Communicating Environmentally Sustainable Transport

THE ROLE OF SOFT MEASURES

OECD

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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The Role of Soft Measures

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

FOREWORD

This document is the report on a workshop entitled Communicating Environmentally Sustainable Transport—the Role of Soft Measures, held in Berlin on 5-6 December, 2002. It was arranged by the Organisation for Economic Co-operation and Development (OECD) and hosted by the Umweltbundesamt (UBA), the German Environment Agency. The Berlin workshop was a sequel to the Environmentally Sustainable Transport (EST) project conducted by the OECD over the period 1995-2002. One result of the project was a set of *Guidelines for Moving Towards EST*, endorsed by OECD Environment Ministers in 2001. The workshop was held to address specific issues related to the implementation of the EST *Guidelines*.

The project concluded that progress towards EST will require widespread acceptance of the need for EST, and a mix of measures designed to achieve the necessary changes and to overcome the barriers to EST. Some of the measures will be *hard measures*, which include taxes, emission standards, speed limits, and other fiscal and regulatory instruments. Some of the measures will be *soft measures*, which include provision of information and use of communication strategies and educational techniques.

Acceptability of hard measures—which are usually more effective than soft measures—is a key issue for policy-makers. Lack of acceptance can reduce the effectiveness of hard measures and even impede their use. Thus, a potentially important role for soft measures may be to increase the acceptance of hard measures. Soft measures may also have a more direct role in changing behaviour through the promotion of environmentally benign alternatives, and other roles such as offsetting media messages that stimulate unsustainable activity.

The overall purposes of the workshop were to explore how soft measures could best contribute to the attainment of EST, promote understanding of EST and its requirements, help determine how soft and hard measures can be combined to be effective towards EST, and develop recommendations concerning the use of soft measures in changing transport-related behaviour that could serve as advice to policymakers intent on achieving progress towards EST.

A 55-page issues paper, entitled *Soft Measures and Transport Behaviour*, was prepared by Richard Gilbert, consultant to the OECD EST project. It was distributed in advance to workshop participants to stimulate discussion at the workshop. The paper overviewed the EST project, noted some of the major contributing factors to the motorised movement of people, discussed the effects of advertising, reviewed some of the data on the effectiveness of soft measures, and drew several conclusions. Richard Gilbert also served as the workshop rapporteur and prepared the present report on the workshop.

The OECD would like to acknowledge the contributions by the speakers and panellists of the workshop as well as the staff of the Umweltbundesamt, in particular Hedwig Verron and Axel Friedrich and his team from the Division of Environment and Mobility, who made all the organisational arrangements and provided logistical support. The financial contribution by the Federal Ministry of Environment, Nature Protection and Nuclear Safety is gratefully acknowledged.

This report was prepared by the Secretariat under the auspices of the OECD Environmental Policy Working Group on Transport. The main responsibility for this project was with Peter Wiederkehr, Environment Directorate. The report is published on the responsibility of the Secretary-General of the OECD.

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OVERVIEW

BACKGROUND

This document is the report on a workshop with the above title held in Berlin on 5-6 December, 2002. It was organised by the Organisation for Economic Cooperation and Development (OECD) and Umweltbundesamt (UBA), the German Environment Agency. The Berlin workshop was a sequel to the Environmentally Sustainable Transport (EST) project conducted by the OECD over the period 1995-2002. A key outcome of the project was development of a set of Guidelines for attainment of EST, endorsed by OECD environment ministers in May 2001. The workshop was held to address specific issues related to implementation of the EST Guidelines.

At the core of the EST project were nine national case studies, although a total of 25 OECD Member and other countries were involved in the project in one or another. The project's main feature was application of a backcasting approach. This comprised development of a vision of EST in 2030, expression of the vision in quantified criteria, and identification of packages of instruments capable of securing attainment of the criteria.

Reports on the EST project are available at http://www.oecd.org/env/transport. A summary of the project can be found in Chapter 2 of the issues paper that is noted below and included as Appendix 1 to this report.

The EST project arose out of assessments concluding that present transport trends are environmentally unsustainable. Transport in OECD countries is already responsible for major adverse environmental impacts and resource depletion. With continuation of present trends in transport activity and policy-making, several of these impacts will become worse. Others will improve, but not enough to ensure attainment of the EST criteria, which were derived from existing international goals, guidelines, and standards.

The EST project was also rooted in a growing sense that continuation of these trends—i.e., 'business as usual'—is no longer acceptable. Transport's trajectory needs to be changed towards directions that are socially, economically, and above all environmentally sustainable. The trends have formidable societal momentum supported by strongly entrenched patterns of individual behaviour.

The EST project concluded that EST could provide the comfort, convenience, and efficiency of today's transport without causing cumulative adverse impacts on the environment. Achieving EST over the next few decades will require changes in vehicles and infrastructure and, above all, changes in transport-related behaviour. In any year the changes could be small, but over time they will amount to major transformations in the movement of people and freight.

The project concluded too that progress towards EST will require widespread acceptance of the need for EST, and a mix of measures designed to achieve the necessary changes and to overcome the barriers to EST. Some of the measures will be hard measures, which include taxes, emission standards, speed limits, and other fiscal and regulatory instruments. Some of the measures will be soft measures, which include provision of information and use of communication strategies and educational techniques.

Acceptability of hard measures—which are usually more effective than soft measures—is a key issue for policy-makers. Lack of acceptance can reduce the effectiveness of hard measures and even impede their use. Thus, a potentially important role for soft measures may be to increase the acceptance of hard measures. Soft measures may also have a more direct role in changing behaviour through the promotion of environmentally benign alternatives, and other roles such as offsetting media messages that stimulate unsustainable activity.

WORKSHOP OBJECTIVES

The overall purpose of the Berlin workshop was to explore how soft measures could best contribute to the attainment of EST. More specific purposes were these:

- To identify the best ways of promoting understanding of EST and its requirements and benefits by policymakers, transport providers, and the general public.

- To investigate what can be achieved in terms of progress towards EST by the use of soft measures alone, and to help determine how soft and hard measures can be combined to achieve packages of measures that could be effective in achieving progress towards EST.

- To develop recommendations concerning the use of soft measures in changing transport-related behaviour that could serve as advice to policymakers intent on achieving progress towards EST.

THE ISSUES PAPER

The 55-page paper, Soft Measures and Transport Behaviour, was distributed in advance to workshop participants. It was prepared to help guide and even provoke discussion at the Berlin workshop. The paper focussed on the movement of people rather than the movement of freight because there is more data on the former and because "soft measures are usually thought of as acting on travellers rather than on shippers or carriers of goods". However, the paper also noted that "soft measures may have as much application in the movement of freight as in the movement of people". The paper is reproduced as Appendix 1 to the present report.

The issues paper overviewed the EST project, noted some of the major contributing factors to the motorised movement of people, discussed the effects of advertising, reviewed some of the data on the effectiveness of soft measures, and drew several conclusions.

The thrust of the issues paper was mostly antagonistic to the view that soft measures can affect behaviour. It favoured management of transport behaviour through manipulation of its consequences. It was somewhat unreceptive to arguments that information and persuasion can play strong roles in changing behaviour. The issues paper thus provided opportunities to contradict its arguments and conclusions by bringing forward important evidence of soft measures' positive effects. These opportunities were taken at the workshop.

OVERVIEW OF THE PRESENT REPORT

The next six sections provide accounts of the six sessions of the workshop. These are followed by a section that lists the points made during workshop discussions that are not noted in the sections on the individual sessions. Then follows a table that sets out 18 questions posed in the issues paper, and provides answers to them based on the workshop presentations and discussions. A final section draws conclusions for policy-makers.

Four appendices provide the conference programme, the papers presented at the workshop, the issues paper distributed in advance of the workshop, and contact information about workshop participants.

SESSION 1: OPENING SESSION

SESSION HIGHLIGHTS

Reinhard Kaiser welcomed participants and gave the opening presentation. He said that technology alone is not enough. Changing transport behaviour is the main challenge in moving towards EST. Soft and hard measures are necessary complements in securing this change. Acceptance of effective measures is the key. People must understand why change is necessary, what is lost if change is not made, and what is gained if change is made.

Peter Wiederkehr briefly overviewed the EST project. He highlighted the backcasting process (see the previous section) and noted that all EST project teams had stressed the importance of soft measures—i.e., education, information, and attitude change—as necessary supports for hard measures. There was little suggestion in the work of the project teams that soft measures alone would provide sufficient progress towards EST. However, policy-makers prefer soft to hard measures, and it would be useful to examine what could be done with soft measures.

Richard Gilbert briefly introduced the previously distributed issues paper by observing that "Behavioural science is not for sissies", a quote from one of its cited sources (Pinker, p. 121; see Note 100 in the issues paper). He said that the topics of the workshop pose fundamental questions about human existence, the nature of society, and the roles of politicians in a democracy. He drew attention to some of the features of the issues paper including, (i) the paper's focus on car ownership; (ii) the paper's focus on the relationships between transport behaviour and the context of the behaviour, particularly its consequences; and (iii) the paper's suggestion that acceptance of hard measures more often comes after they have been introduced rather than before. He offered the view that emphasising soft measures could be a diversionary tactic by policy-makers fearful of taking or otherwise unwilling to take effective action.

During discussion, **David Banister** asked whether we should be seeking merely to reduce the rate of growth in transport activity. The strategies required for attainment of EST are unquestionably aversive. Moreover, the focus should not be on environment alone. The targets of soft measures should include businesses and institutions as well as individuals.

Ladies and gentlemen,

It is a pleasure to welcome you in Berlin on behalf of the German Federal Environment Ministry for this workshop on "Communicating Environmentally Sustainable Transport – The roles of soft measures in achieving EST".

This workshop is part of the implementation phase of the OECD's EST project. The Federal Environment Ministry much appreciates the work of the OECD in this area. The experts working on the project have been courageous, trying to answer questions that most of our decision makers and politicians do not even dare to ask. They considered transport development in the far future, trying to foresee emerging problems. Germany—and many other countries—participated in this project by conducting a case study. The results of the EST project have provided a model for sustainable transport strategies in many other countries and regions.

From the results of the project, we must learn that technology alone will not do: major changes in individual transport behaviour will be necessary. This is the main challenge in moving towards environmentally sustainable transport.

One important goal of this workshop is to investigate how to bridge the gap between what would be necessary from a scientific point of view in order to achieve sustainable transport, and what politicians may dare to do in order to survive as politicians.

Many decision-makers see meanwhile that it is worth struggling for sustainability. Early this year the German Federal Government presented its national strategy for sustainable development. It not only states that the transport efficiency of our economy has to be improved; it repeatedly refers to the need for a "decoupling" of economic growth and the growth in transport activity. Germany has in recent decades achieved such a decoupling between economic growth and energy consumption. A strategy of avoiding unnecessary transport activity must be developed, and the German Government began to take action towards this end during 2002.

That's exactly the central idea in EST: Environmentally sustainable transport will provide access for everyone, and seeks to do that without endangering human health or the ecosystem. Sustainable transport does not necessarily mean less mobility. However, it does mean travelling for short distances, with cycling, walking, and public transport being the main modes for passengers, and railways and ships carrying the main freight burden. Cars will be highly efficient, equivalent-zero-emission, low noise vehicles, driven by people eager to drive smoothly, quietly, and efficiently. With such driving behaviour the accident rate will drop considerably. But how do we achieve such a fundamental change in driving behaviour? That's just the beginning of the discussion about soft measures.

This workshop has been arranged to discuss what soft measures may contribute to make this vision come true. We do not consider soft measures in order to avoid hard measures. Rather—in our view—soft and hard measures are necessary complements. The critical point for both soft and hard measures is to attain acceptance of the strategy for achieving progress towards EST.

The fundamental condition of success for any EST strategy is making people understand the problem and the vision:

- why it is necessary to change transport behaviour,
- what we lose if we do not change,
- what we gain if we do.

How can we reach people with our matters of concern? Is it possible to create an intellectual and ethical milieu supportive of sustainable transport? And, on the other hand, what can we learn about the objectives and values associated with current transport behaviour? Why is this

traditional system so stable? And what are reasonable instruments of change in this area of values and lifestyles?

The questions to be dealt with are numerous and far-reaching. We are sure, from your broad experience with multiple aspects of this topic, you can help us move forward. We in the Environment Ministry are eager to receive strong and practical conclusions from this workshop. We hope that, at the end of this event, we will be able to provide better advice to those in politics and administration who strive for environmentally sustainable transport as to how soft measures can best be used in order to achieve our common goals.

SESSION 2: PRESENT TRANSPORT BEHAVIOUR AND WHAT MAINTAINS IT

SESSION HIGHLIGHTS

Herbert Kemming proposed that soft measures and mobility management are essentially synonymous. They have to be part of consistent, integrated packages of measures. The U.Move project focussed on young people. They are experienced users of green modes, especially public transport. The challenge is to sustain their green transport behaviour into adulthood when they understand car usage as normal. He added that soft measures have an impact only "at the edge". The main work of changing behaviour has to be done by hard measures. Soft measures can help improve acceptance of hard measures, especially when acceptance is low, as in the case of measures designed to achieve car-free housing.

Ellen Matthies could not attend the workshop on account of illness, but her paper had been previously distributed and was referred to several times. In it she noted that psychologists have only recently become interested in travel-mode choice. She proposed a modified 'norm activation model' to serve as a framework for developing 'soft' intervention strategies to change transport behaviour. Moral (e.g., pro-environmental) motivation of transport behaviour is balanced against competing motivations, highlighting possible effects as well as preconditions and restrictions of moral intervention. Car ownership has not been studied, but analysis of settlement factors is under way.

Charles Vlek considered motorised transport as a common- resource dilemma capturing the conflict between individual and collective interests. He said that a systematic policy approach should comprise problem diagnosis, policy decision-making, practical intervention, and effectiveness evaluation. The use of different strategies for transport behaviour change, 'hard' as well as 'soft', should be tuned to one or another of four behaviour processes: deliberation, social comparison, repetition (habit), and imitation. 'Hard' (i.e., confronting, forcing) and 'soft' (i.e., informing, guiding) policy measures are difficult to separate in practice; neither type is effective alone. The main policy task is to sustain a balance between individual freedom and social/environmental equality of opportunities. Policy measures should increase problem awareness, stress people's own responsibility, and make alternatives available. Policy goals should be clarified, and recommended 'sustainable' behaviours should be attractive (or at least acceptable) from both a personal and a social point of view.

In conclusion, **John Adams**, the session chair, summarised the challenges for understanding present transport behaviour by reflecting on the answers to three hypothetical opinion-poll questions: (i) Would you like a car, unlimited air travel, and the best possible electronic communications facilities? (ii) Would you like to live in a world in which this wish was granted to everyone? (iii) Would you like to live in a community in which people know their neighbours and it is safe for children to play in the street? Soft measures could help resolve the fundamental incompatibilities between what people want for themselves and what they want for others.

Introduction

Before showing some research results on mobility and travel behaviour a brief outline of *soft measures* seems to be necessary. The following understanding is strongly influenced by the European research in the field of *Mobility Management* (MM), in which ILS has been involved since 1996. Over a wide range, soft measures and MM are understood as synonymous terms.

Of high importance for an understanding of soft measures or MM is that:

- Actors in this field are neither the *government* (at the different levels) nor municipalities alone. Strategies will not be successful without powerful actions *other stakeholders* (private non-profit associations, public-private agencies, companies), groups of people like teachers or parents at a school, the public, etc.
- In some countries *top-down approaches* (e.g. in the Netherlands or in the UK) encourage stakeholders to implement MM initiatives and to make them successful. Information and communication on the subject – sometimes combined with some kind of pressure – are seen as an instrument to motivate stakeholders and the public to be active.
- In other countries (e.g. in Germany) there are many *bottom-up activities* (e.g. establishing mobility centres). Here is a need for leadership, for co-ordinating activities, for bundling and enhancing communication on best practice, for standardisation etc. to make these initiatives more efficient. Here lies a clear duty of the public sector (*mobility governance*).
- Having this in mind *soft measures* or MM include primarily information, communication, and organisation to make travel behaviour more sustainable within a multimodal integrated approach. Soft measures are flexible to implement and not mandatory. They include integrated sector-crossing strategies and need partnerships between different actors. Examples for these measures are mobility information packages for new inhabitants in cities or initiatives of municipalities to motivate schools to develop mobility management. Looking at companies as actors, soft measures or MM are primarily innovative communicative strategies within the whole marketing mix (e.g. direct marketing) or innovative new products.

Soft measures or MM have to be embedded in consistent integrated packages of measures, they have primarily a complementary role. A strict distinction of soft and hard measures seems to be primarily of academic interest.

