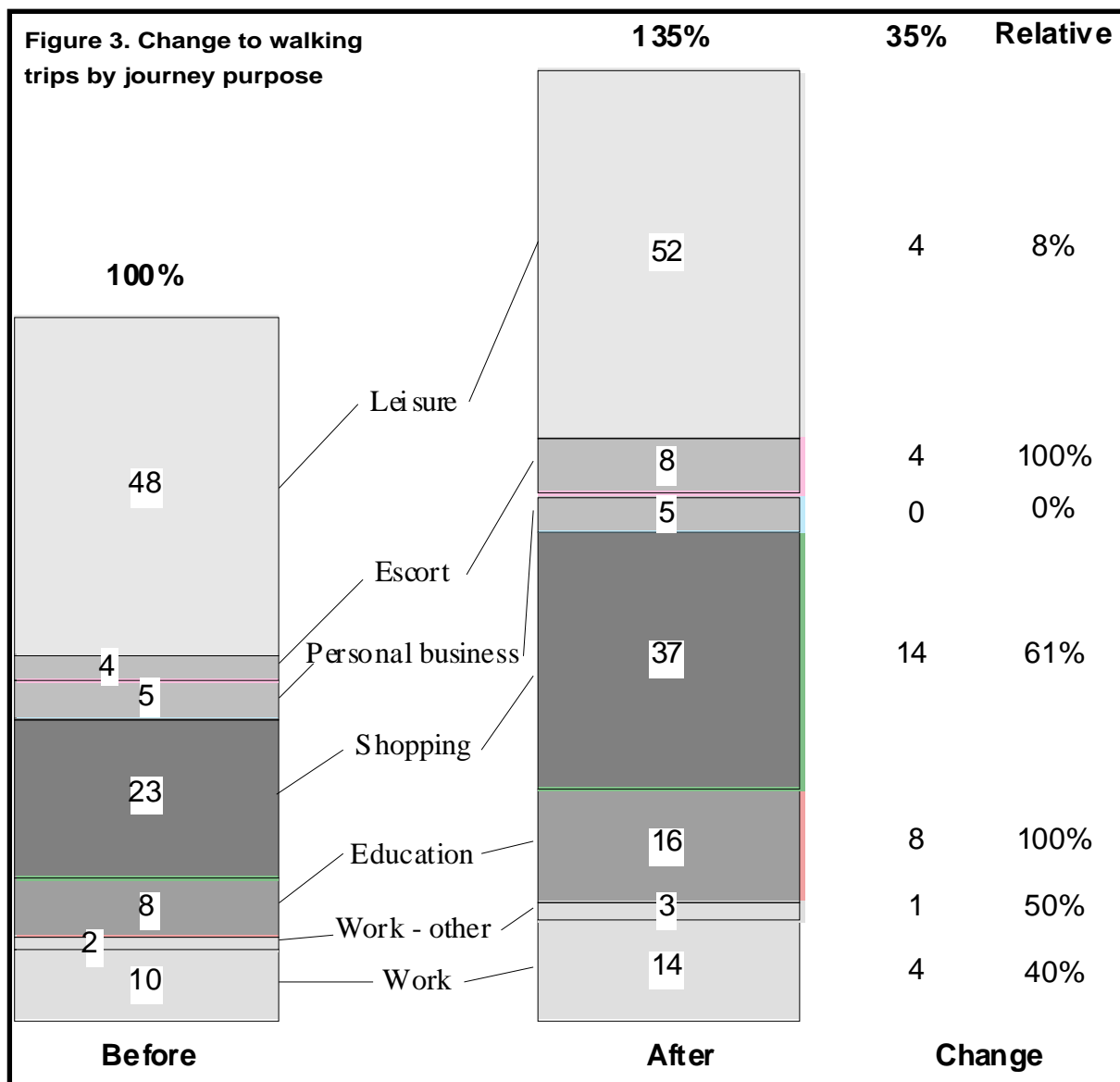
<http://www.travelsmart.transport.wa.gov.au>

The large-scale approach was applied after a successful pilot project which proved that behaviour change occurred and was sustained over two years after the intervention. The large-scale application was delivered to 35,000 people in 15,300 households. The local government municipality in which it was applied is an inner/middle suburban area with a mix

**Table 3. Behaviour change from City of South Perth Individualised Marketing**

	1986	Before 1997/98	After 2000	Change 1997 to 2000
<i>Mode Share</i>				
Walking	15	12	16	+ 35%
Cycle	3	2	3	+ 61%
Car driver	55	60	52	- 14%
Car passenger	20	20	22	+ 9%
Public transport	7	6	7	+ 17%
Total	100%	100%	100%	

of street patterns (grid and culs-de-sac), a mix of socio-economic groups and an established footpath network. The large-scale project was delivered in February to June 2000 with the first after-survey undertaken in October 2000. The before and after surveys (collection and analysis) were subjected to an extensive independent audit to ensure accuracy. The results are shown in Table 3.



The interesting observation from the results is that the mode share of the early 1980s has been achieved. Walking experienced the biggest decline but underwent the greatest reversal as a result of the intervention. The other key observation is that walking captured half of the changed car trips to alternative modes. Given the context of the relative time, funding and effort spent on public transport and cycling by transport planners, walking is able to achieve as much as the other two combined with the least resource allocation.

Extrapolation of the results for the whole population in the City of South Perth means an additional 4800 walking trips per day. A similar extrapolation for public transport means an additional 1200 trips per day. Evidence from the travel surveys shows that the average distance of the walking component of a public transport trip is the equivalent of a walking trip (door to door). This means in effect that Individualised Marketing delivered 6000 new walking trips per day.

#### Comparison of behaviour change with potential for change

The collection of information on the potential for behaviour change and measurement of behaviour change allows a calibration between the two. Figure 3 shows the increase in walking trips by journey purpose. The greatest relative change occurred for escort and education trips, although the biggest change in absolute terms was shopping trips. Shopping trips accounted for 23% of previous walking trips yet they achieved 40% of the new walking trips. Conversely, leisure accounted for nearly 50% of walking trips yet only increased by 8%.

Comparison with the potential for behaviour change shows some expected and unexpected results. The comparisons are shown in Table 4.

Walking to the shops captured 40% of the changed car trips, which reflects shopping trips having the greatest walking potential. The same can be said for escort (school) trips, yet personal business with the same potential did not capture a car trip. Conversely, education trips and work commute trips with a low potential for change achieved relatively high levels of behaviour change. Campaigns are often aimed at increasing walking trips to work yet the in-depth research and measured behaviour change shows focussing on shopping trips will deliver a larger change.

**Table 4. Comparison of potential with actual behaviour change**

Journey Purpose	Potential for change	Actual change*
Work – commute	8.0%	0.5%
Work – other	8.0%	0.1%
Education	9.0%	0.9%
Shopping	25.0%	1.6%
Personal business	20.0%	0.0%
School escort	20.0%	0.5%
Leisure	12.0%	0.5%
	Average = 15%	Total = 4%

#### Programme expansion

The success of the City of South Perth project has provided the evidence and justification for the expansion of the behaviour change approach to other areas of the Perth Metropolitan Area. Subject to funding approvals, the programme will cover 47,800 people by 2004 (see Table 5),

The estimate of additional walking trips is based on a per capita change derived from the City of South Perth project.

The benefits to the Perth community from the growth in walking include savings in car running costs, reduced vehicle emissions and greenhouse gas emissions and improved health from increased physical activity. It is interesting to note that the benefit–cost analysis for the application of this intervention to these areas, including cycling and public transport, is 30–to–1. A copy of the application of this analysis to the South Perth results is available from the TravelSmart® website.

The application of this approach to other Western cities is likely to lead to increases in walking trips. The extent of behaviour change is likely to be different, which could be predicted by the undertaking of in-depth research in these cities.

#### Conclusion

The delivery and evaluation of the TravelSmart® Individualised Marketing programme in the City of South Perth provides clear evidence that this intervention is able to deliver large scale increases in walking, both as walking trips and walking as a component of public transport trips. Walking as a mode is able to capture half of the changed car trips and double that of cycling and public transport trips

**Table 5. Expanding the behaviour change approach to other areas of Perth**

2001/02	60,000 people	=	8200 walk trips	+ 2000 walk/public transport trips. Total of 10,200 extra walking trips
2002/03	140,000 people	=	19,200 walk trips	+ 4800 walk/public transport trips. Total of 24,000 extra walking trips
2003/04	80,000 people	=	11,000 walk trips	+ 2800 walk/public transport trips. Total of 13,800 extra walking trips

combined. Walking to the shop has the greatest potential for change and this has been reflected in the measured behaviour change from this TravelSmart® Individualised Marketing programme.