Mobility styles of young people: the U.MOVE project

The project design

Regarding the topic of *Session 2: Present transport behaviour and what maintains it*, my task is to show some results of the U.Move project which recently was finished by a consortium co-ordinated by ILS.[1]

Targets of U.Move:

[1] Partners within the consortium were: Deutsches Jugendinstitut, Sekretariat für Zukunftsforschung, Forschungsgesellschaft Mobilität, Deutsche Bahn AG, Dortmunder Stadtwerke, Verkehrsbetrieb Potsdam, VIA Beratende Ingenieure and plan-lokal. U.Move has been funded by the German Federal Ministry of Education and Research.
A publication of the project results is just available: M. Hunecke, C.J. Tully, D. Bäumer (Hsg.): Mobilität von Jugendlichen. Psychologische, soziologische und umweltbezogene Ergebnisse und Gestaltungsempfehlungen. Opladen 2002.

- The overall objective was to identify mobility styles of young people as a basis for developing target-group oriented mobility services for young people.

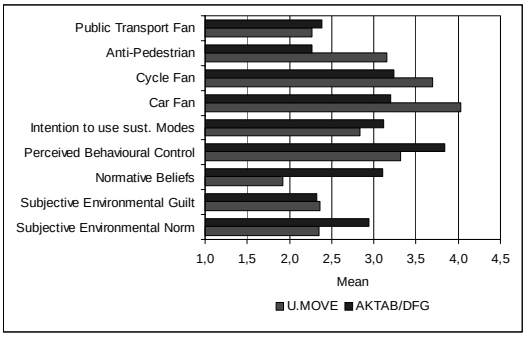

Figure 1: Comparison of mobility-based intentions in U.MOVE with the general population

- A main objective was, in addition, to understand mobility behaviour of young people better. Insofar U.Move had to:
  - identify mobility motives of young people as well as their modal choice behaviour, having in mind their personal situation
  - find out the relationship between mobility style and behaviour
  - elicit how young people perceive different modes as well as combinations of modes
  - develop demand/needs or target-group oriented mobility services which offer alternatives to the car
- A focus was laid on the question of if young people use different modes dependent on situation, intention, etc. (*multimodal* behaviour) or if they use different modes within a trip (*intermodal* behaviour).

The survey included a well balanced sample:

- 4,417 young people between 15 and 26
- 49 % male and 51 % female
- 51 % from East and 49 % from West Germany
- 48 % in cities (Dortmund, Potsdam) and 52 % in rural areas (Passau, Greifswald)
- 36 % of 15-17 years, 30 % of 18-22 years, 34 % of 23-26 years
- 34 % pupils, 23 % trainees, 16 % students, 13 % at work.

The project started with a first Round Table as a basis for elaborating basic hypotheses, a second Round Table to test the questionnaire, the quantitative survey, the statistical analysis of the data to construct mobility types, and qualitative interviews that validate the results. Then U.Move developed exemplary projects together with the young people as well as scenarios to create to generalised results on strategies.

Mobility oriented attitudes of young people

Mobility and especially modes are loaded up with added symbolic values. In early childhood children seem to have a positive attitude especially towards the bicycle and cycling, much more than towards walking and PT. Positive attitudes towards the car strongly increase later on, so that car driving and getting a drivers license has a high importance for the teenager to get independent and grown up.

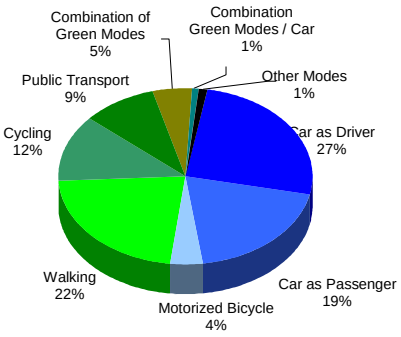

Figure 2: Modal choice of young people, all trips, N=30.649

Figure 1 shows mobility oriented attitudes of young people compared with attitudes of the general population. There are clear differences between young people and adults. Young people are on average more a fan of the car and the bicycle than adults and seem to dislike walking.[2] Young people personally

[2] This does obviously not influence their behaviour, because young people walk more often than adults. See below.

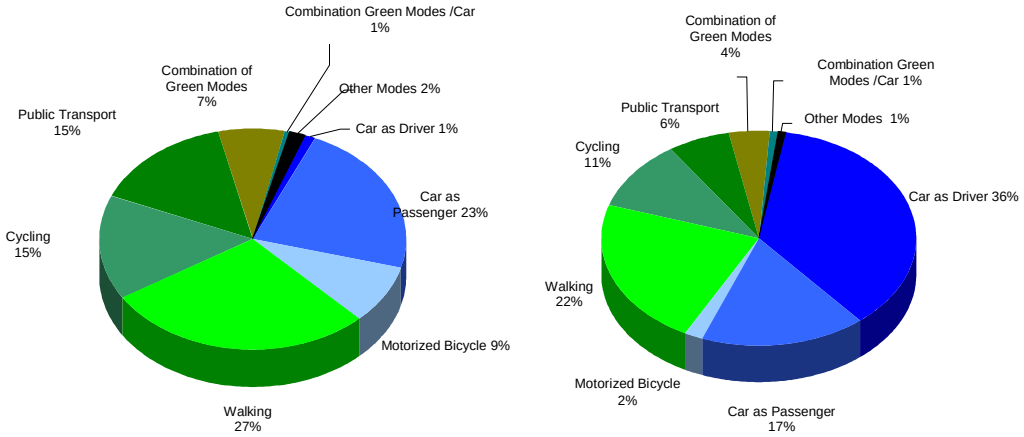

Figure 3: Modal choice of young people by age group

feel less responsible to choose green modes, care less about social standards regarding the use of green modes, see less opportunities to use green modes and are not going to use them. There is no relevant difference between young people in their attitudes towards PT and guilt about not respecting ecological needs.

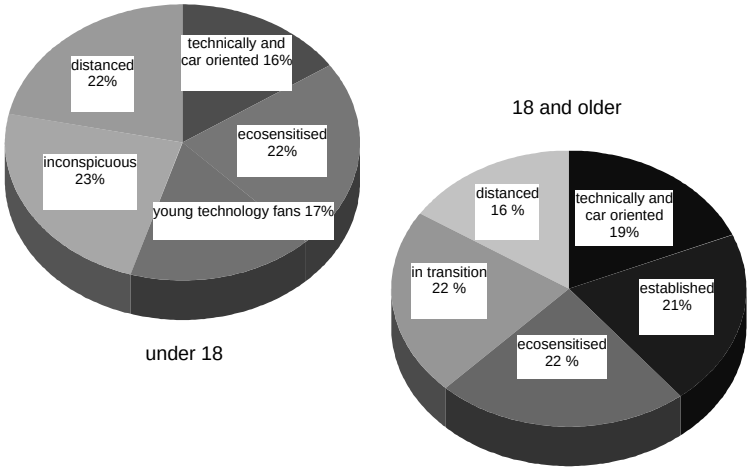

Figure 4: Mobility types in U.MOVE

These results give hints that in the future we probably have to expect less awareness of ecological needs in the population in whole as well as an increasing acceptance of the car. The good results for the bicycle cannot be generalised in a similar way because these results are influenced by the day-to day use of the bicycle of people younger than 18 years. Nevertheless strategies to enhance cycling seem to be promising.

Modal choice behaviour of young people

Figure 2 shows the modal choice behaviour of young people. On average 50 % of trips are done by motorised individual modes, another 50 % by green modes. On working days the share of green modes is higher (57 % to 42 %), on weekends lower (42 % to 57 %). In cities the share of green modes is higher (58 % to 42 %), in rural towns lower (44 % to 54 %). Figure 3 shows the average modal split for young people under 18 and 18 or more, an important differentiation because in Germany the minimum age for getting a driving licence for a car is 18.

Thirty-three percent of those under 18 years old use the car, the others green modes. Remarkable is the big share of walking (27 %), cycling (15 %) and going by PT (15 %). Meaningful is also that 23 % use the car as passengers; accompanied usage of the car seems to be quite normal.

The modal split is quite different for the young people of 18 years old and older in the sample. More than one third use the car as drivers, still 17 % as passengers. Walking remains quite high with 22 %, cycling (11 %) and PT (6 %) have a clearly smaller share.

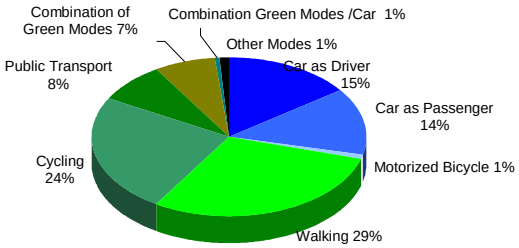

Figure 5: Modal choice of selected mobility types, ecosensitised, 18 and older

Mobility types and attitudes

U.Move identified mobility types for the age of under 18 and 18 and older. Figure 4 shows their share. Three types exist in both groups, two are different in each group.

Of interest are modal choice behaviour and additional facts and attitudes for these types. For all dimensions the values are shown in Figures 5 and 6, using the example of ecosensitised over 18. Here we find a share of 70 % of green modes, the biggest share with 29 % for walking, 24 % for cycling. But, there is also a share of 15 % car drivers and 14 % of car passengers. PT (busses, rail) is with 8 % relatively small. Interesting seems the share of 7 % of mode combination within the green modes.

Looking at basic facts and attitudes we see a higher level of education and a higher age than on average. Car usage for leisure and technical orientation are of minor importance. This group knows and accepts ecological standards. So they use green modes and assess car driving as boring. It will not be astonishing that fans of the car show rather different behaviours and attitudes.

Results

The U.Move results show all in all a multimodal behaviour of the young people in the sample, differentiated for mobility types. For persons under 18 the not yet available car driving license is a main reason for this behaviour. Although the behaviour of the young people of 18 and older is not yet stable, especially mobility types like the car and those technically oriented are close to a monomodal behaviour. For understanding the importance to 18-year-olds we have to have in mind the growing up circumstances of young people today: in a situation where they remain economically dependent on their parents because of the long education phase. The driving licence is an important symbol of becoming an adult.

Young people are experienced users of green modes, and especially of PT. A main challenge will be to sustain their customer relations to PT. Special offers for this group could use their experience to test new combined and integrated services. As the driving license and car driving has a symbolic meaning for young people, it could be counterproductive not to accept their respective interests and needs.

It seems to be clear that for young people positive impacts on the environment are not (alone) a convincing argument for using green modes. Usage of green modes seems to be of interest only if these modes fulfil specific needs and if their handling is

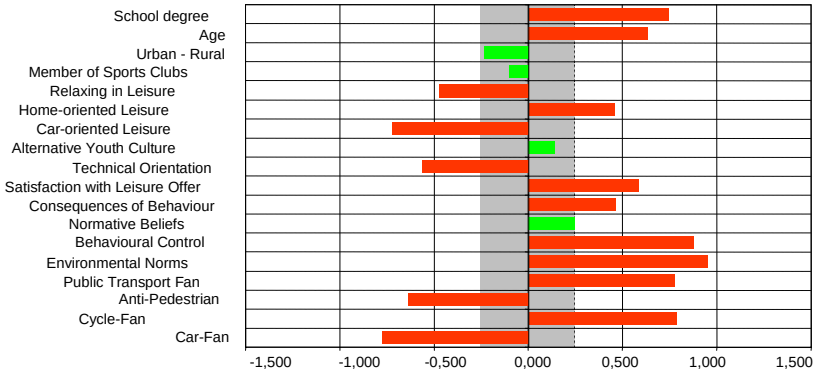

Figure 6: Dimensions of selected mobility types , ecosensitised, 18 and older

easy. Young people have an above-average knowledge of environmental things and their environmental impacts.

This knowledge is usually not transferred into attitudes and behaviour, with the exception of the ecosensitised.

Conclusion: anchor points for soft measures

It cannot be surprising that in an automotive society young people understand car usage as normal. In their private area they are familiar with car usage. And in other spheres like school and leisure activities car usage is also normal.

Therefore, an important anchor point for sustainable mobility behaviour is the car. Strategies can be campaigns for car pooling in rural areas or improving access for car sharing, where young people currently are excluded because of financial barriers (high bail, high insurance premium). This way of car using without owning a car seems to be promising. Helpful could be strategies which include school education as well as driving schools. Car sharing companies as well as insurance companies should be convinced to lower the financial barriers for young people.

Schools are another important anchor point for changing behaviour. Mobility education has to be improved and should take place not only in primarily schools, but also later on. It has to be combined with mobility management at schools to habituate usage of green modes. Without the appropriate behaviour of teachers and parents this will not work. Various stakeholders such as schools, teachers, parents, and pupils should be included. Municipalities could take over a leading role.

Special target group oriented PT services could be another anchor point. Disco busses and night busses are popular because they are trendy and solve a severe conflict (alcohol and driving).

There is also a necessity to find a way to sustain the high level of walking of young people. Measures could be the generally well-known measures to improve walking conditions, including ensuring a walking friendly climate.

Psychology has a 30-year tradition of dealing with environmentally relevant behaviours (e.g., explaining damaging behaviour; promoting pro-environmental behaviour). Starting with analyzing the weak relationship between environmental concern and pro-environmental behaviours (see Maloney & Ward, 1973), in the last decade environmental psychologists have switched to explaining specific environmentally relevant behaviours (e.g., energy consumption; recycling behaviour, consumer behaviour), and only recently, they have become interested in the factors determining travel mode choice (Bamberg & Schmidt, 1997; Aarts, Verplanken & van Knippenberg; 1997; Bamberg, 2001; Hunecke, Blöbaum, Matthies & Höger, 2001; Matthies, Kuhn & Klöckner, 2002).

Psychological knowledge about the factors influencing travel mode choice

There are two classic psychological models which have been applied in order to explain environmental protective behaviour: the theory of reasoned action, or its further development, the theory of planned behaviour, and the norm activation theory. In the last years, efforts have been made to apply these models to travel mode choice (e.g., Bamberg & Schmidt, 1997; Hunecke et al., 2001). Due to the fact that external factors seem to have a strong influence on travel mode choice, psychologists have modified these models by integrating external variables (e.g., costs for car use vs. public transport) and internal, psychological variables (e.g., attitudes towards transport modes, ecological norms) with the aim to get more knowledge about the interplay between these factors. Only recently, the concept of habit has been integrated into the above-mentioned models (Aarts et al., 1997).

In the pre-mentioned empirical studies, the following factors have proved to be relevant (in integrative models) for the actual choice of travel mode:

As external factors: access to a car; costs; quality of transport connections. As internal factors: perceived control over the behaviour; social norms (expectations of significant others); attitudes towards travel mode; personal ecological norm (feeling of obligation to support sustainable ways of transport); travel mode habits. The external factors and the factor habit play a central role in some of the studies, because they seem to moderate the relationship between internal factors and behaviour. Only when behavioural costs for using sustainable modes of transport are low and car habits are weak, attitudes or environmental concern may become decisive factors for travel mode choice.

Psychological models and interventions to promote sustainable modes of transport

The aim of modelling travel mode choice is to identify starting points for interventions able to alter the explained behaviours. Although psychology has developed a great variety of strategies which are able to foster ecological behaviour (e.g., less consumption of electricity; recycling), there has been only little research on altering travel mode choice (but see Bamberg, 2000; Rölle, Weber und Bamberg, 2002; Hunecke et al., 2001). And even less studies have evaluated intervention strategies in a psychological model context.

In our research group a modified norm activation model is used as a theoretical framework for developing intervention strategies to change car use (Matthies, Blöbaum, Höger & Hunecke, 2001). The model has originally been developed by Schwartz (1977) to explain altruistic/moral decision-making. Although it focuses on the activation and influence of personal norms on behaviour, it explicitly takes into account that a moral motivation has to be balanced against other, competing motivations (e.g., to save monetary or behavioural costs, to fulfil expectations of others), and so individuals frequently do not behave in accordance with their personal norms. The competing motivations reflect external influences (e.g., comfort, price of public transport, social expectations), so the model is able to integrate internal and external factors. A further specialty of the model is the assumption that the decision to not behave in accordance with one's norms activates defence mechanisms like denial of responsibility or redefinition of the

situation (e.g., negating the problem or abilities). Because of these characteristics, the model can serve to explain the interplay of soft and hard measures in the domain of travel mode choice, moreover it can help to identify constraints and possible risks of implementing soft measures.