This extent of change from car trips to walking trips shows that this intervention has the potential to achieve 60% of the Perth Metropolitan Transport Strategy target for walking and a mode share not seen since the early 1980s. Walking, therefore, has the ability to play a major role in reducing car trips and this intervention provides the opportunity to reverse the decline in walking trips evident in most cities in developed countries.

#### References

Brög, W. (1982) 'The situational approach – an alternative model concept – theoretical foundations and practical applications' *Proceedings 7th Australian Transport Research Forum*, 7, 2, 547-592, ATRF, Hobart

Brög, W. & Erl, E. (1980) 'Interactive measurement methods – theoretical bases and practical applications' *Transportation Research Record* 765, 59<sup>th</sup> Annual Meeting of the Transportation Research Board, Washington, D.C.

James, B., John, G. & McKaskill, J. (2001) 'Potential for increasing walking trips' *Proceedings Australia: Walking the 21st Century*, Perth, Western Australia Socialdata Australia (2001) *Travel and Indepth Surveys: Indepth Trees* Report for the Department for Planning and Infrastructure, Perth, Western Australia. Transport WA (1995) *Metropolitan Transport Strategy* Transport WA, Perth.

\_\_\_\_ (1999) *TravelSmart 2010: A 10 year plan* Transport WA, Perth.

\_\_\_\_ (2000) *Perth Walking: The Metropolitan Region Pedestrian Strategy* Transport WA, Perth.

TravelSmart® (n.d.)

<http://www.travelsmart.transport.wa.gov.au>

# Locking in the pedestrian? The privatised streets of gated communities

Matthew Burke & Christian Sebaly

Address for correspondence

Matthew Burke

Department of Geographical Sciences and Planning, University of Queensland, Brisbane, QLD 4072, Australia

<[matt.burke@uq.edu.au](mailto:matt.burke@uq.edu.au)>

Christian Sebaly

ZEF – Centre for Development Research

University of Bonn

Germany

<[uzsz7g@uni-bonn.de](mailto:uzsz7g@uni-bonn.de)>

---

## Abstract

The paper outlines research into the travel behaviour impacts of residential estates with privatised and barricaded streets known commonly as 'gated communities'. Through investigations at two particular estates in Brisbane, Australia, it is shown that this built form produces small but significant changes in behaviour, especially pedestrian behaviour, that bring into question whether local authorities should permit such developments if they are sincere about encouraging walking as a mode of transport.

## Keywords

gated communities, pedestrian connectivity, street vitality, street safety, travel behaviour.

## Introduction

The events at New York's World Trade Centre on September 11, 2001, will have far-reaching consequences in what have long been considered 'safe' Western democracies. Concepts of surveillance,

fortification and security-orientated design are more likely to be implemented to counteract potential terrorist actions. The notion of a Freedom of the City and our understandings of the rights of citizens to walk the public street may well be curtailed as pedestrian movement comes to be further scrutinised and controlled in sensitive environments. In a world that makes no sense such social forces are difficult to combat. We may be entering an era where human settlements become further dominated by what Nan Ellin labelled the 'architecture of fear' (Ellin & Blakely, 1997).

Yet such trends have been present for decades. One of the most visible elements of the shift to fortification and surveillance has been the rise of suburban 'gated communities' – privatised and walled off housing enclaves that provide barriers to entry and increased security for their residents. Gated communities are becoming highly visible in cities as diverse as London, Johannesburg, Chicago, Shanghai and São Paulo and they even appear in carefree Australian cities.

While some thoughts have been expressed about the likely effects of gating on pedestrian movements (Burke, 2001) no empirical research has been done into the impacts of gated communities on the routine travel behaviour of residents. Given that more than eight million Americans alone are thought to live behind the gates of such an estate (Blakely & Snyder, 1997), it is important for us to understand the transport-related impacts of this new urban form.

This paper outlines a study undertaken to assess travel behaviour in two small gated communities in suburban Brisbane, Australia, as part of an on-going research project at the University of Queensland. First, the particular type of gated community is assessed and the salient features of the development are identified. Second, the methodology employed in the study is briefly explained, involving a three-pronged investigation of travel diary surveys, attitude and perception surveys and environment-behaviour observations. Third, some findings from the study are given, with some conclusions drawn for policy makers and planning authorities across the world.

### **What is a gated community?**

The seminal study into gated communities in the United States was that undertaken by Blakely and Snyder and published in the book *Fortress America: gated communities in the United States* (1999). They define gated communities as:

'... residential areas with restricted access in which normally public spaces are privatised. They are security developments with designated perimeters, usually walls or fences, and controlled entrances that are intended to prevent penetration by non-residents. They include new developments and older areas retrofitted with gates and fences, and they are found from the inner cities to the exurbs and from the richest neighbourhoods to the poorest' (Blakely & Snyder, 1999, p. 2).

The salient features of gated communities are, firstly, that they are residential estates, rarely featuring much in the way of either commercial or retail functions. Secondly, they are clearly separated from the surrounding community by a barrier to human movement, usually in the form of a wall or fence. The entry and exit of residents and visitors alike, whether on foot or by vehicle, is only made possible through security-controlled access-points, usually gate houses, with numerous electronic and surveillance devices used to ensure those without invitation are not allowed to enter. Thirdly, they are private entities, with private streets, private parks and private facilities. Management of these assets is usually undertaken either directly by the developer, or, more commonly, through a homeowner- or community association.

The dominant form of gated community in Australia

today is defined as the *Secure Suburban Estate*. The word 'suburban' is used to signify that the majority of these developments are to be found in either in-fill or greenfield developments in the middle or outer suburbs of major cities. Characterised by a housing form that is predominantly one of low-rise villas or townhouses, the dwellings are generally developed using common building materials, designs and layouts as restricted by the developer or homeowner association/body corporate. Lifestyle features are absent, other than perhaps in the form of a small communal pool or

gymnasium or barbecue area, and Secure Suburban Estates tend to be relatively small in the number of constituent dwellings (usually 20-80 dwellings in the Australian context).

Good examples of this form of development are the 'Kuranda' and 'Kuranda Close' estates built over four years ago in Eight Mile Plains, a suburb 14 kilometres from the central business district of Brisbane, Australia. Kuranda comprises 56 townhouses (attached two-storey units), formed in a slightly circuitous private street layout behind two-metre walls and fences and electronically controlled vehicular and pedestrian gates (see Figure 1).

At the centre of the estate lie an attractive in-ground swimming pool, a half-court tennis court and a barbecue, all in one small communal area. The estate also has a resident manager who amongst other things is rental agent, groundskeeper, informal security patrol, complaints desk and prominent neighbour of the residents.

Kuranda Close, on the other hand, is a smaller estate located just half a block up the street from Kuranda, featuring a simple design of 25 semi-detached single-storey three-bedroom villa units placed single file down either side of a straight access road. It also features a small in-ground swimming pool and communal barbecue for use by residents. Of all the dwellings in the two estates, only one is owner-

occupied, the rest having been rented out to tenants by their owners.

### **Researching the impacts of gated communities**

To determine whether the gates and walls do alter travel behaviour three differing research approaches were employed. First, a travel-diary survey was organised to ascertain broad resident trip-making behaviours including the modes used, trip distances, trip times and other key variables. Second, a brief survey was prepared to determine the underlying attitudes and preferences of individuals to a series of transport-related issues. Third, an environment-behaviour study incorporating direct observation, pedestrian intercept surveys and other techniques was prepared to record localised travel behaviours. These three separate research techniques were then to be applied not only to the gated community under investigation, but also (for comparative purposes) to an adjacent neighbouring development of similar income status that was not 'gated' in any way.

This approach was piloted in a series of investigations at Kuranda and Kuranda Close in a comparative study with the more traditional suburban neighbourhood co-located in Eight Mile Plains either on, or just off Arcadia Street. The small population of the estates in the pilot meant that the majority of data obtained for both the travel diary survey and

attitude and perception surveys was insufficient to reach statistical significance. However, the environment-behaviour research proved very effective in determining not only observable differences in pedestrian behaviour, but also in uncovering some of the more pertinent issues that gated communities of this type present for transport planners and other related professions.

### **Site & setting**

Kuranda and Kuranda Close are co-located in the midst of a dormitory residential area in the middle suburbs of Brisbane. The two estates share a vehicular access road, Arcadia Street, with a middle-class detached housing estate located to the east, as shown in Figure 2.

Both gated estates have vehicular and pedestrian entries to Arcadia Street. To the north, the estates present two-metre high brick walls to Padstow Road, a four-lane sub-arterial road where regular commuter and local bus services operate. Just to the northwest of the estate lies the Eight Mile Plains Shopping Centre featuring a convenience store, video rental, café, bakery, post office and a limited range of other services. To access the bus stops or the shopping centre, residents of the estates may make use of pedestrian entries located on Padstow Road.

Mention must also be made of some of the significant demographic issues relating to the study population. For instance, housing tenure differs greatly between the gated and non-gated areas with the majority of the gated community's residents renting their villas or townhouses while the traditional estate comprises mostly owner-occupiers. Household structure also differs markedly with the gated communities recording significant levels of 'student-based

households' – often in a house-share arrangement. Further, only three or four children live in the gated communities – for reasons that will be explained later. Surveys therefore focused on adult individuals rather than on household travel behaviour and data weighting was applied despite the limitations of the sample size noted earlier.

### **Pedestrian behaviour at Kuranda & Kuranda Close**

As part of the investigations, a series of observations were made in and around Kuranda and Kuranda Close. To the researchers it seemed that the spaces in both these Secure Suburban Estates were more pedestrian friendly than comparable suburban environments. Kuranda, in particular, shows the common form such estates in South East Queensland take, with roadways not given over to bitumen, but treated with a concrete surface patterned to resemble brick cobblestones (see Figure 3).

Speed limiting signage is clearly displayed throughout the estate and speed-limiting devices are employed liberally – not that there are many vehicular movements during much of the day. Off-peak there are as few as four or five vehicle movements per hour on the internal streets, though where they converge at the gate it is a little busier. Street surveillance is excellent given the negligible setbacks of the units from the street and the small upper-storey balconies on virtually every residence. No separate footpaths are provided, but the researchers' impressions as pedestrians in this environment were that they belonged on the street as a right. The residents obviously feel this way too. In response to an attitudinal question about whether 'there is dangerous traffic within this estate' they uniformly indicated there were no such problems, as

opposed to survey respondents from the neighbouring non-gated streets who recorded perceptions of dangerous traffic manifest in their streets.

Kuranda Close is of a slightly different design, as shown in Figure 4, featuring bare bitumen pavements, with a thin (1.0 m) and (mostly ignored) footway on one side of the street. There is little shelter from the elements though some ornate lamp stands and plantings contribute to a reasonably pleasant streetscape.

To the east of the gated communities, outside in the non-gated 1980s housing estate, there are no footways to speak of along the *culs-de-sac* and vehicles generally travel at around the design speed of the estate (40-50 km/h). There is one speed-limiting device in Arcadia St (see Figure 5), but setbacks are much larger.

Three pedestrian cut-through connectors have been placed between the ends of the *culs-de-sac* to allow access directly to Padstow Road from the end of Jacaranda Place.

#### **Divergence & connectivity**

It was hypothesised that the gating of the two communities would lead to less connectivity for residents and longer trip distances to important destinations, leading to lower modal splits for walking and cycling than would be recorded for their neighbours. On investigation, however, it was found that the impacts of the walls and gates on connectivity

are delivered not necessarily to the residents of the gated communities themselves, but that impacts are instead foisted onto their immediate neighbours.

Trips to Eight Mile Plains Shopping Centre made by the residents of Kuranda and Kuranda Close were reported in travel survey data as almost always being undertaken on foot. But trips to the same destination from houses located just metres apart, yet outside of the walls in Arcadia Street, were almost always made to the same destination by private car. Why were these differences apparent?

The connectivity of the gated community precinct can be compared formally to the more traditional suburban subdivision to its east. The connectivity may be explained using the Pedestrian Route Directness ratio developed by Hess (1997) calculated by the formula:

$$\text{PRD} = \frac{\text{route distance}}{\text{geodetic distance}}$$

The most direct route to the Eight Mile Plains Shopping Centre from six sample locations within the study area is displayed in Figure 6.

The Pedestrian Route Directness ratio values for the two community's journeys-to-local-shopping are shown in Table 1.

The differences between the connectivity of, say, locations 2 & 3 on one hand, and location 4 on the other, is understandable as the external barriers of the

gated communities may be pierced by their residents at the pedestrian gates located on Padstow Road.

However, for those living outside the gates in Arcadia Street (location 4), a trip to the neighbourhood shopping centre involves circumventing Kuranda Estate at the very least via the power line easement to the east of the estate. The night route would record an even higher Pedestrian Route Directness ratio. The walls block any attempt to move directly towards the shopping centre, increasing the overall trip distance by at least 250 metres.

Meanwhile, the locations not immediately blocked by the gated communities (5 & 6) have a low Pedestrian Route Directness value in line with the more connected streetscapes available in this neighbourhood.

Overall, these differences in connectivity most likely account for the mode choices being made by residents for journeys to the local shopping centre.

While the population affected by the barriers in this study area is small, the larger gated communities in Brisbane and elsewhere have a capacity to reduce the pedestrian connectivity of neighbourhoods containing populations in the hundreds and, in some cases, thousands.

**Street vitality**

The researchers also attempted to determine the street vitality of the two gated communities, particularly during peak times such as the early evening. Given their internal communal facilities, smaller setbacks and other design features, it was hypothesised that the gated estates would have a

**Table 1. Pedestrian Route Directness Values for Trip Origins**

Location	Route Distance (m)	Geodetic Distance (m)	PRD
(1) Kuranda	486	328	1.48
(2) Kuranda	461	267	1.73
(3) Kuranda Close	391	264	1.48
(4) Arcadia St	677	299	2.26
(5) Jacaranda PI	567	479	1.18
(6) Poinciana PI	698	574	1.22

more vibrant street usage than the neighbouring estate.

Street vitality is defined as the quality whereby a street portrays life through the display of human activity. A crude Street Vitality Index (SVI) may be determined by combining the number of dynamic pedestrian movements within or through a delimited space with the number and duration of static pedestrian behaviours (sitting, stopping to chat, etc.) observed within the space. This can be done for a given hour (usually a morning or afternoon 'peak' hour) using the formula:

$$SVI = \frac{2P + S}{t}$$

where:

- P represents the total number of pedestrian movements;
- S represents person minutes engaged in static pedestrian behaviour; and
- t represents time measured as hours of observation.

The validity of any such index is admittedly limited but it is useful here in comparing the usage of streets within these differing but adjoining environments.

Observations were made one late afternoon/evening at the three separate locations noted in Figure 2, signified as A, B and C. These observations were made concurrently by three trained researchers so as to calculate Street Vitality Indexes for the differing locations. The results are shown in Table 2.

The findings were somewhat surprising. There was a reasonable level of activity within the walls of Kuranda, slightly less in Kuranda Close (where there is very little attention to the street paid by the small villas), but the most vital street was Jacaranda Place – outside the walls.

On examining the recording sheets some obvious differences become apparent. The first observation was that almost a third (28%) of the Street Vitality Index for Jacaranda Place was due to the presence of children at play. There were no children playing on the streets of the two gated estates. However, this is not because there are no children (though it is true that very few children live in these estates), but because children are literally *prohibited* from playing in the streets of the privatised communities. Like the majority of Australian gated communities, Kuranda and Kuranda Close have provisions specifically prohibiting children from occupying the street for the purposes of play included within the body corporate or homeowner association regulations governing the estate. The reasons for such prohibition are not stated but it may be presumed that basketballs, skateboards, chalk and other play equipment are potentially damaging to property and there is a potential for litigation should a child be injured. As a result, children may play only in their small backyards and be heard but not seen on the street. This seems unlikely to have a positive impact on children's levels of exercise and socialisation.

The second observation relates to the more explicit form of social exclusion caused by the walls and gates preventing outsiders from travelling through. Another significant share (21%) of the Street Vitality Index recorded in Jacaranda Place was the result of through movement by recreational walkers – including a few Kuranda residents. The barriers to entry at the gated communities prevent such individuals from outside the estate considering a recreational route in that direction.