The model comprises four steps (see Figure 1): In a first activation step, the individual has to become aware of a problem (e.g. climate change). Moreover, he or she has to recognize some further aspects of the person-situation-interaction, e.g., that there are effective actions which could help to solve the problem (e.g. reduce car use), and the ability to contribute to change. At this stage, awareness of consequences of one's own behaviour may play an important role. In a second step, the personal obligation (to switch to sustainable transport modes) is generated from pre-existing personal values (e.g. environmental concern). Along with the moral obligation also social (expectations of others) and further non-moral motivations (e.g. economical motivation) are activated. In the following evaluation stage, probable competing costs (e.g. loss of comfort, costs of violating peer group norms) and outcomes (satisfaction of acting in accordance with one's norms; positive aspects of using sustainable transport modes) are assessed. Due to the result of that primal balancing of costs and outcomes the individual may engage in sustainable transport behaviour (fourth stage) or reassess and redefine the situation, and probably neutralize the obligation to act.

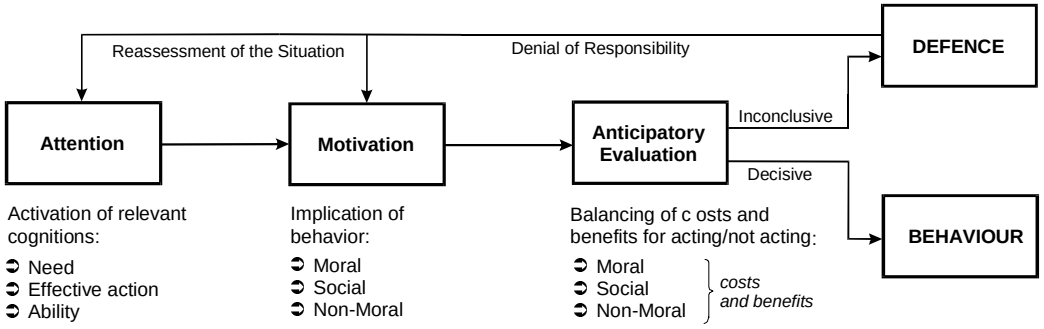

Figure 1: Stages of moral decision-making

Consequences for the implementation of soft measures to support sustainable transport

According to the model, choice of travel mode is determined by a variety of motives of which environmental concern is only one. In order to promote a reduction of car use there are several starting points for soft measures:

- *Make aware the positive consequences of sustainable transport modes.* E.g., show that walking/going by bike is healthy, that using public transport saves money and time, that going by bus is a relaxed way to get to work, etc.
- *Make aware the negative implications of car use*. E.g., show that looking for a parking lot is time consuming, that traffic jams are both annoying and time consuming, etc.

Note that these strategies presuppose that sustainable transport modes *actually have* the mentioned positive implications. Ideally, these soft measures should *be combined* with adequate hard measures.

- *Give special attention to social expectations.* A campaign with role models who advertise for using public transport may change social norms that are nowadays more supportive for car use and car ownership than for the use of public transportation. To change social norms may be of special relevance for the group of adolescents and young adults, so it will be useful to employ social models relevant for this subgroup, e.g. soccer players or pop stars.

- *Provide information about public transport that is tailored to the specific target group.* A basic pre-condition for the development of new behaviours is knowledge on how to act and self-efficacy (in the terminology of norm activation theory the ability to act and the anticipation of effective action). These are good starting points for soft measures, as has been shown recently by Rölle et al. (2002).

Only if the target behaviour is reasonably easy to perform (e.g., using a comfortable subway line into the city centre), a personal ecological norm may become a decisive factor for travel mode choice. There are several soft measures which may activate personal norms to reduce car use:

- *If people are caring about climate change, inform about adverse consequences* of their car use (e.g., climate change, air pollution, noise) and about possible alternatives.
- *If people are caring about climate change*, give the option to *solicit a verbal or written commitment* to reduce the problematic behaviour (e.g., take the subway instead of car for the next trip to the city centre). This is a very effective way to activate and stabilize personal norms.

However, the model of norm activation makes clear pre-conditions and restrictions for the use of norm activation strategies:

An important pre-condition for the effect of norm focused soft measures is that people actually care about climate change, air pollution, etc. So before implementing such strategies the target group should be examined with respect to pre-existing environmental values. Environmental education (in the media or at school) can be a soft measure which can build up personal norms and may serve as a pre-requisite for future norm focused interventions.

If norm focused strategies are applied in a situation where the desired behaviour change is too difficult (e.g., using public transport in spite of a poor connection) norm focused strategies will not only fail but even may be counter-productive, because it may lead people to change their perception of the problem and deny responsibility.

Constructs of the moral decision model	**Applied to car use/car ownership - Possible barriers to *est***	**Soft measures to promote *est***
moral motivation (personal norm) • preexisting values • awareness of need • awareness of effective action • ability to act/self efficacy	• no preexisting values (general environmental concern) • no awareness of the consequences of private car use, climate change etc. • no awareness of more sustainable modes of mobility, e.g., public transport and car sharing • lack of skills (how to read time tables, how to organize mobility without a car)	• establishing pro-environmental values (e.g. by educational programs) • informing about the adverse consequences of BAU • informing about more sustainable modes of mobility • training new behavior (e.g. at school or driving school)
social motivation • expectations of friends, colleagues, family	• high prestige of owning a large, powerful car • low prestige of going by public transport • low prestige of borrowing/sharing things	• counter advertising • campaign with role models (e.g. soccer-players) advertising for public transport, for car sharing etc.
further motivation • e.g. need for convenience • e.g. economic motives • e.g. security motives	• use of public transport is inconvenient, car sharing facilities are inconvenient • costs are too high • security concerns (when using public transport, when owning a smaller car)	**Hard measures:** Make sustainable mobility more convenient, less expensive **Soft measures:** Make aware the negative implications of car ownership, e.g., costs of car purchase & garage, maintenance costs, etc.

Figure 2: Applying the moral decision making model to car use and car ownership

Against this background, it may be useful to implement norm activation strategies primarily in the context of participatory approaches, i.e. approaches which involve parts of the target group in the design and execution of an intervention.

Soft measures to reduce car ownership

Until now, car ownership has not been investigated empirically by psychologists. However, the modified norm activation model can be used to identify possible influencing factors, and therefore help to indicate starting points for useful measures to change the problematic behaviour. Figure 2 shows barriers that may exist to the required behaviour change, and starting points for soft measures. The bigger part of the soft measures depicted (e.g., establishing pro-environmental values, informing about adverse consequences of BAU, informing about alternatives, campaign with role models) can be implemented to change both car use as well as car ownership.

For the application of soft measures one generally has to bear in mind the moderating factors: behavioural costs and habits. If behavioural costs are high, or car habits are strong, soft measures may fail or be even counter productive. Therefore it makes sense to restrict the application of soft measures to target groups with weak car habits (e.g., people moving to a new city, young people who have not yet developed strong car habits), and with an infrastructure supporting sustainable modes of transport.

Can soft measures help achieve denser patterns of land use?

Urban sprawl seems to have its causes in a variety of structural as well as individual factors. Before considering soft measures to increase settlement density, a thorough analysis should be performed, concerning the causal relationships between the choice of a domicile's location, life style and mobility behaviour (see Hunecke & Wulfhorst, 2000). A multidisciplinary research team comprising psychologists as well as traffic scientists and regional planners (STADTLEBEN: www.rwth-aachen.de/stadtleben/), run by the German Federal Ministry of Education and Science (BMBF), are currently working on this analysis.

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Thus far, the area of human mobility and transport is escaping from effective policy-making in view of sustainable development. During the past 100 years increasing motorisation has brought about an enormous revolution in everyday life, in human interaction and in the spatial configuration of social and economic activities. Currently, there are widespread and growing concerns about congestion, (other) environmental impacts and reduced quality of life in relation to unsustainable transport developments (i.e., a general over-motorisation, or avoidable use).[1]

This paper first indicates (as requested) various psychological mobility-and-transport research done at the University of Groningen. It then discusses the commons dilemma as a situation of conflict between individual and collective interests. The logical follow-up goes along seven general strategies for (transport) behaviour change in relation to four different behaviour processes (e.g., deliberate choice *versus* automatic habit). Here, some conclusions are drawn about the meaning of 'hard' *versus* 'soft' policy measures for environmentally sustainable transport. In the last part, traditional (Dutch) mobility-and-transport policy is critically considered and various principles and policies for sustainable transportation are discussed.

Psychological transport research at Groningen

Since roughly ten years ago, the small environmental psychology group at the University of Groningen has undertaken a variety of mobility and transport studies, as follows.

- Evaluation of car-use reduction scenarios (Jager, Vlek);
- Reasons, strategies and a catalogue of measures for reducing car use (Vlek, Michon);
- Problem awareness, willingness to change car use, evaluation of policy scenarios (Steg);
- Evaluation of car *vs.* other household durables in the context of energy saving (Gatersleben);
- Analysis of options for energy saving in relation to global warming (Slotegraaf *et al.*);
- Transport users' sensitivity for diverse policy measures (Cavalini, Hendrickx, Rooijers);
- Rational and emotional motives for car use (Slotegraaf, Steg);
- Energy-saving household scenarios: focus 'mobility' (Poortinga);
- Effectiveness of pricing policies in transport (Schuitema, Steg);
- Motorised transport as a common-resource dilemma (Vlek, Hendrickx, Steg).

In most studies data were collected via mail questionnaires, personal interviews and/or small-group sessions. The studies were done in the context of 'sustainability' questions applied to either motorised transport itself or to household behaviour as a more encompassing area of human activities. Some findings are: many people would accept some pressure ('push') on car-use reduction if feasible alternatives ('pull') are provided; problem awareness plays a significant role here. Next to other household durables such as TV and washing machine, the car is particularly valued for the freedom, comfort and pleasure it may provide. Business travellers, commuters and private-purpose travellers are differentially sensitive to policy measures such as fuel

[1] Motorised transport is, of course, part of a more-encompassing development of mass motorisation of numerous human activities. Divergent examples are building construction, street cleaning, lawn mowing and water scooting. For any of the relevant tools, implements or vehicles used, pertinent 'sustainability' questions are: why is this used; what are its social and environmental costs; to what extent is the user aware of the costs; what would be feasible alternatives; how could the user be encouraged to use a more environment-friendly alternative? There is rather little systematic analysis and environmental policy making on the various motorised vehicles and tools.

price increases, speed limitations and parking restrictions. Apart from instrumental-reasoned motives for car ownership and use, symbolic-affective motives play important roles. Due to the importance of other than financial motives, pricing policies for regulating car use may not be as effective as economists like to think. And government attempts at reducing car ownership and car use, directly aimed at the individual citizen, may be of limited value, because of the strong influences emanating from higher levels in the socio-economic and social-cultural systems of society. See reference list for relevant publications.

Motorised transport as a commons dilemma

Massive motorised transport constitutes an impressive example of a common-resources or commons dilemma (see Hardin, 1968; Dawes, 1980; Vlek & Steg, 2002). This is a social situation of conflict between a set of aggregate collective interests such as public health and living environments, and numerous individual interests such as getting from A to B for various reasons. In pursuing their own personal interests, many individuals disregard limited negative effects on their common physical and social environment. By accumulation of the many small contributions the overall effect may be rather burdening, and collective environmental qualities may significantly deteriorate. An example is urban air pollution through the accumulation of exhaust gases from individual motor cars. Such a social process of environmental decline often proceeds slowly and gradually, which stands in stark contrast to the immediacy and frequency of the benefits obtained by individual resource users.

Almost by definition, a commons dilemma exceeds the physical, cognitive and motivational scope of individual actors at the micro-level of society. Therefore, the basic question is how the collective environmental cost or risk can be validly assessed, effectively communicated and acceptably managed. Table 1 provides a stepwise model approach revolving around the four components of problem diagnosis, policy decision-making, practical intervention and effectiveness evaluation. Together, these may be elaborated into twelve points of attention, as listed in Table 1.

Problem diagnosis
1. Analysis and assessment of collective risk, annoyance and stress
2. Analysis/understanding of socio-behavioural factors and processes underlying risk generation
3. Assessing problem awareness, risk appraisal and actors' individual values and benefits

Policy decision-making
4. Weighing of collective risk against total individual benefits ("need for change?")
5. If 'risk unacceptable': setting environmental and/or social risk-reduction objectives
6. Translation of risk-reduction objectives into individual-behaviour goals

Practical intervention
7. Specifying feasible behaviour alternatives and selecting effective policy instruments
8. Zooming in on target groups and considering essential conditions for policy effectiveness
9. Target-group(s) oriented application of strategic programme of behaviour change

Effectiveness evaluation
10. Designing a monitoring and evaluation programme to determine effectiveness
11. Systematic, comprehensive evaluation of observable effects and side effects
12. Intermittent and *post hoc* feedback about, and revision of intervention policies

Table 1: Twelve points of attention for research and policy about commons dilemmas.

One key issue in Table 1 is, of course, the design and implementation of effective policy interventions. Note that commons dilemmas may be 'resolved' only by the achievement of a safer, sustainable *balance* of individual benefits and collective goods. In collectively risky situations such a balance may only be achieved by changing (impacts of) relevant individual behaviours.

Four different behaviour processes

For an adequate design of behaviour-change programmes one needs to be aware of the ways in which human behaviour may be determined. Traditionally, in psychology two 'grand' theoretical frameworks are relevant here. One is *behaviourism* where it is assumed that human behaviour largely depends on 'hard' (physical, economic and social) *environmental* conditions or manipulations. This is most ingeniously demonstrated when animals learn tricks on the basis of a consistent reinforcement scheme of rewards and punishments. The latter is usually called the incentive structure of the behaviour. Behaviourism implies that human behaviour may be changed by environmental manipulations *forcing* choices that can not (or hardly) be evaded.

The other theoretical framework is *cognitivism* whose adherents maintain that human behaviour depends on cognitive processes ('between the ears') involving learning, feeling and thinking. These processes are sensitive to information, persuasion and social performance examples. Cognitivism implies that human behaviour may be changed via 'soft' information-processing manipulations aimed at *guiding* choices to be (otherwise) made in freedom.

The behaviourism-cognitivism distinction runs parallel to the everyday distinction between reasoned and automatic behaviour, or between deliberation and habit. A second major distinction is between private, or individual, and public, or social, behaviour; public behaviour being subject to influences emanating from other people around. Thus, as Table 2 shows, policy makers aiming at human behaviour change should be aware of the existence of at least four basically different behavioural processes: deliberation, repetition (habit), social comparison and imitation, respectively. For each of these four processes well-established theories are available that specify behaviour determinants, the way these operate and the external manipulations whereby determinants might be changed.[2]

	Private (individual)	Public (social)
Reasoned ('cognitivism')	***DELIBERATION*** *Behavioural decision theory* *Theory of planned behaviour*	***SOCIAL COMPARISON*** *Social comparison theory* *Relative deprivation theory*
Automatic ('behaviourism')	***REPETITION*** *Pavlovian conditioning theory* *Instrumental learning theory*	***IMITATION*** *Social learning theory* *Theory of normative conduct*

Table 2: Four different behaviour processes following two dimensions, with relevant theories

To explicate, *'deliberation'* is a process of individual reasoning about possible behaviour options and their feasibility, the pros and cons of alternatives, possible uncertainties about consequences and the value or utility of the latter. The major motive of deliberative behaviour is to maximise the expected value or utility of the behaviour, whereby 'value or utility' may be broadly considered to also encompass non-monetary ingredients (such as effort or time spent).

'Repetition' (or habit) is an individual process of automatic behaviour which has been well-established over time as the result of recurrent positive reinforcements and the absence of major punishments (and/or the presence of discouraging punishments linked to alternatives). The primary drive of repetitive (habitual) behaviour thus is average positive reward, but note that part of the reward lies in the absence of deliberative effort: not having to think about what to do in frequently recurring situations like travelling to and from work saves cognitive energy for other, more demanding behavioural decisions.

[2] See Vlek (2000) for references and more on relevant theories.

'Social comparison' is a process of tuning one's behaviour to what is observed or supposed about significant other people. The latter may be family, friends, colleagues, teachers or other authorities whose opinions, abilities and accomplishments one finds important. The main motive in social comparison behaviour is to (eventually) distinguish oneself positively, in one way or another, from comparable other people, so that feelings of relative deprivation may be avoided. Social comparison and the competition involved tends to be strongest with respect to resources or goods that are (becoming) scarce so that fewer people can actually afford them; big cars, spacious homes and exotic holidays are examples.

'Imitation' is a behavioural process of automatically copying other people's (visible) behaviour or their behavioural norms or expectations. Like repetitive behaviour, imitation also goes without explicit reasoning. Simply copying what others are or have been doing in similar situations is not only cognitively easy, but it also frees the subject from possibly critical responses or admonitions by other persons. Imitative behaviour may come about through so-called descriptive norms, as when the subject simply mimics what others are actually doing. Or it may rest upon 'injunctive' norms, that is, the subject's own suppositions about what other people would approve or disapprove of.