It is not only the chance of meeting recreational walkers that is negligible in a gated community. Without a public thoroughfare there is no possibility of meeting the outsiders making pedestrian or cycle journeys for any trip purpose (journeys to school, to

**Table 2. Street Vitality Indices for observation locations**

Location	Street Vitality Index
(A) Kuranda	63
(B) Kuranda Close	44
(C) Jacaranda Place	122

recreation, or to shops), the ice-cream vans, the charity collectors, leaflet distributors, or any of the other dozens of individuals who pass by our homes every day. The gates may provide security but they also make for a social environment denuded of these valuable yet routine interactions. The costs to society this creates cannot be estimated, but Jane Jacobs may have been right when she argued that:

'Lowly, unpurposeful and random as they may appear, sidewalk contacts are the small change from which a city's wealth of public life may grow' (Jacobs, 1961, p. 83).

Overall, the hypotheses about gated communities containing more vital streetscapes than other estates were refuted by the data gathered in this study. Even the managers of the estates report the use of internal facilities such as the pool as being inconsistent. On reflection, perhaps the lack of front gardens and other features of conventional suburban housing ensures residents have little reason to be outside their houses, and the balconies of the townhouses are either simply too small to attract users, or adjoin bedrooms and other non-living-room areas of the dwellings, leading to infrequent use. The extension of the research to a much larger study population, presently underway, will compare gated communities with alternate forms. This may help to clarify what variables are of importance in leading to an increased street vitality within such estates.

#### **A fear of the outside world?**

Another case where the researcher's hypotheses were not proven correct was in appraising resident perceptions of personal safety on the street in both the secure, gated communities and in the areas outside the walls. It had been hypothesised that the residents of gated communities would feel safer walking inside their estates than the residents of non-gated streets, due to the security offered by the gates and other features. It was also thought that the residents of gated communities might be more fearful of the outside world than their neighbouring residents due to the psychological conditioning of living within such secure surroundings. To test these hypotheses two attitude and perception questions were set asking respondents to indicate on a Likert scale their willingness to walk

both inside and outside their estates at night, when street safety concerns are heightened.

As hypothesised, all the residents of gated communities reported that they either 'agreed' or 'strongly agreed' with the statement that they 'feel safe when walking *inside*' their estate at night, and the majority 'disagreed' they felt safe walking in the streets *outside* their estates at night. Residents of the non-gated estates provided a mixture of responses, although generally reporting they did not feel safe walking in either their estate or outside it in this context.

This altering of perceptions about street safety caused by the installation of walls and gates is a very positive thing for residents. However, there were few opportunities to take advantage of this, because the very small boundaries of the gated communities and the lack of viable destinations meant there were insufficient internal trip distances to encourage recreational walking trips solely within the walls, none of which were either recorded or reported in the study.

The data also showed that the level of apprehension reported by the residents of the gated communities about walking in the streets *outside* their estate was very similar to that expressed by the residents of the non-gated estate – the preliminary data dispelling somewhat the hypothesis that residents of these estates would be more 'fearful' of the outside world. There appears to be no conditioning effect in estates like Kuranda or Kuranda Close on resident perceptions of how safe the external environment is. The situation may change, however, in an environment where the gated community is of a much higher socio-economic advantage than its surrounds, as is often the case. Future research may clarify this issue.

## Conclusion

This research has so far appraised only a few of the impacts of gated communities on travel behaviour. However, as our understandings of the effects of this urban form on society grow, so is the value of gated communities increasingly being questioned in many jurisdictions. The Brisbane City Council, which permitted both Kuranda and Kuranda Close, has taken steps to prohibit the privatisation and barricading of streets – the measure that effectively creates gated communities – within its most recent town plan (Brisbane City Council, 2000). On the other hand, many other Australian jurisdictions are encouraging their construction. This preliminary work suggests that local authorities should be discouraged from permitting this type of development if they are sincere about encouraging walking as a mode of transport and creating sustainable transportation futures in their areas.

## References

- Blakely, E. & Snyder, M. (1997) 'Putting up the gates' *Shelterforce Online* May/June 1997  
<http://www.nhi.org/online/issues/93/gates.html>
- Blakely, E. & Snyder, M. (1999) *Fortress America: gated communities in the United States* Brookings Institution Press, Washington, D.C.
- Brisbane City Council (2000) *Brisbane City Plan 2000* Brisbane City Council, Brisbane.
- Burke, M. (2001) 'The pedestrian behaviour of residents in gated communities' *Proceedings Australia: Walking the 21<sup>st</sup> Century – An International Walking Conference*, Perth, Western Australia, WA Transport.
- Ellin, N. & Blakely, E. (1997) *Architecture of fear* Princeton Architectural Press, New York.
- Hess, P. (1997) 'Measures of Connectivity' *Places* 11, 2, 59-65
- Jacobs, J. (1961) *The Death and Life of Great American Cities* Random House, New York.

# The role of public policies in promoting the safety, convenience & popularity of bicycling

John Pucher

Address for correspondence

The role of public policies in promoting the safety, convenience & popularity of bicycling

John Pucher

Address for correspondence:

Professor John Pucher, Bloustein School of Planning & Public Policy, Rutgers University, 33 Livingston Avenue, Room 354, New Brunswick, New Jersey NJ 08901–1900 U.S.A.

e-mail: <[pucher@rci.rutgers.edu](mailto:pucher@rci.rutgers.edu)>

<http://www.policy.rutgers.edu/faculty/pucher.htm>

publications in PDF format at <http://www.policy.rutgers.edu/papers>

---

## Abstract

In the special issue on bicycling of WTPP (Volume 7, Number 3), Heath Maddox questions the potential of public policies to encourage bicycling. This response to the Maddox critique argues that he seriously misinterpreted the concept of public policy, considering only a small subset of the many policies that can facilitate bicycling. He does not adequately examine the impacts of special cycling facilities. Moreover, Maddox ignores virtually all other transport policies as well as all land-use, housing, taxation, education, training, law enforcement and public relations policies. This counterpoint article re-emphasises the crucial importance of a wide range of public policies to increase the safety, convenience and attractiveness of cycling. In order to generate the necessary political support for such policies, this article recommends focussing on the enormous public health benefits that would derive from increased cycling.

## Keywords

Bicycling, Germany, land-use, non-motorised transport, obesity, physical exercise, public health, public policy, traffic safety, travel behaviour, U.S.A.

## Introduction

In his recent article in this journal, Heath Maddox questions the potential of public policies to encourage bicycling (Maddox, 2001). In particular, he contests my earlier finding that public policies were essential for permitting the dramatic growth in bicycling in Germany from the mid-1970s to the mid-1990s (Pucher, 1997).

Although he provides no empirical evidence of his own, Maddox summarises the views of a few German 'experts' he selected. On the basis of that selective literature review, Maddox draws the conclusion that the bicycling boom in Germany occurred, at best, independently of supportive public policies and, at worst, in spite of public policies that supposedly hindered bicycling.

## Maddox's Misinterpretation of Public Policy

The most serious problem with Maddox's critique is his misunderstanding of what I had meant by the term 'public policy'. Although Maddox never elucidates precisely how he defines this key term, it is clear that his definition is far narrower than my own. As I have laid out in detail in four of the articles I have written about urban transport in Germany, a wide range of public policies have supported the 'green' transport modes of walking, bicycling, and public transport (Pucher & Clorer, 1992; Pucher, 1997; Pucher, 1998; Pucher & Dijkstra, 2000). They include not only transport policies but also land use policies, housing policies, taxation policies – even education, training and law enforcement policies. By no means are they limited to the very narrow concept used by Maddox, which includes only the provision of separate facilities such as bike lanes and paths. This is the only aspect of public policy that Maddox considers for its impact on bicycling levels.

Even his consideration of special facilities is sharply limited. Although he repeats my own time-trend statistics on bicycling modal split shares in Germany, Maddox does not include any statistics at all to back up his vague claim that the timing of special facility provisions did not coincide with growth in bicycling. As he does throughout his article, Maddox bases his claims not on specific empirical evidence but on references to the general conclusions of selected German 'experts.'

Maddox's misinterpretation of my public policy hypothesis is further confirmed by his own listing of the most important factors causing the German bicycling boom. Based on his review of the literature, Maddox attributes the boom to four supposedly exogenous factors: high petrol prices, urban roadway congestion, suburbanisation, and environmental awareness. These factors, however, are hardly exogenous. The first three factors, in particular, are largely the outcome of public policies.

Maddox does not seem to be aware that 60%-70% of the very high price of petrol (gasoline) in Europe is due solely to taxation. Moreover, almost all of the petrol price differential between the U.S.A. and the EU is due to the much higher taxes imposed on petrol in Europe (International Energy Agency, 2001). As of 2001, the total tax on a litre of petrol in Germany was DM 1.45 (= \$0.65), compared to a total tax of only \$0.10 per litre in the U.S.A. Thus, German taxation of petrol is more than six times higher. The percentage of taxes in the final retail price of petrol is 71% in Germany, compared with just 26% in the U.S.A. (International Energy Agency, 2001).

Clearly, this tax policy is not aimed at promoting bicycling in particular. Nevertheless, both the German federal government as well as the European Union have explicitly supported high taxation of petroleum-based fuels to slow down global warming, encourage energy conservation, and promote alternatives to the private car such as bicycling, walking and public transport.

Similarly, Maddox proposes urban roadway congestion as a factor in the bicycling boom as if public policies had no role at all in influencing congestion levels. In Germany, in particular, the expansion of roadway supply was deliberately held far below the rate of growth of private motor vehicle use, at least partly to discourage a further modal shift to the private car. Moreover, in sharp contrast to the U.S.A., the extensive autobahn network in Germany does not reach into the urban cores of most metropolitan areas (Transportation Research Board 1998; Pucher, 1998). That limited supply of high-speed motorways and arterials within German cities unquestionably was an important public policy decision. It has contributed to the high levels of urban roadway congestion cited by Maddox's experts as a reason for growth in cycling.

Maddox cites the increasing trip distances caused by suburbanisation as the third factor explaining the bicycling boom. He claims that increased trip distances in Germany led to a shift from walking to cycling. Maddox does not present any empirical evidence of this impact, but let us assume that Holz-Rau (1991), the expert he cites on this issue, is correct. My own publications on German travel trends also show a fall in walking modal split shares just as cycling modal split shares have risen (Pucher 1998; Pucher & Dijkstra 2000). Thus, the alleged impact is at least plausible.

Nevertheless, public policies in Germany have been largely responsible for creating a suburban environment where bicycling remains a feasible travel option – in sharp contrast to the U.S.A. Zoning and building codes, as well as detailed planning regulations, ensure that all German suburbs have sidewalks and either

bikeways and bike lanes or traffic calming to facilitate bicycling. Moreover, the average density of German suburbs is over twice as high as in the U.S.A., thanks partly to land-use policies that sharply restrict the supply of land for development around German cities (Pucher & Clorer 1992; Pucher, 1998). Thus, while trip distances in the suburbs are longer than in the central city (perhaps favouring cycling over walking), they are not usually so long (as in American suburbs) as to make the private car the only feasible transport option.

The density of German suburbs, their mixing of residential and commercial land uses, their design and layout, their provision with sidewalks and bikeways or bike lanes, and their traffic calming *all* represent important public policies. I explicitly included these factors in the range of policies I used to explain the growth of cycling in Germany (Pucher, 1997; Pucher & Dijkstra, 2000).

One of my articles cited by Maddox deals with the co-ordinated, self-reinforcing package of transportation, land use, housing and tax policies in Germany that together have encouraged public transport, walking and cycling (Pucher, 1998). I specifically explained the need to view these policies as an integrated whole, since it is the overall package of policies that is so effective, not any isolated policy or subset of policies. Although he had access to all of my articles, Maddox does not even include all my transport policies when examining my hypothesis, let alone the many other public policies I have discussed in so much detail over the past two decades in comparing urban transport in the U.S.A. and Europe.

The fourth factor Maddox lists is growing environmental awareness. That obviously is not a public policy itself, but it has been crucial to the adoption of policies throughout Europe that have promoted bicycling as well as walking and public transport. One can only wonder, however, how important this vaguely mentioned factor could have been on its own. The U.S.A. has also experienced an extraordinarily widespread and influential environmental movement over the past three decades, but with virtually no perceptible impact on raising cycling levels.

#### **Misunderstanding about the Role of Public Policies**

In addition to misunderstanding the very broad range of public policies I had advocated, Maddox misinterprets the role I had intended to assign to public policies. He suggests that my main hypothesis in the 1997 article was that 'the bicycling boom was... sparked initially by planners and policy makers with a unified goal in mind'. Nowhere in my article did I make such a statement. I never claimed that the policies I listed were part of some unified pro-bicycling

master plan, designed in advance and carried out in precise co-ordination, with a uniform goal in mind.

My main hypothesis was that a wide range of public policies were absolutely crucial to facilitating, enabling, and to some extent, even engendering the bicycling boom from the 1970s to the 1990s. Whether or not such public policies furnished the initial spark is not as important as Maddox claims. The sustained 20-year boom would never have occurred without the accompanying public policies that supported it. That is the important point I wanted to make. It is a point that Maddox can hardly have missed. Maddox himself notes that 'the German literature generally indicates that public policies have played a key role in maintaining high and growing rates of bicycle use in recent years'. Since that is quite similar to my own hypothesis, I find it baffling that Maddox devotes so much of his article to contesting that very notion. At any rate, he seems to lose sight of the main point while focusing on the less important issue of whether public policy initiatives were the initial stimulus to the boom.

To some extent, this is the usual chicken-and-egg problem. Which came first? From my perspective, it does not really matter much, while Maddox seems to base his entire article on that question. The same question could be posed for the role of roadway and parking facilities in promoting the growth of private car ownership and use. Clearly, there have been important exogenous trends in per capita income and suburbanisation that have stimulated the demand for car travel. Nevertheless, without significant expansions in roadway capacity, parking and other facilities, the growth in car use would not have been nearly as dramatic as it has been.

Similarly, whatever exogenous factors might have helped spark the initial rise in bicycle use, there can be no doubt that public policies were crucial in facilitating and encouraging the long-term boom.

### **Public Policies & Cycling Safety**

Totally aside from the impact of public policies on the amount of cycling, there is the equally important issue of cycling safety, which Maddox completely ignores. There can be no question whatsoever that the specific pro-cycling policies adopted in Germany have enormously enhanced the safety of cycling there (Pucher & Dijkstra 2000; Pucher 2001). To a large extent, German safety policies have been identical to their cycling promotion policies:

- separate bike paths and lanes, bicycle streets and special bike routes;
- intersection modifications and signal priority for cyclists;
- traffic calming of residential neighbourhoods;

- restrictions on auto use in cities (especially on through traffic);
- better education and training of both motorists and cyclists;
- enforcement of traffic regulations protecting cyclists; and
- urban design oriented toward pedestrians and cyclists instead of cars.

As the bicycling boom progressed, the same policies that encouraged more cycling also permitted safer cycling, so that the total number of cyclist fatalities in Germany fell by 66% between 1975 and 1998 (Pucher & Dijkstra, 2000). The cyclist fatality rate per kilometre cycled fell even more sharply in those 23 years, since the total amount of cycling almost doubled.

Does Maddox also ascribe that enormous achievement in greater safety to exogenous factors having nothing at all to do with policy? Would he abandon all such public policies simply because he does not think they sparked the initial growth in cycling? Does he think that the dramatically improved safety of cycling in Germany had no role at all in encouraging more cycling and thus sustaining the bicycling boom?

Clearly, one of the main impediments to more cycling in the U.S.A. is the widespread perception that bicycling is extraordinarily dangerous (Pucher *et al.*, 1999). On a per kilometre basis, cycling is indeed dangerous in the U.S.A., almost eleven times as dangerous as private car travel in the U.S.A. and more than four times as dangerous as cycling in Germany (Pucher & Dijkstra, 2000). In 1995, there were 109 cyclist fatalities per billion km cycled in the U.S.A., compared to only ten car occupant fatalities per billion passenger km. In the same year, Germany had less than a fourth as many bicyclist fatalities per billion km cycled (25 vs. 109 in the U.S.A.). The almost complete lack of German-style bicycling safety policies in the U.S.A. is certainly one reason for the much greater danger of cycling in American cities.