Taken together, the set of four different behavioural processes given in Table 2 indicates that transport behaviour, too, may be determined by 'reasoned' as well as 'automatic' factors, and by 'private' as well as 'public' factors. Thus it is useful to conduct some kind of behaviour diagnosis in order to identify which are the basic drivers of the observed behaviour, so that, if need be, strategies for behaviour change may be well chosen and adequately elaborated.[3]

General strategies for behaviour change

The nature and the effectiveness of various solution approaches for commons dilemmas have been investigated in a great number of laboratory and some field experiments. Most of these approaches may be categorised under seven general strategies for social behaviour change, as given in Table 3 ~ along with exemplary specifications.

Strategies 1, 2 and 3, and certain (physical) forms of strategy 6 would initiate so-called *structural*

1. PROVISION OF PHYSICAL ALTERNATIVES, (RE)ARRANGEMENTS
   [adding/deleting/changing behaviour options, enhancing efficacy]
2. REGULATION-AND-ENFORCEMENT
   [enacting laws, rules; setting/enforcing standards, norms]
3. FINANCIAL-ECONOMIC STIMULATION
   [rewards/fines, taxes, subsidies, posting bonds]
4. PROVISION OF INFORMATION, EDUCATION, COMMUNICATION
   [about risk generation, types and levels of risk, others' intentions, risk reduction strategies]
5. SOCIAL MODELLING AND SUPPORT
   [demonstrating cooperative behaviour, others' efficacy]
6. ORGANISATIONAL CHANGE
   [resource privatisation, sanctioning system, leadership institution, organisation for self-regulation]
7. CHANGING VALUES AND MORALITY
   [appeal to conscience, enhancing 'altruism' towards others and future generations]

[8. (by default) 'WAIT AND SEE' : 'do nothing, the quay will turn the ship']

Table 3: General strategies for behaviour change in managing commons dilemmas.

[3] Many *instrumental-reasoned* and *symbolic-affective* motives for using a motor vehicle can be categorised following the 2 x 2 scheme of Table 2. For example, convenience, freedom and safety fall under 'deliberation'; continuous availability, known infrastructure and familiar operating rules are associated with 'repetition'; identity, power and status link up with 'social comparison'; and social cohesion, hero-

(or: 'hard') solutions to a commons dilemma, whose basic nature or type would thereby be altered. Strategies 4, 5, certain other ('mental') forms of strategy 6, and strategy 7 would imply *cognitive-motivational* (or: 'soft') solutions. Through the latter, individual actors would be induced to behave in a cooperative (i.e., collectively optimal) manner, while the basic nature and payoff structure of the commons dilemma would be maintained. Structural solution strategies are generally more effective, but they are often not available or not easily implemented. Specific cognitive-motivational solution strategies are more easy to design and apply, but their effectiveness is generally lower. 'Changing values and morality' (no. 7) stands relatively by itself as a cultural solution on which much behaviour change might come to rest, so that explicit regulation is no longer needed.

Each strategy in Table 3 has its own strengths and weaknesses. For example, new physical infrastructure may *not* be effective because subjects turn away from it or start overusing it. Lawful regulation may just as well *not* work because rules are unknown or the needed enforcement is perceived as violating acquired civil rights. Pricing policies may have unexpectedly weak effects because subjects do not feel the price increases hard enough in their purses, while hard-enough prices would be politically unacceptable.

Strengths and weaknesses of various strategies for behaviour change largely depend on the subjects' own situation and their capacities to accept and accommodate to the strategy. Thus, given the targeted subject group and the power of application, each strategy may eventually be characterised by its own 'dose-response' relationship. This would indicate how much effect is realised or may be expected on a specific response variable, given a certain, well-specified 'dose' of application of the relevant strategy. In view of the above, various behaviour-change strategies, 'hard' and 'soft' ones alike, may best be combined such that their common effects may be optimal, while negative side effects are largely avoided. For example, the idea of tradable emission quotas (well applicable to motorised-transport kilometres) may be elaborated into an environmental management system in which regulatory, financial and communicative strategies are integrated.

'Hard' and 'soft' strategies for transport behaviour change

'Hard' strategies

Given the seven behaviour-change strategies in Table 3 and re-considering the distinction between 'hard' and 'soft' policy measures in light of the four behavioural processes in Table 2, we may conclude the following. Practical strategies usually considered as 'hard' are the provision of infrastructure and other physical and/or technical facilities or modifications, 'hard' regulation and enforcement, and significant pricing policies. Such 'hard' measures leave subjects little or no choice, should ideally lead to new automated behaviour processes (repetition and/or imitation in Table 2) and they may thus make life 'easy' ~ as long as subjects accept and comply. However, 'hard' policy measures, potentially effective as they may be, often meet with social and political resistance ('reactance', in social-psychological jargon) which may be manifested in evasive or counter-active behaviour undermining the original policy. Thus, building social acceptance is a crucial issue in the preparation of any 'hard' policy campaign.

'Soft' strategies

In contrast, practical strategies typically considered as 'soft' are information provision, education, communication, social (role or lifestyle) modelling, persuasive advertising, antecedent behaviour cueing or prompting[4], appealing to social norms and values, and providing feedback about (non)intervention results. 'Soft' measures largely apply to reasoned behaviour processes, that is, deliberation and social comparison in Table 2, and they are meant to change people's knowledge, perceptions, evaluations, attitudes, intentions and expectations and maybe also (eventually) their longer-term norms and values. However, because of their linkage to reasoned behaviour, 'soft' measures may do little to change automatic or habitual behaviours.

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ism and anthropomorphisation may belong under 'imitation'. See Diekstra and Kroon's list of motives elsewhere in this report.

[4] That is, the well-designed posting of small but conspicuous warnings, reminders, admonitions or bits of needed information, aimed at enabling, eliciting and/or encouraging specific 'desirable' behaviours.

Stepwise application of strategies

In addition to connecting 'hard' *versus* 'soft' measures to the four behaviour processes in Table 2, we may also attempt to link the seven strategies in Table 3 to the successive research foci and policy tasks in the commons dilemma approach of Table 1. This would provide us with an answer to the question: in which stage(s) of policy-making may 'hard' and 'soft' measures be usefully put in? Going along the lines of Table 1 we may well conclude that 'hard' measures may apply to steps 5 and 6 (goal setting), 7 (specifying alternatives) and, of course, 9 (policy execution). In contrast, 'soft' measures seem to have a much wider range of application. 'Soft' measures, may, for example, raise people's problem awareness (step 3), their understanding of the need for change (step 4), and thus their eventual cooperativeness. 'Soft' measures may also strengthen societal acceptance of principal policy decisions about goal setting for risk reduction and behaviour change (steps 5 and 6). Further, 'soft' measures may greatly support the introduction and effective implementation of 'hard' (structural) measures (steps 7 and 8) which ~ at least initially ~ may require significant adaptations of everyday life. 'Soft' measures may, of course, be a direct part of the behaviour-change programme implemented under step 9. And they may in some form play a role in data collection about the actual effects and side effects of any policy programme (step 11). Finally, 'soft' measures are important to convey the results of practical ('hard') policy interventions and provide subjects with a *post hoc* justification of what they have had to accept and accommodate to (step 12).

A commons dilemma approach to motorised transport

Let us now consider more substantively (and less precisely) how the four divisions of Table 1: problem diagnosis, policy decision-making, practical intervention and effectiveness evaluation, may aid in the understanding and management of collective problems involved in motorised transport.

Problem diagnosis

Currently in OECD countries, the private motor car is dominating human settlements, consumers consider their car a daily necessity, the car industry keeps cherishing its sales' growth, and governments willingly cash in tax money and supply infrastructural facilities. Meanwhile, most parties involved tend to look away from short-term as well as long-term sustainability problems related to accessibility, liveability and environmental quality, especially in metropolitan areas. At least for the past 50 years, car ownership has been strongly facilitated and gradually promoted into an 'acquired civil right'. Car ownership has led to structural changes in economic, social and government practices. Therefore, 'sustainable' changes require comprehensive, multi-level innovations. To get effective policies going, society wants to know:

- What are the main reasons for change?
- What are possible substantive transitions?
- How will needed transitions be managed?

National, regional and local governments are reluctant to come up with convincing answers. At some distance, however, international organisations are fairly concerned about developments in motorised transport. For example, at the end of the international OECD-conference *'Towards sustainable transportation'* in Vancouver, 1996, it was concluded (OECD, 1997, p. 56):

> "Sustainable transportation is achieved when needs for access to people, services, and goods are met without producing permanent harm to the global environment, damage to local environments, and social inequity. (..) Systems of transportation used in OECD and some other countries are unsustainable."

In its second *Environmental Assessment Report* the European Environment Agency (EEA, 1999, p. 30, 62 en 416) writes:

INDIVIDUAL BENEFITS	COLLECTIVE COSTS/RISKS
• Availability (continuous) • Payability (low costs) • Speed • Comfort (passengers, baggage) • Flexibility ('from door to door') • Reliability • Safety-*en-route* • Privacy • Freedom, autonomy • Pleasure, sensation • Social embeddedness • Social status, distinction	• Space occupation (roads, parking, street life) • Traffic jams, congestion, delays • Landscape fragmentation (biodiversity) • Traffic accidents (prevention and handling costs) • Energy consumption • Use of raw materials • Solid wastes • Harmful emissions, air pollution (local-global) • Environmental noise • Costs of infrastructure and maintenance • Costs of lawful regulation and enforcement • Decline of transport alternatives (train, bus, bike)

Table 4: Individual benefits *versus* collective costs/risks of motorised transport

> "Transport and mobility is jeopardising the EU's ability to achieve many of its environmental policy targets. (..) improved eco-efficiency is not a sufficient condition for sustainable development .. (..) In the past, economic growth and lowering transport prices have raised demand for transport. Where congestion occurred, new roads, airports and other infrastructures were constructed. (..) This closes the vicious circle of ever expanding transport volumes. (..) While many instruments are being applied to reduce transport damage, these are being overwhelmed by the rapid rise in demand for transport."

And in its broad-ranging *Global Environment Outlook*: 'GEO 2000', the United Nations Environment Program (UNEP, 1999, p. xxix en 13) notes about traffic and transportation:

> "Means must be found to tackle the root causes of environmental problems, many of which are unaffected by strictly environmental policies. (..) If current rates of expansion continue, there will be more than 1000 million vehicles on the road by 2025. Transport now accounts for one-quarter of world energy use, and about one-half of the world's oil production; motor vehicles account for nearly 80 per cent of all transport-related energy. (..) The transport sector has, so far, proved highly resistant to attempted policy reforms."

From a commons-dilemma perspective there is an impressive contrast between the individual benefits and the collective costs and risks of motorised transport, as illustrated in Table 4. This hardly needs detailed explanation. Collective (system) benefits of motorised transport, such as government income, business profits and employment, are not accounted for in Table 4. We must realise, however, that in motorised transport conflicts of interest occur at all system levels.

Market versus government operation. The oppressing problem reflected in Table 4 is that the supply, achievement and improvement of individual benefits are in the hands of 'the market': vehicle producers, sales companies, customers, specialised media and sports organisations. In contrast, the monitoring and control of the collective costs and risks is considered to be a government responsibility. However, the necessary infrastructure for motorised transport has almost been extorted from the hands of the government. What complicates matters is that the government is in a double position: on the one hand it should limit the collective costs and risks; on the other hand, it eagerly profits from tax and excise revenues. Thus it is not entirely incomprehensible that ~ under the dominant free-market ideology ~ governments tend to view the traffic and transportation domain as rather uncontrollable.

Freedom versus equality. As in every commons dilemma, in transportation too, two classical ideals struggle for priority: freedom for the individual (household, business) and equality for all. The dilemma implies that too much individual freedom of (private) transport leads to unacceptable violations of equal rights to mobility, liveability and environmental quality for all. In traffic and transportation, individual freedom and its risks of social inequality play a prominent role. The public space of roads, streets, squares and parks withdraws itself more than other locations (homes, offices, restaurants, theatres) from social control of behavioural rules and norms. Thus in private transportation people are tempted to manifest extensive freebooting, at the expense of traffic safety, the mobility of vulnerable groups, environmental quality and ultimately the equal accessibility of chosen destinations.

In combination with the increasing scarcity of desired high-speed mobility (at least on the roads), the dominant principle of individual freedom brings along widespread feelings of social deprivation, envy and competition, three factors that guarantee a strong upward drive for 'more, bigger, stronger, faster and further' (cf. 'social comparison' in Table 2). In contrast, collective transport systems (bus, train, airplane) bring along greater social equality, less individual freedom and therefore less competition among travellers.

Policy decision-making

In a densely populated country like The Netherlands, government policy on traffic and transportation is a topic of national debate, political crisis and social controversy. It is perhaps illustrative to briefly consider ten traditional policy foundations for this domain and (in brackets) the critique they provoke, as follows.

- *'(Motorised) Mobility = prosperity*'. [But individual prosperity is being reduced by the deterioration of environmental and social goods and qualities.]
- *'Let there be freedom of (motorised) mobility.*' [But this dogma of free-market thinking neglects the importance of equal rights for all citizens, including future generations.]
- *'Reducing the volume of traffic is impossible.*' [But behavioural and social scientists surely can come up with effective measures for traffic volume reduction.]
- *'Government should meet people's transport needs.*' [But transport needs are not inevitably 'given'; needs/values can be changed and shaped to meet collective interests.]
- *'Local problems are unrelated to national problems.*' [But local policy options and limitations *are* strongly dependent on national policies (e.g., taxes and fuel price).]
- *'Both car use and transport alternatives should be facilitated.*' [But effective promotion of one transport mode requires simultaneous discouragement of the other(s).[5]]
- '*The supply side of car use does not need more attention.*' [But many 'excuses' of transport users lie in the force of system properties; the supply side actually plays a dominant role.]
- '*Technology will eventually offer decisive solutions.*' [But technology is only one way of eliciting behaviour change; several other strategies exist (cf. Table 3).]
- *'Factor 4: prosperity can be doubled while environmental impact is halved.*' [But 'factor 4' is proving to be an illusion, due to steady volume growth and to rebound effects of environmental technology.]
- *'Society cannot be shaped following a preferred policy scenario.*' [But society is continually shaped through infrastructure, technology, economic policy and socio-cultural events.]

What seems to be missing in (Dutch) policy decision-making is a clear future perspective on sustainable transportation, and a consistent set of long-term policy goals. By consequence,

[5] This is precisely what happened in favour of road transport through the long-term neglect of public transport.

motorised transport seems to be a domain of unbridled developments where governments cannot or will not (yet) introduce effective sustainability policies.[6]

Practical intervention for sustainable transportation

What then might be 'sustainable transportation'? Following its definition of sustainable transportation (see above), the OECD conference (1997, p. 56) also concluded:

> "Achievement of sustainable transportation will likely involve improvements in vehicles, fuels, and infrastructure (..) , and reductions in personal mobility and in the movement of goods, (..)."

More recently, OECD ministers of transport have agreed to a more elaborate definition, as summarised in Table 5.

- Meeting basic access needs of individuals, companies and societies ...
- Safe, healthy and environmentally friendly ...
- Equitable within and between generations ...
- Affordable, fairly and efficiently operated ...
- Supportive of a competitive economy ...
- Allowing balanced regional development ...
- Optimally using renewable energy, materials ...
- Controlled use of non-renewables ...
- Minimising land use…
- Minimising noise generation.

Table 5: OECD ministers' (2001) requirements for 'sustainable transport'

While the original 1997 definition is strict and clear, the revised (ministers') definition is much more encompassing and considerably vaguer. For one thing it involves trade-offs which have not been explicated. Another question is whether this definition is not inherently conflictual, depending on how liberally one defines the term 'basic access needs'.

Eight policy principles. Elaborating on the idea of 'sustainable transport' in light of Dutch mobility and transport problems, we may consider the eight principles for achieving a sustainable transportation system as displayed in Table 6.

1. Transport freedom is inversely proportional to the negative external effects of the chosen transport mode.
2. Transport policy will be tuned to the fundamental causes and driving forces of motorised transport.
3. Policies will be aimed at strategic changes in transport needs, system, infrastructure and technology.
4. 'The user pays' for his/her part in all collective costs and risks of traffic and transportation.
5. An expansive, freedom-loving market will be checked by a responsible, equality-guarding government.
6. The environmental responsibility of transport users will be significantly improved.
7. Social acceptance of sustainable transportation must be continually increased.
8. Authorities (cabinet ministers, politicians, the royal family) will set good examples.

Table 6: Eight general principles for sustainable traffic and transportation

As for principle 1, the simple observation that environmental decline is gradually boomeranging on individual living environments and thus actually is reducing individual freedom, makes it

[6] The newest developments in Dutch transport policy are expressed in a white paper on wide-ranging 'mobility management' (V&W, 2002), which describes a collection of 'soft' measures to 'tempt' people into using less impactful transport modes. At the same time, however, little is done to improve and extend the threadbare railway services, whilst road congestion problems are intently solved by expanding car infrastructure.

inevitable that limits be set to individual behaviour expansion and that individual freedom be subordinated to the safeguarding of collective goods and qualities.

Under principle no. 3 it must be stressed that 'hard' physical and social *system* changes are likely to bring about greater behaviour change than direct 'soft' campaigns appealing to transport users who are dependent on given system characteristics. However, the usual *'and and*' policies (e.g., stimulating public transport *and* facilitating car traffic) would have to be left behind: you can't have your cake and eat it, too.

Lifting sustainability barriers. More generally, psychological conditions for social behaviour change can be derived from the various strategies given in Table 3 above. Policy measures should lift the barriers for sustainable transport behaviour and facilitate and stimulate change. For example, problem awareness should be increased, people's own responsibility should be stressed, policy goals should be clarified, behaviour alternatives must be available, and recommended 'sustainable' behaviours should be attractive (or at least acceptable) from both a personal and a social point of view.

Effectiveness evaluation

Much policy making about transportation and (motorised) traffic is focussed on the resolution of immediate problems (which may have aggravated for a while) and the introduction of policy measures that seem to have some promise of alleviating the problem noticeably, however temporarily. Actual effects and side-effects of measures taken are rarely observed and analysed systematically, and this especially applies to long-term and indirect effects and side-effects of policy measures.

Policy-relevant effectiveness evaluation is a professional affair, which should be carefully designed and conducted according to plan. To the extent that practical interventions should somehow link up with the problem diagnosis performed, effectiveness evaluation should be related to the nature of interventions, their application conditions and the target groups involved. This involves repeated monitoring of the variables for which policy goals (environmental, social, behavioural) had been set, differentiation among target groups and of physical locations and time periods, and a valid description of what has and what has not been achieved and what will likely be the future trends in observed effects and side-effects of policies.

Patterns of behaviour change set in motion via 'hard' and 'soft' policy measures are usually not limited to transport mode choice, travel speed and/or parking location themselves. Behaviour change in relation to mobility and transport may also involve changes in daily activities, in spending patterns and in the nature and intensity of social interactions. It is in these and other behaviour domains that one may find various reasons for the acceptance or rejection of innovative transport policies aimed at strengthening system sustainability.

Substantive changes in transport

In a debate on 'hard' and 'soft' policy measures for sustainable transportation we must also look into the kind of changes policies should be aimed at. On the premise that, in wealthier-getting and liberalising societies, growing mobility and transport cannot be suppressed, the main challenge for policy-makers is to accommodate reasonable transport demands and to keep transport systems, technologies and behaviour patterns within the environmental and social constraints of sustainable development. This simply means that it should be attempted to get persons and goods from A to B (and from fewer A's to fewer B's) in a much more resource-efficient way than currently is the case. The key-words for sustainable transport are: meaningful, efficient, clean, quiet, safe and compact. These criteria seem to be best met by electric, collective, moderate and/or non-motorised ways of transportation, wherever needed in some optimal combination.

Motor vehicle efficiency. Undoubtedly, the dominant present-day cause of unsustainability is the mass of private motor vehicles: cars, vans, lorries, motor-twowheelers as well as a diversity of motorised implements such as tractors, cranes and excavators. Other important causes are shipping and aviation, increasingly. Given their present popularity, first of all the private motor

vehicle should be made much more durable, energy-efficient, clean, less noisy, safer, more efficiently used and generally restricted in use for distances greater than 5 kilometres (one way).

Renewing rail transport. Secondly, special efforts are needed to revive, improve and extend collective rail transport of passengers and goods. Rail transport naturally differs for the local, regional, national and international level, ranging from metropolitan light-rail to international high-speed train systems. New infrastructure, improved (cleaner, quieter and safer) technology, professional organisation and greater convenience are badly needed. Significant funds for long-term investments should be withdrawn from the (expensive) private motor vehicle system.

Towards sustainable aviation. Among environmental interest groups and in policy debates much attention has been given to motorised road transport. However, the rapid growth in civil aviation (somewhat mitigated by high-speed rail transport) justifies an increase in research efforts aimed at clarifying its economic necessity, its environmental impacts and its contribution, positive and/or negative, to the social well-being of different involved groups of people. In November 2002, the UK Royal Commission on Environmental Pollution concluded:

> "..means by which the government could address the issue of sustainability .. include: (-) moderating demand through emissions charging, (-) optimising the use of existing airport capacity, (-) increasing consumer choice by providing less environmentally damaging alternatives for short-haul flights, (-) encouraging the development of technologies to limit the climate changing effects of flight, (-) incorporating the sector into an open emissions trading scheme." (UK-RCEP, 2002, p. 31).

In view of its international structure and organisation, civil aviation does not easily lend itself to thorough and well-coordinated research. The latter is politically sensitive and it will be methodologically difficult. Nevertheless, good problem diagnoses, policy decision-making, intervention planning and effectiveness evaluation must be undertaken if sustainable transport policies in this domain, too, are to be put in place.

Transport demand management. Fourthly, mobility demand for road, rail and air transport, respectively, should be prudently managed so as to be met only in a long-term sustainable fashion. Unnecessary or unacceptably useless transport by impactful motor vehicle (car, van, lorry, motor-twowheeler, train, plane) should be discouraged.[7] The necessity of other transports may be reduced through reorganisations in physical planning, greater efficiency of daily activity patterns, substitution of transport-intensive behaviour goals, and by shifting to non-motorised vehicles such as bicycles and other human-powered vehicles.

Conclusions

Considering problem diagnosis, policy decision-making, practical intervention and effectiveness evaluation together, we see that applying the commons dilemma model of Table 1 to motorised transport reveals rich possibilities for more systematic research and improved policy-making. With regard to transport behaviour change, it is essential that practical interventions be tuned to behaviour diagnoses of target groups. Often a combination of ‘hard’ and ‘soft’ policy measures is useful, taking account of deliberation, repetition, social comparison and imitation as basically different behaviour processes (cf. Table 2).

Digging somewhat deeper into the policy *problematique* we must note that not only transitions in transport modes, infrastructure and organisation themselves are needed. A more fundamental look is required into transport-generation developments in other domains such as household and family life, health care and educational systems, cultural and sports activities, business lifestyles and work organisation, and, of course, outdoor recreation and tourism. Many current

[7] ‘Unnecessary motorised transport’ is transport for which a feasible ‘sustainable’ alternative exists. In general, unnecessary use of a motor vehicle refers to the disproportionality between action goal, transport need and actual travel behaviour. Such disproportionalities may be clarified in research about specific behaviour patterns and scripts.

developments and future projections are heavily oriented towards the availability and regular use of motor cars.

Attending to the underlying phenomena of transport generation also implies that getting effective transitions in mobility and transport under way necessitates new forms of collaboration between various interest parties. It will not be enough to focus at individual transport users. Effective transitions towards sustainable transportation demand greater understanding, ingenuity and cooperation from transport business, other businesses generating much transport, socio-economic branch organisations and diverse government agencies having a stake in reducing the negative environmental and social effects of powerful unsustainable developments.

In view of the enormous worldwide dimensions of unsustainable transport development, it is unfortunate that, so far, international coordinated research is lacking with regard to transport generation, transport behaviour and the potential for transport behaviour change. To complement existing research on environmental effects, technical innovations and economic policies regarding motorised transport, a social and behavioural science programme of well-designed studies seems needed. Some candidate research topics are, respectively:

- the nature, extent, and factors of problem awareness (congestion, pollution, noise, equity);
- risk-benefit weighing by various involved groups and organisations, and their perceived need for sustainability policies;
- the perception and evaluation of transport alternatives (system, infrastructure, vehicles and organisation);
- the evaluation of sustainability policy measures and scenarios for the longer term;
- relevant conditions for behaviour change concerning different transport user groups; and
- people's expected changes in future quality of life, when sustainable-transport policies would be effectively implemented.

As many debates over the past ten or so years have made abundantly clear, all this will not be easy. Motorised transport is an enormous domain of popular human activity (see footnote 3), where sustainability questions are being asked only recently while collective problems are pressing already for some time. The biggest policy task in this huge commons dilemma is to work out, establish and maintain a sustainable balance between individual freedom and social (and environmental) equality of opportunity and development.

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SESSION 3: ROLES OF SOFT MEASURES IN CHANGING TRANSPORT AND OTHER BEHAVIOUR

SESSION HIGHLIGHTS

John Whitelegg said that soft measures can be effective in changing transport behaviour. What is needed is more intelligently conceived use of them in relation to expensive projects and programs so as to avoid perverse subsidies and major investments that only worsen the problems they are designed to solve. We need to move quickly towards EST, with many different measures applied at different times.

Tony Weggemans proposed that the distinction between soft and hard measures is artificial; both are required. Proper diagnosis is needed before behaviour can be changed. What is the wanted behaviour, and the unwanted behaviour? Why make the change? Whose behaviour is to be changed? Clear market segmentation is required. Explore branding EST as a general image for actions towards sustainability.

Hermann Knoflacher said that human behaviour in general and car use in particular is a quest to reduce energy expenditure. Accordingly, separating humans from where they park their cars to at least the distance of the nearest public transport stop is the key element of any successful sustainability measure. This is the change in milieu that is required to change transport behaviour.

In discussion, **John Whitelegg** said that car users are not the enemy. We should learn from worst practices as much as from best practices. Politicians like to hear about the economic advantages of moves towards sustainable transport, especially if costs to taxpayers are reduced. **Martin Kroon** added that the car-industrial complex is the real villain, and that both soft and hard measures can have roles in changing the collective behaviour of this complex.

Udo Becker, the session chair, concluded by saying there is no real distinction between soft and hard measures. In real world conditions, both are always necessary. What is most important is to coordinate implementation of all measures. To be effective, it is necessary to concentrate on access, guarantee access to transport users (instead of trying to deny them mobility), and celebrate success.

> "Thinking is the hardest work there is, which is probably the reason why so few engage in it. If it were possible first to teach people how to go to work to think, and then to think, there would be hope for all sorts of things".
>
> Henry Ford, *My Philosophy of Industry*, George C Harrap, London, 1929

Introduction

It is not helpful to maintain an artificial distinction between hard and soft measures. The key dimensions of a robust approach to achieving EST are:

- Exploiting synergy
- Time
- Space

A discussion of what is hard or soft can only be diversionary and ultimately sterile and without purpose.

Exploiting synergy

This means finding out by trial and error and by intelligent thinking what kind of things work well together and what kind of things can multiply and magnify the effectiveness of other measures. Let me give an example from the UK. Lancaster University is a successful and popular university located 5 kms south of the city of Lancaster on a greenfield site surrounded by countryside. It has a good quality cycle path connecting it with the city centre and residential areas and a reasonable bus service. It has about 15,000 staff and students and it is safe to assume this is an intelligent and aware group. Sixty per cent of the staff and students prefer to use the car for journeys of 3-5 kms in length. The reason for this is that the university has 2,500 parking spaces which cost the user 35 Euros per annum. The absence of a parking strategy coupled with the financial rewards in giving a valuable resource (a parking space) for such a trivial sum supports and encourages car use. Here the lack of synergy has produced an environmentally non-sustainable outcome. At the other end of the scale York (also with a successful university and also in the north of England) has extensive walking and cycling facilities, parking restraint, park and ride and has reduced car trips by 14% on secondary roads in the AM peak. In York walking and cycling strategies have moved forward at the same time as investments in new buses, new park and ride facilities and parking restraint to produce an "EST" outcome. Many good ideas are not very good unless they are combined with other good ideas. Many soft measures no matter how they are defined will only work well with hard measures and vice versa.

Time

It matters a great deal what is done in what order. If we really do want to move towards EST then we need to move quickly with lots of different measures "piling in" at different times as the overall effort moves towards its finale/conclusion. The enormous disappointment of EST is that very simple/easy/low cost things are not done soon enough and widely enough. Even if we have a clear objective to be realised in 30 years time we still have to do something towards that goal next Monday morning. Time is also important in another sense. Transport behaviour has very powerful feedback mechanisms. If we introduce the world's best public transport, fares and ticketing system in a European city and back this up with car parking restraint, charges, taxes and high quality information aimed at the individual and repeatedly delivered we will achieve a transfer of 20-30% of car users away from the car. If then the roads appear empty they will fill up again with some other kind of traffic. Our policies must have a temporal dimension to make sure we capture benefits as they appear and make sure they are not eroded by behavioural change. Often we can do this through spatial management i.e. compensate for time shift with spatial shifts. This is what "highway space reallocation" does (wider pavements, fewer lanes, more space for bikes, buses, trams and children).

Space

We need to be very clear what geographical area we are talking about. Measures aimed at small areas in cities may well produce displacement (moving the problem elsewhere). Measures across a city may well not take into account the needs and aspirations of rural dwellers and those who live in smaller towns and cities that feed into the larger city as a supplier of higher order services. Regional issues also must be confronted. The primary driver of non-sustainability in the UK is perceived regional competitiveness. Towns and cities argue for more roads and more car parking because if they don't do this then an adjacent town or city will "steal a march" and win the battle for shoppers, tourists, inward investors etc. Manchester and Liverpool look at each other with great suspicion and Bremen and Hamburg have a long-standing rivalry. Regional competition has the potential to kill off EST arguments and requires a solution that is specifically spatial. What is spatial or regional sustainability?

EST works and is effective

In the UK there has been a debate about soft factors and the degree to which they can deliver EST outcomes. The debate has been between two sets of consultants: Halcrow and Eco-Logica. The debate and its results can be seen in Local Transport Today, 349, 12th September 2002. Eco-Logica maintain that the interactive and cumulative nature of soft factors in reducing travel demand is not adequately represented in the Halcrow report, and some issues have been undervalued either by disregarding evidence presented in the report or in other ways as discussed in this report. Table 1[1] summarises the effect that incorporating these elements has on the overall assessment.

Conclusion

We should have this discussion about soft factors but not in a semantic or definitional context. We need to know more about how to bring about change in behaviour, capture benefits and work with politicians to support the process of development and implementation of measures in ways that benefit all groups and does not damage economic prospects. We need to know more about why this does not happen more often. In most of North America, Europe, Japan and Australia we have a good understanding of sustainability, demand management, social exclusion, health issues and much more and yet we still continue to maintain perverse subsidies (paying for car parking spaces) or pursuing expensive infrastructure projects that will only make the problem worse (Birmingham Northern Relief Road, Thames Gateway Bridge). In most countries things go wrong and lurch in the direction of non-sustainability at the project level. Why do we get such poor quality thinking on the most expensive projects?

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[1] Notes re. Table 1:
All figures are percentages, against 1999 total of 380 bn vkm.
Second column includes only mathematical corrections to Halcrow forecasts
Subject areas exclude freight issues, since all other figures are for vkm by car
Subject areas exclude local sourcing and fuel supply issues, for which no reasoned basis for forecasting has been identified, though effects will occur.
Figures are explained in report text, except for the following figures in the 'Revised Forecast' column:

- Workplace travel plans: 20% reductions at 30% of workplaces
- School travel plans: half the Halcrow predicted effect with 30% reduction in car use, which was maximum effect observed to date i.e. takes 15% as a minimum effect
- Car clubs: half the Halcrow reported maximum effect with 8% uptake of car club membership i.e. takes 4% as a minimum effect
- Marketing: individualised marketing effect alone, 10% reduction in car use, 15% uptake
- Interchange: Halcrow forecast doubled to include rail, doubled again to allow for new interchange provision
- Information: Halcrow forecast doubled to include effects not considered
- Walking: one-third of car trips below 3km transferred to other modes
- Cycling: one-tenth of car trips 3-8km transferred to other modes

In this research on soft factors we are confident that we can achieve an 18% reduction in vehicle kilometres through the measures listed in the above table. This has not included taxation, congestion charging or recovering the real resource cost of a car parking place.