As emphasised by Pucher and Dijkstra (2000), bicycling itself is not inherently dangerous. It is the lack of appropriate conditions for cycling that makes it dangerous in the U.S.A. Cycling, in fact, can be made very safe, as indicated by the dramatically lower fatality rates in the Netherlands and Germany. The U.S.A. also has the potential to make bicycling safe, but only if American cities adopt the same range of comprehensive policies listed above. In many respects, this means giving bicyclists and pedestrians priority in urban transport, as in the Netherlands and Germany. That is the general policy orientation so sorely lacking in every American city. It is the policy change that would make the most important difference of all in

encouraging more sustainable transport systems in the U.S.A.

In short, Maddox ignores the important problem of cycling safety and the role of public policy in improving cycling safety in Germany. Public policy actions that increase cycling safety and thus its overall appeal surely *should* be considered when evaluating the role of public policy in promoting cycling.

### **Maddox's Vague Call for Political Action**

Having rejected, or at least downgraded, the role of specific public policies in promoting cycling, Maddox proposes bicycling advocacy as the most effective way to spark a bicycling boom in the U.S.A. In particular, he recommends 'broadening and intensifying political action' and 'harnessing...any groundswell of support for cycling. to help create a mutually reinforcing situation in which community activism intersects with policy and planning'. Maddox himself notes that this suggestion sounds facile, as indeed it does. He provides no details at all on how to generate or harness such a groundswell of political support for cycling.

Furthermore, Maddox ignores the very active involvement of bicycling groups at all government levels in the U.S.A. Especially over the past decade, they have succeeded in inserting strong pro-bicycling provisions in federal transportation law. At the very least, the federal government now provides generous financing of cycling facilities and requires bicycling to be explicitly considered in any federally-financed roadway construction or improvements. At the state and local levels as well, bicycling advocates have successfully pushed for more separate facilities and special provisions for cycling. Moreover, nearly every state Department of Transportation now has a professional bike/ped advocate responsible for co-ordinating bicycling and pedestrian policies at the state level.

Maddox seems to view the need for political action as a new discovery on his part. Yet as Maddox himself notes, Wachs (1998) had already emphasised the importance of political action in getting pro-bicycling public policies adopted and implemented. He also cites one article where my colleagues and I specifically recommended 'broadening and intensifying political action' as one of many approaches in a multifaceted strategy to encourage cycling (Pucher *et al.*, 1999). In short, I had already included his favoured strategy in my own list of necessary measures.

Of course, it is not political action itself that will produce any growth in cycling, but the wide range of public policies that political action can succeed in getting adopted and implemented. No one denies that political support is necessary to generate the sorts of public policies I have been advocating. But it is only a

means to an end.

### **Promoting Bicycling to Improve Public Health**

Although Maddox does not even mention it, one of the most promising approaches to promoting more bicycling is through public health advocacy. As of 1999, 27% of all adult Americans were obese (body mass index = 30+) and 61% were overweight (body mass index = 25+) (National Center for Health Statistics, 2001). Public health professionals consider the problem of obesity in the U.S.A. to have reached epidemic proportions (Mokdad *et al.*, 2001). There is almost unanimous agreement on the need for more regular physical exercise. Many official organisations now specifically advocate the promotion of walking and/or cycling to get around town as the easiest, most affordable and most accessible means of physical exercise for most people (Dora, 1999; British Medical Association, 1997; Koplan & Dietz, 1999). Hillman and others have written extensively on this topic (Hillman, 1997). *Hillman, in fact, concludes that cycling provides such valuable cardiovascular exercise that it is a health risk not to cycle!* Indeed, he calculates that, in the UK, the life years gained through the health benefits of regular cycling offset the life years lost through traffic crashes by a ratio of 20-to-1 (Hillman, 1993).

Even in the sprawled, low-density metropolitan areas of the U.S.A., 49% of all trips are shorter than 3 miles, 40% are shorter than 2 miles, and 28% are shorter than 1 mile (U.S. Department of Transportation, 1998). Bicycling can easily cover all these distances. Yet less than one percent (0.9%) of all urban trips in the U.S.A. are made by bicycle. Thus, there is enormous potential for increasing cycling for urban travel in the U.S.A., generating public health benefits not only from the physical exercise cycling offers, but also from reductions in air pollution, noise and other environmental degradation.

Currently, I am co-principal investigator of a research project funded by the Robert Wood Johnson Foundation which specifically examines the role of our land-use patterns and transport systems in encouraging or discouraging walking and cycling. Similar research projects are being conducted throughout the country and publications on the topic are appearing with increasing frequency.

Maddox does not propose any specifics for generating widespread public support and political action to encourage bicycling. I would propose this public health emphasis, since everyone has a stake in improving their own health through more physical exercise. In the U.S.A., in particular, obesity is an ever-worsening epidemic that has been generating increasing coverage in the media (New York Times, 1999; The Economist, 2001). Americans need only look

around them and at themselves to see the alarming dimensions of the problem. Public health departments in every state, and hundreds of thousands of medical doctors and public health professionals, have the potential to spark the sort of groundswell of public opinion and individual action that Maddox only vaguely suggests in his article.

Even if such a strategy succeeds, it will only be with the aid of the entire gamut of public policies to make cycling safe, convenient and attractive as an alternative to the private car. In particular, it will be necessary to undertake many measures to improve the abominable safety record of cycling in the U.S.A. Otherwise, any rise in cycling might produce an unacceptable jump in cycling fatalities, thus short-circuiting whatever temporary increase in cycling would occur.

### References

- British Medical Association (1992) *Cycling Towards Health and Safety* Oxford University Press, London.
- \_\_\_\_ (1997) *Road Transport and Health* The Chameleon Press, London.
- Dora, C. (1999) 'A Different Route to Health: Implications of Transport Policies' *British Medical Journal* 318: 1686-1689.
- Hillman, M (1993) 'Cycling and the Promotion of Health' *Policy Studies* 14 (2) 49-58.
- \_\_\_\_ (1997) 'Health Promotion: The Potential of Non-Motorized Transport' in Fletcher, T. & McMichael, A., eds. *Health at the Crossroads: Transport Policy and Urban Health* John Wiley & Sons, London.
- Holz-Rau, H.C. (1991) 'Genuegen verhaeltnisorientierte Verkehrsmodelle den Erfordernissen integrierter Planung?' *Internationales Verkehrswesen* 43(1/2) 14-19.
- International Energy Agency (2001) *Energy Prices and Taxes, Third Quarter 2001* Organization for Economic Cooperation and Development, Paris.
- Koplan, J. & Dietz, W. (1999) 'Caloric Imbalance and Public Health Policy' *Journal of the American Medical Association* 282 (16) 1579-1581.
- Maddox, H. (2001) 'Another Look at Germany's Bicycle Boom: Implications for Local Transportation Policy and Planning Strategy in the U.S.A.' *World Transport Policy & Practice* 7(3) 40-44.
- Mokdad, A, Bowman, B., Ford, E., Vivicor, F., Marks, J. & Koplan, J. (2001) 'The Continuing Epidemics of Obesity and Diabetes in the United States' *Journal of the American Medical Association* 286 (10) 1195-1200.
- National Center for Health Statistics (2001) *Prevalence of Overweight and Obesity Among Adults: United States, 1999* National Center for Health Statistics, Centers for Disease Prevention and Control, Hyattsville, Maryland.
- New York Times* (1999) 'Overweight was Bad Enough: The Fat Get Fatter' May 2, 1999.
- The Economist* (2001) 'International Comparison of Obesity' Dec. 17, 2001.
- Pucher, J. (1997) 'Bicycling Boom in Germany: A Revival Engineered by Public Policy' *Transportation Quarterly* 51 (4) 31-46.
- \_\_\_\_ (1998) 'Urban Transport in Germany: Providing Feasible Alternatives to the Car' *Transport Reviews* 18 (4) 285-310.
- \_\_\_\_ (2001) 'Cycling Safety on Roadways vs. Bikeways' *Transportation Quarterly* 55(4) 9-12.
- Pucher, J. & Clorer, S. (1992) 'Taming the Automobile in Germany' *Transportation Quarterly* 46 (3) 383-396.
- Pucher, J. & Dijkstra, L. (2000) 'Making Walking and Cycling Safer: Lessons from Europe' *Transportation Quarterly* 54(3) 25-49.
- Pucher, J., Komanoff, C., & Schimek, P. (1999) 'Bicycling Renaissance in North America? Recent Trends and Alternative Policies to Promote Bicycling' *Transportation Research A* 33 (7/8) 625-654.
- Transportation Research Board (1998) *Consequences of the Interstate Highway System for Transit* TCRP Report No. 42. National Research Council, National Academy of Sciences, Washington, D.C.
- U.S. Department of Transportation (1998) *1995 Nationwide Personal Transportation Survey: Public Use Data Files* Federal Highway Administration, Washington, D.C.
- Wachs, M. (1998) 'Creating Political Pressure for Cycling' *Transportation Quarterly* 52(1) 6-8.