SUBJECT AREA	HALCROW FORECAST EFFECT	HALCROW FORECAST CORRECTED	INCLUDING EFFECTS REPORTED BUT NOT USED	REVISED FORECAST
Teleworking	1.6	2.0	2.0	3.7
Internet Shopping	0	0.0	1.2	1.2
Videoconferencing	0.7	1.2	1.2	1.2
Workplace Travel Plans	0.6	0.6	0.6	2.4
Schools Travel Plans	0	0.0	1.3	1.3
Car clubs	0	0.0	1.0	1.0
Marketing/ ticketing	0.4	0.4	0.4	2.0
Interchange	0.1	0.1	0.0	0.4
Information	0	0.0	0.1	0.2
Bus quality partnerships	0.4	0.4	0.4	0.8
Walking	0.5	0.5	0.5	1.0
Cycling	0.4	0.4	0.4	1.2
Land use effects	0	0.0	2.0	2.0
Min. reduction in vkm by car:	4.7%	5.6%	11.1%	18.4%

Table 1: Minimum percentage reductions in vkm by car by 2015

Introduction

The concept of soft measures is a peculiar one. The issues paper[1] says "soft measures are other actions (than taxes, regulations and infrastructure) taken by government to change behaviour". In other texts soft measures are equal to "mobility management", which is defined as a demand-orientated approach to support and encourage a change of attitude and behaviour towards sustainable modes of transport.[2] Marketing sources use the term 'soft measures' for activities to influence opinions, perceptions and feelings rather than factual behaviour. The first definition accentuates the used means, the second one the object of change (transport demand) and the third the social and psychological aspects of behaviour.

In my view 'soft measures' do not exist. You have effective and not effective measures for changing behaviour. The introduction of a new tax system without communication is (at least in a democratic society unthinkable). A motivational campaign which is not followed by 'hard' behaviour is useless.

In my presentation I will focus on the social and psychological aspects of behavioural change, which have to be taken into account to make any measure (governmental or non-governmental) effective. Necessary is a thorough analysis of the present behaviour, a clear description of the new behaviour and a well-chosen combination of 'hard' and 'soft' measures.

The dilemma of acceptability and effectiveness

The structure of Western societies demands a more or less public discussion on a certain measure and a political decision before a measure can be implemented. The emphasis on the political process creates the impression that a policy is successful if it is accepted politically. Of course this is only half of the truth.

Therefore we have to realize the difference between the goal of *acceptability* (in the public and political debate) and the goal of *effectiveness* (in daily life). We have to deal with the dilemma:

The more acceptable a measure is, the bigger the chance that it won't be effective. And vice versa.

Acceptability

Factors influencing acceptability are:

- Content
  - problem awareness among the public
    - individual level
    - in social groups
    - at the societal level
  - belief in policy targets
  - belief in effectiveness of strategies
- Form
  - followed procedure of policy development
  - expectancies about the role of government
  - amount of necessary behavioural change

Acceptability of a policy is usually no guarantee for change of behaviour. A policy which asks only minor change of behaviour or even fits with the present behaviour is easier accepted than a policy which aims for massive changes.

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1 OECD, issues paper *Soft measures and transport behaviour*, November 2002.

2 According to the website of EPOMM, the European Platform of Mobility Management, www.epommweb.org.

The opposite relation between acceptability and behavioural change, however, does exist. Non-acceptability can be an important explanation for the absence of behavioural change.

Problem awareness

Problem awareness is the recognition of the problem the government is trying to solve. Problem awareness can be the result of own experience, of beliefs in the relevant social groups or of acceptance of the message of a respected authority, which does not necessarily need to be an official from the government. Sometimes intermediaries are in a better position to bring messages on the existence of problems.

A very effective way to raise problem awareness is to connect it with present behaviour. By reframing this behaviour as a (part of the) solution for the problem, the definition of the problem is easier accepted. In this example behaviour precedes problem awareness, instead of the other way around.

Belief in policy targets

Acceptance of policy targets is a more or less logic consequence of problem awareness. However, when policy targets and concrete measures are closely connected, resistance against the targets can arise when people do not accept the measures. Therefore, it is advised to communicate separately on the targets themselves and on the means to reach them.

Acceptance of strategies

For the acceptance of strategies we distinguish four important factors:

- Belief in the effectiveness of the measures, based on statements of trusted persons or on visible feedback of experiments.
- Belief that the measure is better than any alternative.
- Belief that people are informed properly and honestly (no concealed purposes or side-effects).
- Belief that the proposed measures are just and fair. Important aspect is that no social groups specifically will be the victim of the measures.

Effectiveness

As far as measures are aiming at behavioural change, it is very important to specify precisely which behaviour should be changed and what the characteristics are of the new behaviour. Often behaviour is part of a chain, in which case the whole chain must be analysed. Also important is to distinguish subgroups for which the meaning of the behaviour might be different.

First step in the analyses of the present behaviour is the distinction between:

- Impulsive behaviour
- Habitual behaviour
- Reasoned behaviour

Most behaviour belongs to the first two categories. A conscious evaluation of alternatives and proper choice process is lacking most of the time.

Habitual behaviour and impulsive behaviour use short cuts in the processing of information. Because of the fact that the steps of prediction and evaluation are passed, it has no use to convince people to change their behaviour when their behaviour is predominantly habitual, as is the case with transport behaviour.

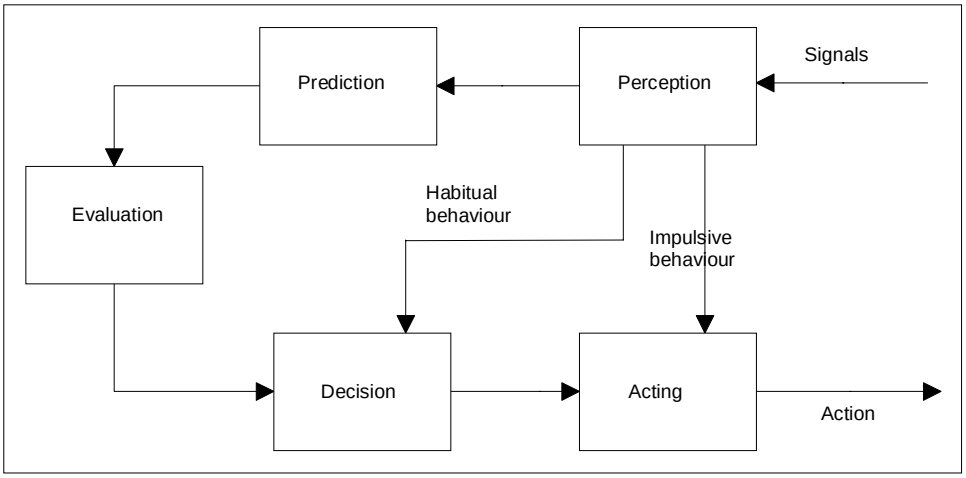


Figure 1: Types of behaviour

Next step in the analysis of the present behaviour is analysis of the context of the behaviour (when, where, what circumstances), both for the present and the future behaviour. Then we have to get an idea of the possible consequences of behavioural change seen through their eyes (material, social and psychological).

After the analysis of the behaviour comes the design of the intervention. Important points to take into account are:

- Can we influence motivations through seduction, prohibitions, financial stimuli or social condemnation or appraisal?
- Can we influence the context in which the behaviour starts?
- Can we influence people's capacities for the new behaviour by education or information?

In the case of habitual behaviour we can try to break the automatic response by a sudden and unexpected intervention. A sudden rise of taxes is an example of this. Another strategy is to use changes in people's life (moving, birth, new job, holiday situation, etc.). A third possibility is to try to change the trigger for the habitual behaviour without people noticing it. As an example: when people are used to adapting their speed to the design of the road, changing this design can cause a lower speed without people realizing the difference in their behaviour.

Communication of EST

An interesting question is in what way the provision of information on the content of the EST-project might be relevant for the change of behaviour as discussed in this paper.
Basically I see two lines of reasoning:

- Communication on EST (as part of an intervention for behavioural change) makes no sense because EST is mainly directed towards governmental action and is too abstract to function as an inspirational source for individual behaviour.
- Communication on EST makes sense because it might create a meaningful context for the new behaviour of individual people.

It is this second line of reasoning which – in my opinion – deserves further exploration. There is an interesting parallel between the level of abstraction of EST and global brands for consumers. A big part of the popularity of brands as Nike, Coca-Cola, BMW of Nokia has no relation anymore with the specific products, but with the general lifestyle these products refer to. Strong brands are often more like

religions. The need for meaning is stimulating many people to connect themselves with popular brands.

Perhaps this same need for meaning can be used to position EST as a general brand for sustainable mobility. When information campaigns would provide the general image of EST, other actors (such as national governments, NGO's or local groups) can connect this image to their specific behavioural intervention. When wearing Nike's shoes gives you a Nike-feeling, using a new form of public transport should give you an EST-feeling.

Conclusion

The difference between 'hard' and 'soft' measures is artificial and not fruitful. The possible consequences of 'hard' measures on culture, social relations, beliefs, and feelings may not be ignored. The social and psychological aspects of the behaviour involved can determine their failure or success. Communication and education (as typical soft measures) without 'hard' counterparts are deemed to fail; this is the more so when the effects of for instance a tax system is countervailing the aim of the communication program.

The problematic relation between acceptability and effectiveness should be taken into account when developing policies for behavioural change.

Many interventions lack prior diagnosis.[3] Therefore the main question in the first phase of policy development is: 'What should be changed among whom, when and to what extent?'. The next step is to design effective interventions on the basis of relevant sociological and psychological theories. Choosing the proper means (hard, soft or a combination) can only be the last step in such a procedure.

Recommendations

To conclude I present some recommendations:

1. The first one is the need for proper behavioural diagnosis before any intervention can be designed by answering the following questions:

   - Why is behavioural change necessary (why?),
   - What is the present behaviour, what the proper new behaviour (what?)
   - Who are the target groups that have to change their behaviour (who?)
   - At which specific moment is change the most likely (when?)
   - How much change is necessary for a measure to be effective (how much?)
   - Who is the best actor to stimulate the change (by whom?)

   Only with a proper analysis of the situation and a solid design of the strategy do soft measures have a chance.

2. The second recommendation is the use of some kind of segmentation

   - Start with the easiest groups
   - Use specific role models for each target group
   - Organise rewarding feedback

[3] See: H. Greer e.a., The guide to change, Aeneas Publishers, Boxtel, The Netherlands, p. 14.

Research shows that strategies which employ a clear market segmentation are much more successful than those which use the ‘scattergun’ approach.

3. The third recommendation is to explore the possibilities of branding EST as a general image for actions towards sustainable mobility.

Introduction

In dealing with travel and other types of behaviours we have to distinguish between system behaviour and system user behaviour, or more precisely, the behaviour of the transport system and behaviour of users within this system. Historically, the difference between system behaviour and the system user behaviour in transport was not a problem, as long as humans have organised the transport system within their evolutionary limits, which were constrained by their sensual physiological and physical abilities. Action and reaction could be experienced and the space in connection with the road network, in which activities adopted a certain pattern, resulted in a closed entity.

With the invention of mechanical transport systems (powered externally by steam or the combustion and jet engines) and telecommunications, the evolutionary boundaries of man were exceeded. The railways, the dominating mode of transport in the 19th century, had a controlled access but nonetheless a strong influence on the development of the industries and cities. With the invention of the car, an open system on the individual or user level was introduced in human society for the first time in history. Transport science has dealt mainly with the benefits and new opportunities of this system, which resulted in the building of an optimal environment for this fascinating new mode, creating effortless “mobility” over a period of one hundred years. The flip side of the coin, with an increasing number of accidents, environmental and noise problems and later with problems of social, cultural as well as economic degradation, has not been recognised. The effects of the system as a whole were not understood and the elements of the system were very often built on indicators, which are totally wrong or even don’t exist at all in the system.

This paper describes the state of knowledge of transport system behaviour arising from evolutionary new (less than 200 years) invention of mankind, which is still quite different from official publications of other points of view.

Current received wisdom suggests that:

- There is no growth of mobility:
  (the average number of trips for persons remains the same). It is only a shift from one kind of mobility to the others. (EST seminar of 2000 / 2001 in Paris)
- Travel time in the transport system as a whole is constant:
  Increasing speed leads to an increase of distance without time savings. All calculations based on time savings are therefore wrong. If no time saving exists in the transport system, there are no losses of time. The calculation of congestion costs is therefore nonsense. Increasing travel speeds changes the structures, which has been forgotten so far. (Knoflacher 1986, Lill 1889, Schafer 1998, Schmidl 1990).
- Freedom of modal choice:
  On the system level modal choice is determined basically by the evolutionary preconditions of man and the physical structures of the transport system.

Understanding human behaviour in the transport system: five approaches?

The “Issue papers” of the workshop provide an excellent reflection on how human behaviour is understood in transport today. “There are almost as many views about how human behaviour is maintained and how it changes as there are people who hold the views.” These views can be distinguished in regard to five different approaches.

- Interior constructs
- Brain activities

- Heredity
- Antecedent external causes
- Consequences of behaviour

Their conclusion is: "... the approach preferred here implies that the best way to change transport behaviour may be to change the milieu or the context within which it occurs."

This confusion is a result of the not obvious interactions of the different levels, i.e. where the car takes effect on human behaviour, which problems it creates. Therefore, the explanation requires an analysis of these five approaches and afterwards we should be able to understand whether the conclusion is a stringent necessity or only a vague recommendation.

Tools to analyse the approaches:

The tools, which will be used, are based on the theory of evolution and epistemology. They have their roots in the 19th century Darwinian theory and general system theory and were described in a popular way by Konrad Lorenz, Rupert Riedl and others. Riedl has published a hierarchy of disciplines, following the order of evolution. If this approach is applied to find a hierarchical order, i.e. from the basic elements of matter with the processes that emerge from atoms, molecules, bio molecules, to the more complex structures of animals and man, families and societies, civilisations and cultures we find a parallel order of the scientific disciplines.

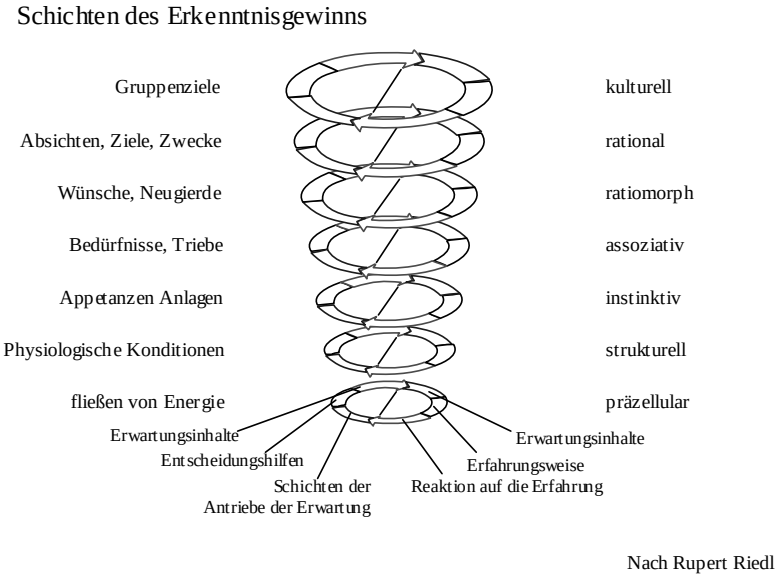


Figure 1: Evolution has formed structures from atoms to societies

Today, the basic problem is the lack of a holistic viewpoint. Each discipline is more or less isolated from the other disciplines. If effects occur on one level they can also affect other levels – and therefore other disciplines. This means that each discipline attempts an explanation on their specific level, and ignores the other level where they actually come from.

At the lower part of this evolutionary process where the molecules are studied, human behaviour is usually not the core issue of this very discipline. From this angle it becomes clear that explanations are usually a reflection of the problem related to the level of the discipline and not related to the process of the level on which it occurs.

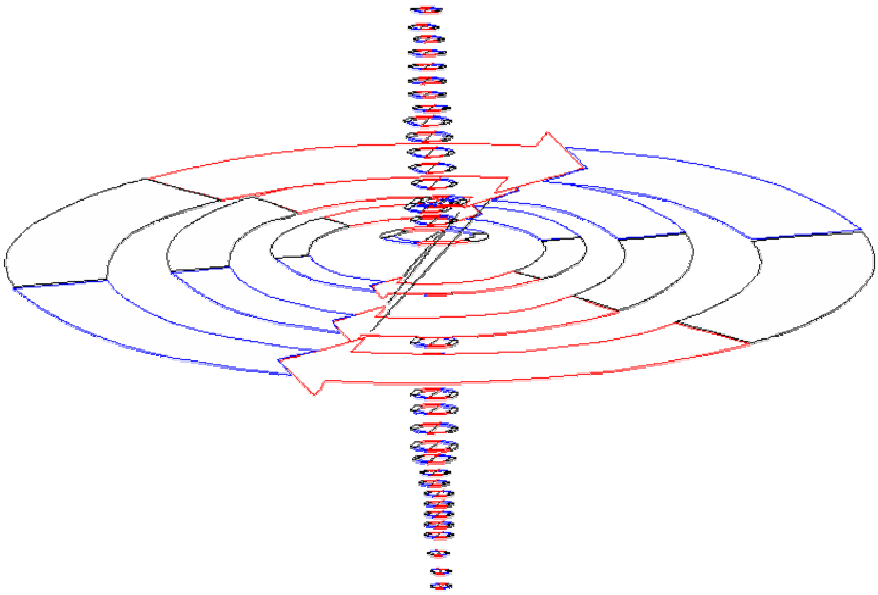


Figure 2: Each discipline recognises mainly its neighbours

According to this distinction, the approach of interior construct comes from the upper levels, not taking into account that this new kind of transport system may also influence the more basic levels, which are far away from the consciousness of man.

The second approach concerning brain activity can be described as a part of the system but not influential enough to deal with the problem.

In this paper heredity is understood as a part of the process, concerning the preconditions of the behaviour. It can be understood as a result of the useful behaviour in response to a circumstantial context or the human environment. However, more specifications are necessary to understand human behaviour in the artificially built-up environment.

Antecedent external causes are, of course, effective in the system but cannot explain the behaviour as a whole.

Finally, the consequences of behaviour describe only one part of the truth, the other part of this group is the feed-back, connecting experience with expectations.

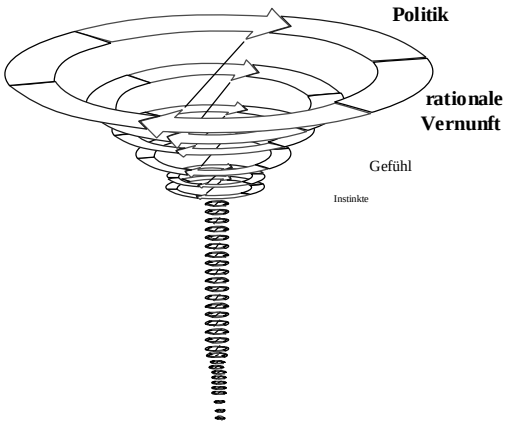


Figure 3: The upper levels of the evolution are overestimated – and their effect also

From this multi-level perspective, the problem can be seen as one of trans-disciplinary understanding of human behaviour and, to a certain extent, as one of the composition of man. And common to all five approaches is the overestimation of the upper evolutionary levels.

On what level does the car interact with the driver? By using the work of Walther, Konrad Lorenz and Karl von Frisch it is possible to develop a hypothesis, which provides an answer for the question of levels on which the car affects human behaviour. (Knoflacher 1981)

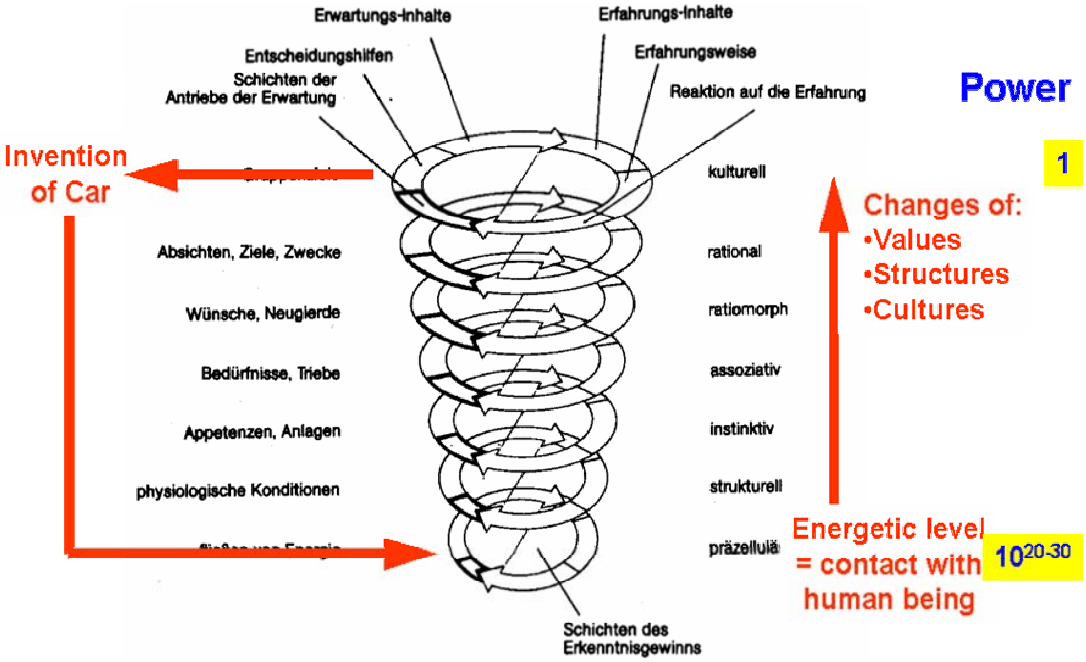


Figure 4: The car saves body energy on the low level of human evolution and moves all levels above

As the main level can be determined the one related to the body energy, i.e. one of the deepest evolutionary levels, and this level affects all levels above. Energy saving was the most successful strategy for survival in evolution. It is probably the deepest rooted driving force for behaviour in general, and human behaviour in particular. For example, the car driver requires only half of the body energy compared to pedestrian per unit of time, or even less. But during the same time he moves ten or even twenty times faster and with more ease. This acceleration must create an unimaginable and wonderful effect of strength and superiority which is much stronger than culture and ethics or everything else which can be derived from the later and weaker levels of consciousness in our evolution.

This effect could be derived from the fundamental Weber-Fechner law of sensation in 1871 (Knoflacher 1981). It can now easily be shown what kind of measures have produced which behaviour and their effects. For example, if we compare the changing degree of motorization within the share of public transport, the relationship of this law can be found.

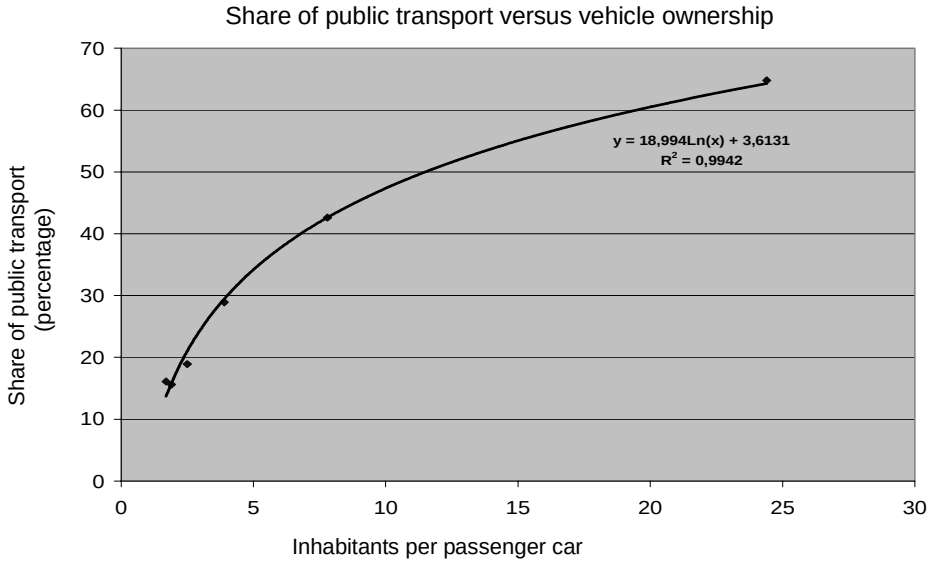
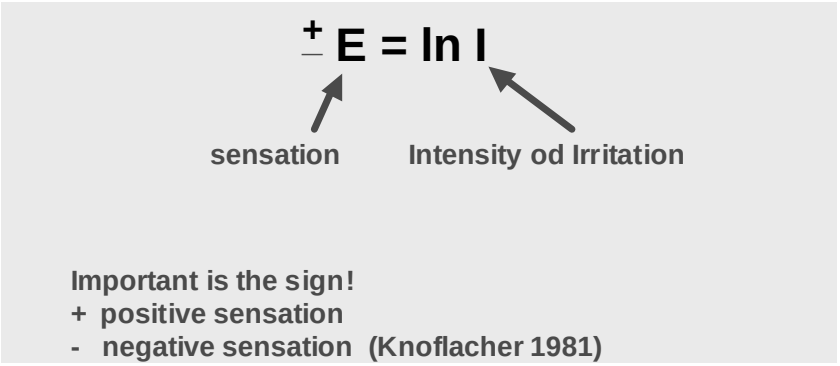


Figure 5: Increasing motorisation reduces the share of public transport

Furthermore, if we analyse human behaviour in cities or countries over time as well as on the microscopic level, this basic relationship between irritation and sensation crops up.



Human behaviour is always related to human sensation. Apart from the mathematical function, the sign of the sensation is very important. It is equally valid for positive sensations, i.e. attracting people, as well as for negative sensations which deter people from this particular behaviour.

The transport system as an artificial environment

The transport system of today constitutes an artificial, man-made environment. During the last 200 years, the transport system was developed as an attractor for mechanical transport system users. The effect was increasing distances and with that a change of villages and cities from human related structures to inhuman, mechanic means related agglomerations, from free flow of pedestrians to congestions of car traffic. Congestion is an excellent example of a positive and strong stimulation for car users. But media, public and politicians recognise congestion as a negative effect since they don't understand the cause of it. They try to solve the problem with the method which is again the very cause of the problem, i.e. an increase of the attractivity for the car user by adding more lanes or building more roads. The inevitable result is an exponential increase of congestion. No one would produce congestion if the stimulation of car usage wouldn't be so overwhelmingly superior compared to all other means of transport. If this is known, congestion can be used as an excellent "soft measure" to change human behaviour.

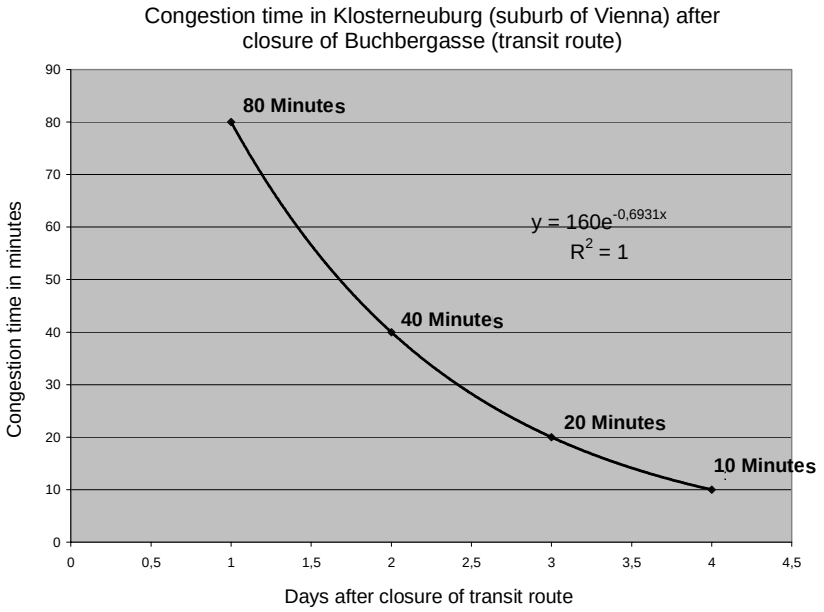


Figure 6: Congestion disappears after few days
(measured congestion time in Klosterneuburg June 2002)

If congestion is permanently installed, the transport system users are extremely flexible and adapt to the new conditions very soon, normally within a few days or at the most within some weeks.

A sound base for the approach

This new approach is not another one in the line of the other five, it is one in its own right, since it can provide explanations for the other five. For the application we can now evaluate different kinds of so-called soft or hard measures (depending on for whom the measure is soft and for whom it is hard).

The question should not be regarding soft or hard: effective or ineffective should be the correct answer.

Soft and ineffective measures can lead to a painful and discouraging process. This process is not only painful for drivers and travellers, but it can also be very dangerous for decision makers and administrators. This happened during the last decades were environmental enthusiasm stirred up hopes for people and politicians which couldn't be fulfilled by this kind of measure, due to a lack of knowledge about human behaviour and to wrong education in transport science and transport engineering. It was a terrible disappointment for all people involved. Examples of these disappointments were the attempts to reduce car traffic by declaring the "city of short trips" (Stadt der kurzen Wege) or to change the modal choice by using strategies related to transport costs, e.g. ticket price strategies in public transport, etc. Another property of an effective strategy is that it must also be sustainable. This is only possible, if the measure tackles the problem on the same level on which it occurs.

What and where is the key point?

The key point is the binding force between car and man on the level of body energy which changes all evolutionary levels above. This has effects for the social, cultural and economic systems and also influences the values in regard to a family and a settlement.

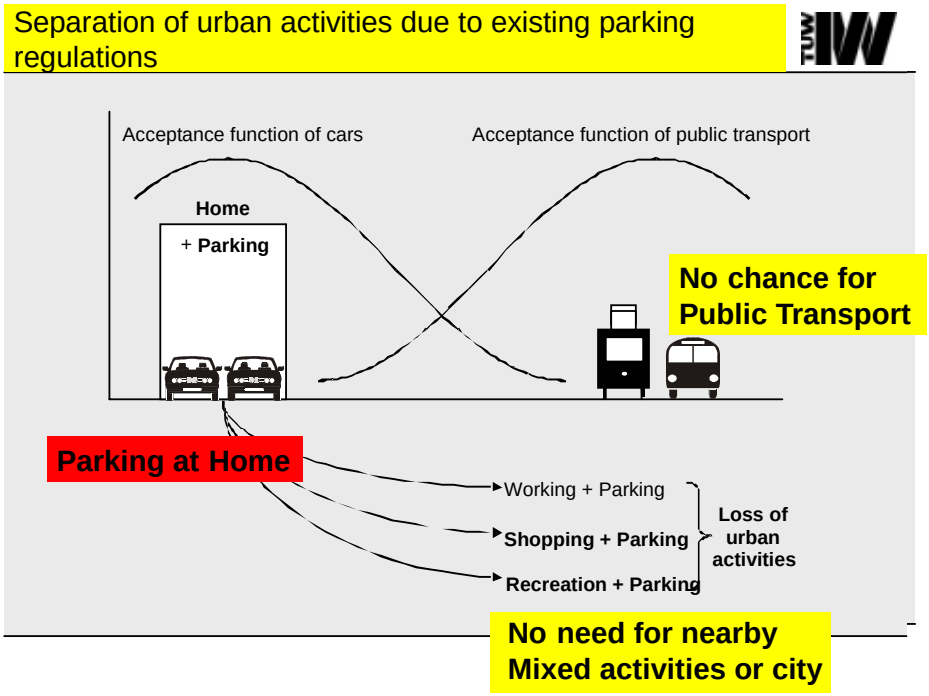


Figure 8: Only if parking is organised in order to give people a chance of choice, can all other soft measures can be effectively implemented to develop an environmental sustainable transport system
Figure 7: Parking close to human activities is the fulcrum for unsustainable behaviour of man in transportation

The problem takes place at the point where people get in contact with the car which is the car park. When man gets in contact with the car before he gets in contact with other people, public transport, shops and so on, he will not use them or get in contact with all those opportunities which lie beyond this point. Since the binding force between him and the car is much greater than the binding force to the family, to the children, or the city, he will do everything to keep his contact with the car as close as possible.

Without a new parking organisation no environmentally sustainable transport will be possible

The parking organisation of today is optimised not for the human system, it is optimised for the individual user not taking into account the system effects for the society, local economy the environment. The winners of the system of today are: Centralisation and big corporations – and, for a short time, also the car user, but captured in his trap for some time.

And this fact produces all the problems in traffic flow, urban sprawl and centralisation. It can also explain to a certain extent, structural unemployment beside environmental degradation. There are many attempts to solve the problems on the level of traffic flows, on the financial level and on the level of traffic calming. But all these measures are not very effective, because they have not changed the basic attitudes of the transport system users.

There has been some success under specific circumstances, where the share of cyclists and public transport users could be maintained over a certain period or even increased. If successful measures are introduced in another environment, the success never was repeated - at least not in the long run. If we analyse such success-stories, we find always a hidden, but strong contribution by effective measures of parking regulation in them. And these measures are always related to parking or basic changes of built structures.

The separation of man and his car park is therefore the key element of any successful sustainable measure. This can be easily done by reorganising existing patterns of parking.