## John Street

Volume 7(3) of WTPP was a special issue on cycling. It covered extensively the problems and challenges of making cycling more popular as a means of transport.

Comprehensive though the coverage was, there was virtually no reference to two growing challenges to the popularity of cycling: the conflict with pedestrians that arises far too frequently on urban pavements, and the inappropriate road 'sense' of a significant proportion of cyclists.

Philine Gaffron, in the Editorial, asked whether cycling was part of the solution or part of the problem, and concluded that the great thing about cycling was that it could be part of the solution, whatever your view of the problem. This depends on your definition of the problem, whether the problem is the result of comparing cyclists with motorists, or of comparing cyclists with pedestrians.

Marcus Jones ('Promoting cycling in the U.K. – Problems experienced by the practitioners') almost acknowledged the problem when he wrote that the most basic principle is that the bicycle is a vehicle, with speeds considerably higher than the pedestrians with whom cyclists are frequently asked to mix on equal terms. Jones also acknowledged that common concerns regarding many UK cycling schemes include conflict with pedestrians on shared use paths. He went on to accept that both cycling and walking have long been neglected from the training of the majority of transport planners.

Hugh McLintock ('Local Transport Plans, Planning Policy Guidance & Cycling policy: Issues & future challenges') reflected the concerns when he referred to the increased emphasis in recent years on minimising conflict between cyclists and pedestrians, reflecting political pressure from pedestrian groups over perceived dangers from cyclists, on shared paths as well as footways and in pedestrian areas, often aggravated by irresponsible cycling behaviour. McLintock also expressed the hope that there is perhaps some prospect that conflicts between cyclists and pedestrians may gradually lessen.

James Harrison ('Planning for more cycling...') related the York experience, where cycling is forbidden in 'footstreets' with plenty of cycling facilities provided as well as a virtually traffic-free route for cyclists around the edge of the footstreets.

McLintock came nearest to acknowledging the first problem mentioned, that of cyclists who insist on using pavements to the detriment of their rightful users, pedestrians. Cyclists who continue to use non-shared footpaths as if they were their own cause danger not only to themselves but also to pedestrians. It should be remembered, as stated by Jones, that a bicycle is basically a vehicle. If cyclists continue this dangerous

practice then they will do nothing to make cycling appear a better solution; it will still be part of a problem. An increased interest in cycling may well be part of a solution to one problem, as referred to in the Editorial, but at the risk of becoming part of another problem that requires its own solution.

As well as the pedestrian-cyclist conflict just referred to, one thing that does seem to be missing in the shift towards cycling is education relating to rules of the road. How many car drivers would, as a matter of routine, drive the wrong way along one way streets, regularly drive across traffic lights long after they have turned red, and not even have lights fixed to their vehicles, let alone use them? Yet these practices are common among cyclists.

As a result of personal observation, it appears that over half of those who cycle in the hours of darkness either do not have lights attached to their vehicles or do have lights but choose not to use them. In addition, a small, but significant, minority of cyclists do not seem to regard themselves bound either by red traffic lights or by no-entry signs.

These failings amongst cyclists all represent accidents waiting to happen. For night-time cyclists to wear dark clothing, and carry no lights, even in built up areas, is just a catastrophe in the making. Not only is this another practice that diminishes the status and responsibility of the cyclist in the eyes of the public, but in the event of an 'accident', it is almost certain that the cyclist will be more badly damaged than the motorist.

Why do these conflicts exist? Is it that when given a bicycle some people lose all regard for the well-being of their fellow road and pavement users? Presumably, those who do cycle on pavements or through red lights or the wrong way along one way streets have themselves at some time been either pedestrians or motorists.

For the image and attraction of cycling to be raised rather than lowered, meaningful steps need to be taken to address these issues; cyclists and their behaviour need to be compared with pedestrians as well as with motorists.

Yours faithfully

John Street

Bromley, Kent.

<[johnstreet@gn.apc.org](mailto:johnstreet@gn.apc.org)>

Philine Gaffron responds:

Many of these issues were addressed in my article "Walking & cycling – does common neglect equal common interests?" in WTPP Volume 7, Number 1, 2001.

---

<b>A</b>		
ALLAN, A. Walking as a local transport modal choice in Adelaide	(2)	43
Another look at Germany's bicycle boom: implications for local transportation policy & planning strategy in the U.S.A. MADDOX, H.	(3)	40
<b>B</b>		
BRÖG, W., see JAMES, B.		
BROOK, D., see KATZEV, R.		
BURKE, M. & SEBALY, C. Locking in the pedestrian? The privatised streets of gated communities	(4)	67
<b>C</b>		
CAVILL, N. Walking & health: making the links	(4)	33
Copenhagen on foot: thirty years of planning & development GEMZOE, L.	(4)	19
Cycling in African Cities: Status & Prospects RWEBANGIRA, T.	(2)	7
<b>D</b>		
DAVIS, R. Twisted Logic in the upside-down world of 'road safety' ideology: A case study of 'The Safety & Security issues of Women drivers & passengers'	(2)	20
DE BOOM, A., WALKER, R. & GOLDUP, G. Shanghai: The greatest cycling city in the world?	(3)	48
Deconstructing the future: assessing new initiatives in transport, including demand management & walking KER, I.	(4)	55
Determinants of air travel growth NIELSEN, S.K.	(2)	28
<b>E</b>		
Editorial (cycling special issue) GAFFRON, P.	(3)	5
(The) effects of car sharing on travel behaviour: analysis of CarSharing Portland's first year KATZEV, R., BROOK, D. & NICE, M.	(1)	22
<b>G</b>		
GAFFRON, P. Editorial (cycling special issue)	(3)	5
GAFFRON, P. Walking & cycling – does common neglect equal common interests?	(1)	9
GEMZOE, L. Copenhagen on foot: thirty years of planning & development	(4)	19
GOLDUP, G., see DE BOOM, A.		
GOODMAN, R. A traveller in time: Understanding deterrents to walking to work	(4)	50
GRENGS, J. A Nicaraguan Street Clash	(3)	45
Guidelines for a safety audit of bikeway systems MATWIE, C.T. & MORRALL, J.F.	(3)	26
<b>H</b>		
HARRISON, J. Planning for more cycling: the York experience bucks the trend	(3)	20
(The) Headloading & footpath economy – walking in Sub-Saharan Africa HOWE, J.	(4)	8
HILLMAN, M. Prioritising policy & practice to favour walking	(4)	39
HOWE, J. The headloading & footpath economy – walking in Sub-Saharan Africa	(4)	8
<b>I</b>		
I Quit KINNERSLY, P.	(1)	5
Increasing walking trips through TravelSmart® Individualised Marketing JAMES, B. & BRÖG, W.	(4)	61
<b>J</b>		
JAMES, B. & BRÖG, W. Increasing walking trips through TravelSmart® Individualised Marketing	(4)	61
JANARDHAN, K.S.V.S., see SARKAR, A.K.		
JONES, E. Liveable Neighbourhoods	(2)	38
JONES, M. Promoting cycling in the U.K. – Problems experienced by the practitioners	(3)	7

**K**

- KATZEV, R., BROOK, D. & NICE, M. The effects of car sharing on travel behaviour: analysis of CarSharing Portland's first year (1) 22
- KEEFFE, T.J., see TRANTER, P.J.
- KER, I. Deconstructing the future: assessing new initiatives in transport, including demand management & walking (4) 55
- KINNERSLY, P. I Quit (1) 5

**L**

- LENARD, J., see WOODCOCK, A.
- Letter in response to the special issue on cycling, Volume 7, Number 3 (2001) STREET, J. (4) 80
- Liveable Neighbourhoods JONES, E. (2) 38
- Local Transport Plans, Planning Policy Guidance & Cycling policy: Issues & future challenges MCCLINTOCK, H. (3) 13
- Locking in the pedestrian? The privatised streets of gated communities BURKE, M. & SEBALY, C. (4) 67

**M**

- MADDOX, H. Another look at Germany's bicycle boom: implications for local transportation policy & planning strategy in the U.S.A. (3) 40
- Making pedestrian facilities more usable & safer for all MCMILLEN, B. (4) 28
- MATWIE, C.T. & MORRALL, J.F. Guidelines for a safety audit of bikeway systems (3) 26
- MCCLINTOCK, H. Local Transport Plans, Planning Policy Guidance & Cycling policy: Issues & future challenges (3) 13
- MCMILLEN, B. Making pedestrian facilities more usable & safer for all (4) 28
- MORRALL, J.F., see MATWIE, C.T.

**N**

- National symbolism undermining healthy transport policies? A case study of Canberra's V8 Supercar race TRANTER, P.J. & KEEFFE, T.J. (2) 11
- (A) Nicaraguan Street Clash GRENGS, J. (3) 45
- NICE, M., see KATZEV, R.
- NIELSEN, S.K. Determinants of air travel growth (2) 28

**P**

- Pedestrian flow characteristics at an intermodal transfer terminal in Calcutta SARKAR, A.K. & JANARDHAN, K.S.V.S. (1) 34
- Pedestrian infrastructure in the city transport system: a case study of Delhi TIWARI, G. (4) 13
- Planning for more cycling: the York experience bucks the trend HARRISON, J. (3) 20
- Prioritising policy & practice to favour walking HILLMAN, M. (4) 39
- Promoting cycling in the U.K. – Problems experienced by the practitioners JONES, M. (3) 7
- PUCHER, J. The role of public policies in promoting the safety, convenience & popularity of bicycling (4) 75

**R**

- (The) Role of public policies in promoting the safety, convenience & popularity of bicycling PUCHER, J. (4) 75
- RYLEY, T. Translating cycling policy into cycling practice (3) 34
- RWEBANGIRA, T. Cycling in African Cities: Status & Prospects (2) 7

**S**

- (The) Safety & Security issues of Women drivers & passengers WOODCOCK, A., LENARD, J. & WELSH, R. (1) 15
- SARKAR, A.K. & JANARDHAN, K.S.V.S. Pedestrian flow characteristics at an intermodal transfer terminal in Calcutta (1) 34

---

SEBALY, C., see BURKE, M.		
Shanghai: The greatest cycling city in the world? DE BOOM, A., WALKER, R. & GOLDUP, G.	(3)	48
STREET, J. Letter in response to the special issue on cycling, Volume 7, Number 3 (2001)	(4)	80
<b>T</b>		
TIWARI, G. Pedestrian infrastructure in the city transport system: a case study of Delhi	(4)	13
TOLLEY, R. Unfulfilled aspirations: a review of the Select Committee Report on <i>Walking in Towns &amp; Cities</i> in Britain	(4)	44
Translating cycling policy into cycling practice RYLEY, T.	(3)	34
TRANTER, P.J. & KEEFFE, T.J. National symbolism undermining healthy transport policies? A case study of Canberra's V8 Supercar race	(2)	11
(A) Traveller in time: Understanding deterrents to walking to work GOODMAN, R.	(4)	50
Twisted Logic in the upside-down world of 'road safety' ideology: A case study of 'The Safety & Security issues of Women drivers & passengers' DAVIS, R.	(2)	20
<b>U</b>		
Unfulfilled aspirations: a review of the Select Committee Report on <i>Walking in Towns &amp; Cities</i> in Britain TOLLEY, R	(4)	44
<b>W</b>		
WALKER, R., see DE BOOM, A.		
Walking & cycling – does common neglect equal common interests? GAFFRON, P.	(1)	9
Walking & health: making the links CAVILL, N.	(4)	33
Walking as a local transport modal choice in Adelaide ALLAN, A.	(2)	43
WELSH, R., see WOODCOCK, A.		
WOODCOCK, A., LENARD, J. & WELSH, R. The Safety & Security issues of Women drivers & passengers	(1)	15

Contributions to *World Transport Policy & Practice* are welcome. Whether you are a novice author or an experienced one, the Editor would like to invite you to consider sharing your thoughts and experiences with others like yourself. We can promise a considered and constructive review of your article and, for contributions deemed suitable, publication in *World Transport Policy & Practice*.

Read through the following guidelines and feel free to contact John Whitelegg, the Editor, who will be pleased to offer comments on drafts, work in progress, or ideas which could be made into an article.

### Editorial objectives

The journal aims to provide validated information about the latest developments in transport policy to enable local authorities, governments, consultancies, NGOs and supra-national organisations to speed up their policy development and implement new ideas from around the world. It will:

- cover all passenger and freight transport
- deal with global as well as local issues
- include the development of the ideas of sustainability, the design of cities and rural areas, transport corridors and international links to improve health, the economy and the environment.

### Article composition

Articles should normally be between 2,000 and 4,000 words. Shorter articles can be published as 'Comment' pieces. Responses to papers which have appeared in the journal, either as letters to the Editor or as response articles, will be welcomed.

### Submitting articles

#### 1. By e-mail

Articles for publication may be submitted by e-mail attachment to Pascal Desmond. It is useful if authors indicate what software is required to read any attachments and if they include the letter combination 'zq' in the title. Please DO NOT name articles 'whitelegg', 'wtpp' or variations of these. Authors are advised that they may need to provide a version on paper and/or on 3.5" disk prepared on an Apple Macintosh or PC system.

#### 2. On paper

Three copies of articles, typescript and double spaced with wide margins are needed. Manuscripts will not normally be returned, so you should ensure you retain a copy. Provide the article on paper of no less than 80 gsm weight with high quality print. This will enable electronic scanning if needed. Please supply the same version of the article on a 3.5" disk prepared on a Macintosh or PC system in ASCII format. Mark the disk clearly with your name, the article title and the software you have used. Where there is ambiguity, the disk version will normally be considered definitive.

#### Presentation

Headings and subheadings should be used at approximately 500–750 word intervals. Ensure that headings and subheadings are clearly identified.

#### Charts, diagrams and figures

These should be called 'Figures' and numbered consecutively (e.g. Figure 1, Figure 2, etc.). Make sure they are clear and can be reproduced easily. In addition, provide the raw data so that we can redraw them, if necessary.

Indicate where in the text they should appear ('Figure 1 about here'). Each figure should have a brief title (e.g. 'Figure 1. Schematic of the Programme').

#### Tables

Tables should be numbered consecutively, independently of figures. Indicate in the text where they should appear. Give them a brief title. Ensure that they are clear and legible. Authors should not use many tabs or spaces between columns of data – normally, one tab is sufficient.

#### Maps

Maps are especially welcome as 'tiff', 'pict' or 'jpeg'. They should be numbered consecutively, independently of figures and tables and their location in the text should be indicated. Ensure that they are clear, uncluttered and legible. They should have a title.

#### Measurements

SI units should be used throughout.

#### Abstracts & Keywords

Write an abstract of 75 words or so which summarises the main points of the article. It should be sufficient for a reader to decide whether or not they want to read the whole article. Also note up to six keywords which describe the content of the article. These could include geographical area, if specific, industry, functions, managerial activity and process.

#### References

Authors should keep references to a minimum, ideally no more than ten to fifteen. References should be confined to essential items only and those that are necessary to establish key steps in an argument or key areas of support for a particular proposition.

Reference citations within the text should be by the author's last name, followed by a comma and year of publication enclosed in parentheses. A reference list should follow the article, with references listed in alphabetical order in the following form:

Books: Surname, Initials (Year of Publication) *Title* Place of Publication, Publisher.

Articles: Surname, Initials (Year of Publication) 'Title' *Journal* Volume, Number, Pages.

#### Originality

The author should indicate if a paper has been presented elsewhere. If the author does not do so, the Editor will assume that the paper is an original contribution. Papers appearing in *World Transport Policy & Practice* should not be published elsewhere without the written consent of the Publisher of the journal.

#### Copyright

Authors submitting articles for publication must warrant that the work is not an infringement of any existing copyright. Papers and contributions published become the legal copyright of the publisher, unless otherwise agreed.

#### Contact details

*World Transport Policy & Practice*, Eco-Logica Ltd., 53 Derwent Road, LANCASTER, LA1 3ES. U.K.

Telephone: +44 1524 63175 Fax: +44 1524 848340

Editor: Professor John Whitelegg <[ecologic@gn.apc.org](mailto:ecologic@gn.apc.org)>

Business Manager: Pascal Desmond <[pascal@gn.apc.org](mailto:pascal@gn.apc.org)>  
<http://www.ecoplan.org/wtpp/>