- The number of parking opportunities should be not greater than the number of public transport stops in an area.
- In urban areas the number of garages should be reduced to half of the number of public transport stops. With car-free areas between them.
- The car user has to pay for the benefit of parking at home in our market economy. A driving related fee or charge has to be introduced.

These measures bind time in the closed system and when time is kept within these boundaries, activities must come back into cities and villages. More sophisticated logistics have to be developed instead of compensating local stupidity with sterile increasing number of kilometres.

It is also very easy to prove that with the increasing amount of traffic and kilometres driven, economies become more and more stupid and ineffective. Such processes can be observed in all our countries with the same patterns of behaviour. Today many more kilometres have to be driven to produce one Euro out of the economy than decades ago.

If we want people to have a choice between car and public transport, the distance to the parked cars must be at least as long (at the origin and destination) as the distance to the public transport stop. If this basic measure can not be realised, all the following measures to change human behaviour like traffic calming etc. are only a symptom-oriented treatment of the system and can never lead to the goal, even if they work in the right direction, towards an environmentally sustainable transport system. But if man is disconnected from the car as described above, this set of common measures will become even more effective. They become primary measures and their effects will eventually make sense. As long as the existing parking regulation and habit are maintained, all the other measures will be very soft measures. In that case, we cannot catch the car driver and it will be a painful and stressful process if we want to step forward to an environmental, social and economically sustainable transport system. But if this measure concerning human behaviour and transport system is realised in the form of the new organisation of parking, the system will start to work in the right direction in a relaxed way with a lot of synergetic effects on all levels.

Conclusion

We still have yet to answer the question of whether the conclusions in regard to the issues addressed in this paper can be supported by the above findings.

The conclusion is that they are completely in accordance with the principle. However, since it leaves open specification and this specific approach, which is necessary if we want to introduce environmentally sustainable transport, it is not helpful enough and can even be misused.

The “change of the milieu” is now known: it is the change of parking organisation as precondition for the enhancement of all other measures, from pricing to more attractive infrastructure for non motorised transport system users.

This measure is a priority measure. Since the effect of cars on man is realised at the physical level - human body energy - the measure must be put into position on the same level! If we try to solve the problem with this measure, instant benefits will appear very soon in relation to the limitations of social and political acceptance.

Here we approach zones of taboos, where a wrong interpretation of “freedom” can prevent the escape from this trap, which was built to perfection during the last 80 years of transport planning and policy, far apart from a sound scientific ground.

It is not only the physical structure which has to be changed, it is also the financial one, which is totally in contradiction with the basic principles of market economy: For example, in Austria, somebody who builds a house or a flat without an adjacent parking place today, has to pay a countervailing duty. If he behaves in the right way, he is punished by existing financial regulations. In a market economy the price must reflect the value of a benefit. If we introduce market

economy into the transport system, the owner of an adjacent near a parking place will have to pay for this privilege and for the cost resulting from this privilege to the society, to the environment and to the local economy. Parking has to be charged in accordance with the effect it causes.

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SESSION 4: HOW SOFT MEASURES COULD BE USED TO ACHIEVE EST

SESSION HIGHLIGHTS

Martin Kroon, the session chair, introduced the session by suggesting that psychological analysis can help us understand what sustains unsustainable transport activity and why effective measures are not applied. He supported the view noted above that neighbourhoods should be designed so that there is physical separation of people from their cars. He added that reducing the power of cars would be a key element in reducing their attractiveness, which is essential if cars are to be bought and used less.

Peter Jones suggested that soft measures can raise support for policy measures that promote EST and that encourage changes in behaviour towards EST. Such policy measures include shifting investment from roads to public transport, and restraining car use through pricing and regulations. Behaviour to be changed includes whether trips are made and how they are made. He argued that problem awareness is essential for behavioural change to occur. To secure a high level of support for a measure, there should be a focus on meeting the concern the measure is designed to address, not on the measure itself.

Regarding the issues paper, **Peter Jones** added that rather than address car ownership in itself, it may be advantageous to address the attention given to the acquisition of a driver's license as a 'rite of passage', and make this less attainable. On the matter of higher densities—strongly promoted in the issues paper—one result can be more congestion, and consequently poorer freight service.

Jens Schade noted that research has focussed on low acceptability of transport pricing measures. Key factors are social norms, personal expectations, and perceived effectiveness. Soft measures can change these factors to increase acceptability. An important lesson from research is the need to communicate the future advantages of new policies before implementing them. He added that environmental awareness has little influence on transport behaviour. Soft measures generally have little effect, except as they make hard measures more acceptable. Hard measures are also more acceptable if they include positive and negative elements, e.g., both incentives and charges.

Anders Berndtsson described the Vetlanda project, which focussed on changing attitudes in a community through soft measures. It changed attitudes, and also transport-related behaviour. The key may have been facilitating dialogue between politicians and citizens, providing "a way to formulate our common future and a way to give politicians the courage to make necessary decisions".

In discussion, **Martin Kroon** emphasised the need for feedback mechanisms to guide behaviour. **David Banister** said there was danger in focussing on environmental measures only. A key factor in any programme is its consequences for decision-makers.

This article analyses the phenomenon of the motor car and driving behaviour in terms of current psychological theories, particularly the motivation theory of Henry A Murray (1938) and the acceptability/availability model of behaviour as described by Rose (1990). These theories contain a set of concepts for the analysis of car ownership, car use and driving behaviour and for the development of intervention strategies to influence these. Psychological and social/contextual aspects of human behaviour are partly the product of previous developments in the meanings, functions and appraisal of that behaviour. Behavioural analysis of car use and driving therefore is not complete without an initial examination of the phenomenon of the motor car in a historical and social-cultural perspective and of the extent to which historically defined meanings and motives determine the current car culture and driving behaviour, such as done by Sachs (1984). This will be followed by a detailed analysis of the most significant motivational functions of the car. In as much as the car is a technique par excellence of satisfying basic human motives and needs, current car ownership, use and driving habits can largely be explained in terms of the acceptability/ availability hypothesis (Rose, 1990), on the basis of which recommendations for reduction and control can then be made. In the context of democratic market-based economies the extent to which reduction and control of car ownership and use can be achieved, however, is modest at the most. For the car-industrial-cultural complex is both an economical and psychological force of enormous magnitude as well as an expression of contemporary types of personality.

Introduction

Measures to restrict or influence car use can rarely count on broad public support. On the contrary, the more effective they are, the more resistance they evoke. Every initiative that limits the freedom of the car-driver runs up against a fierce lobby defending an alleged freedom of movement for motorists. The arguments for cars are well-known: convenience, speed, comfort, individual freedom and, not least, their economic significance. These rational arguments and functions cannot, however, explain why measures to restrict car use generate such strong emotions, not to mention the wide range of paradoxical behaviour that surrounds the car. The following urgent questions testify to this:

- Why do most car owners use their car when in many cases it would be more cost-effective, sensible and feasible [in The Netherlands about one in three car trips] to go by bicycle or public transport?
- Why are car owners prepared to spend such large sums of money on their cars at the expense of the basic needs of themselves and their families, and why do they drive so uneconomically?
- Why do most car drivers think that they drive far better and more safely than the average car driver in their country?
- If 90% of Dutch people are prepared to make an effort to preserve the environment, why are 70% not prepared to use their cars less (despite a bicycle fleet twice the car fleet)?
- Why does the 'social-dilemma paradigm' (Vlek et al 1992) play such a dominant role in car use?
- Why are politicians apparently so unconcerned about the fact that over 40,000 people die in road accidents in the European Union every year and about a million globally?
- Why do most transport researchers neglect the role of psychological motives for car ownership and transport choices, despite their dominance in the car culture and in car marketing?

The phenomena implicated by these questions, cannot be explained simply in terms of the enormous demand for mobility or the actual function of the car as a mode of transport. Nor can the social-cultural developments which have led to the present individualistic techno-culture explain the success of the

car. We must dig deeper and seek out the emotions and motives that this inanimate piece of machinery summons up. To do this we have to return to the early years of the motor car.

History

In the summer of 1902 the German author Otto Julius Bierbaum drove from Berlin to Italy and back in an open Adler Phaeton. In his account of this trip, Bierbaum describes in unmistakable terms why the car is usually favoured above the train:

> "The train merely transports us; it bears no relation to real travelling. We are forced to be passive - whereas travelling is the ultimate expression of the freedom of movement. The train subjects us to a timetable, makes us the prisoners of a schedule drawn up by someone else, shuts us up in a cage that we cannot even open, let alone leave if we wish to.... Anyone who calls that travelling might just as well call a military parade a walk in the woods (Bierbaum, 1903)."

As Sachs (1984) explains, the coming of the train in the second half of the 19th century caused our conceptions of distance and time to shrink. The train was faster and more comfortable than any other form of transport. But the wealthy could enjoy these benefits only at the expense of their traditional privileges, such as a 'sovereign' mode of travel, whereby the vehicles in which they travelled were entirely their own domain, equipped according to their own status and taste, as saloons, boudoirs or even bedrooms. The coach, with its coats-of-arms and emblems, was a symbol of nobility and power and was therefore a way of keeping the common people at a respectful distance. It enabled its occupants to come and go as they pleased. To enjoy the benefits of the train (speed, comfort and distance) the upper classes had to subject themselves to the timetable and network of the railways. They had to use the same personnel, carriages, schedules and stations as the common people.

In short, the aloofness and the social [and physical] superiority guaranteed by the coach was no longer possible in the train. And then came the automobile. Suddenly it was possible to benefit from the transport revolution without having to forfeit the advantages of travelling by coach. Only the nobility and the wealthy could afford the first automobiles, which were built by hand and constructed, fitted out and used in almost the same manner as coaches. Even the terminology of the coach era was adopted and is still used today (coachwork, horsepower). The automobile culture was born among the upper classes - the nobility, bankers, manufacturers, theatre stars and prominent academics. The rich demonstrated to the astounded masses what the motor car signified: social status, freedom and independence, and - above all - an opportunity to escape from the crowd.

From the early years of the automobile, the belief that the car is a symbol of social superiority and individuality became deeply embedded in the soul of elite and mass alike. Motor racing added to this a sense of sport and adventure. Many car drivers still consider themselves superior to those who use a less powerful form of transport or a less powerful type of car. Once behind the wheel of a car, the driver is often - for himself and for others - no longer just the 'man in the street'. He demands and is given priority, which implies superiority and sets him apart from cyclists and pedestrians. In the Netherlands, for example, car drivers have had priority over cyclists coming from the right from the 1940's [a rule set by the occupying German Army!] till 2002.

Initially, the popularisation of the automobile - starting with the Model T Ford and symbolised by the Volkswagen (what's in a name?) - seemed to have adversely affected its position as a status symbol. The car industry, taking its lead from General Motors, responded by producing a wider variety of models and accentuating the differences between them. Such a wide range of models with varying engine capacities and features is now available that there is something to suit everyone's real or imagined status. Some makes of car and the images associated with them exist purely as a reflection of the status assigned to them, as illustrated by this slogan from a Jaguar advertisement: 'A car built to standards that start where everybody else stops'. More of a paradox was the once BMW 7 series slogan: "a car you buy not for status but for driving!" The symbolic value of the Mercedes star, or the renowned BMW or Alfa Romeo grills are unrivalled. In the allocation of company cars, the close link between the status of the car and the position of the employee within the company is jealously guarded as though it were a system of military ranking.

The car has also become a widely available means of exercising power, whether it be a Mini or a top-of-the-range sports car. This function of the car is a permanent feature of American TV series and action films where cars are used to perform spectacular stunts and to humiliate adversaries. With abundant horsepower at his disposal, the car driver is able to escape from others, hunt them down and defeat them. Every motorway is a breeding place for conscious and unconscious power games, played by adults who seem to have regressed to an infantile stage of development. The car has acquired such psychological power that, for many people, the superior qualities of their own machine over those of their neighbours and other road-users no longer has to be proved on the road. The car and its features, described in turbo-speak using sacred codes like V8, 16V, GTI, ABS, ASR, ESP, CBC, EBD, TCS and 4WD, radiate superiority. Inflated this might be, some top class models offer no-code versions, leaving green light competitors in doubt about engine size and performance. Meanwhile, all car models are continuously upgrading their engine size and power/performance levels, thus widening the gap between safe speeds and the right foot's lack of self restraint. Never have there been as many fast cars on the market and never have the possibilities of testing them to their limits been so restricted.

Motivational aspects

This historical examination of the popularity of the car has already shown that, in addition to economic factors, psychological motives play a significant role in the development of ownership and driving behaviour. Table 1 shows the most important psychological motives affecting ownership and driving behaviour and may explain the car's epidemic effect throughout the world. In analysing these motives it is important to realise that, although they can be distinguished from each other, they cannot always be kept separate. Motives vary from individual to individual and from group to group (man/woman, young/old, etc.). The examples given are illustrative and no general conclusions can be drawn from them. Most readers will most probably only recognise the *car-fanatic* who lives next door. Nevertheless, recent studies by Steg et al., using new social research methods and avoiding socially desirable response patterns, reveal that the symbolic-affective motives are as relevant as traditional instrument-reasoned motives based on cognitive-reasoned behaviour models.

- 'Auto' regulation: freedom of movement and autonomy (Man as nomad/hunter)
- Archetypal meaning: chivalrous/macho/heroic/superior (Autobahnkrieg)
- Power motive: dichotomy of the desire for power and community spirit
- Territorial/possessive aspect (car as mobile territory)
- Individualism/status/communication: I am what I drive
- Anthropomorphisation: the personification of the car, identification
- Emotional/relational aspect: the car as an object of desire or love (car as a toy)
- Social cohesion function: the car as a common interest
- Neuronic stimulation: speed and neurobiochemistry (narcotic effect, speedaholism)
- Pilot or engineer function: the skill and fun of handling a complex machine
- Structuring the day: the car as a time-filler
- Protective function: the car as a second skin, womb or friend

Table 1: Cars and behaviour: symbolic-affective motives (see also Diekstra, 1993)

The sequence in which the following symbolic-affective motives are discussed is not inflexible, nor is it based on the idea of fundamental versus superficial or innate versus learned. As Murray's motivation theory makes clear, such distinctions are more difficult to make for humans than for animals. From a primate's stick as a primitive instrument to the 6-speed gear stick is a giant psychological leap for top-mammal man, who may enjoy following 'auto feelings' shown in Table 1.

Cars and autonomy

Perhaps the most important motivation for driving a car is: it puts an end to dependence on Nature's own forces to move from place to place. Complete freedom from this (animal) dependence was achieved when man succeeded in moving over land, across the sea and in the air faster and carrying greater burdens than any other living being. With the compact combustion engine, running on fossil fuels, he has acquired the most advanced form of individual mobility. In short, with the car, man has reached a provisional peak in his 'auto'-regulative capacity. Because homo sapiens was originally a nomadic hunter-gatherer, our response to the opportunities for mobility offered by the car are a direct extension of tendencies anchored deep in our genetic and neural make-up. In addition, the car makes our 'auto'-regulative capacity available on an individual basis. Both lower and higher animal species (including humans) almost always prefer situations and devices with the most 'auto'-regulative potential or opportunity for autonomy. The individual freedom that the car offers is therefore not a by-product but the principal motive for car ownership and use.

Cars and power

An increase in individual freedom of movement means an increase in power. The car is a **'**magnifying technique', a technique that magnifies and reinforces qualities which human beings already possess, such as the power of mobility, the ability to mark out territory or to attack and to defend. The car increases human power and speed to such an extent that it also constitutes an increase in a qualitative sense. With the aid of the car, man is capable of claiming territory practically anywhere in the world. This is a completely new phenomenon. Never before have so many people had the opportunity to claim territory - albeit temporarily - simply by driving there or by parking.

Another aspect of the territorial character of the car is its function as a second living room which, like the traditional coach, we can take with us wherever we go and furnish with sound systems, carpets, colourful upholstery, climate-control, a (mini) Christmas tree in December, telephone, PC, DVD or a coffeemaker. In the car, each individual can lead his or her own life, including the physical expressions of one's personality. For this reason alone it is naive to hope that traffic congestion will drive many people out of their cars. The advertising slogan for car telephones - "This is a mobile estate agency" - illustrates clearly that, even when it is not moving, the car is an extension of our 'fixed' territory. New market trends, such as the massive introduction of once-luxury accessories like air-conditioning, hifi-sets and GPS navigation systems in "ordinary" cars, and the growing popularity of 4WD, SUV and MPV type of cars are tribute of the need to extend one's territory into all terrains and without loss of home comfort.

The consequence of the car as a mobile territory is that - unlike in the past - car-man with his territorial urges can - and does - become embroiled in territorial conflicts at any place and any time. Using a variety of visual, audible and verbal signs and signals, the car driver can chase his rivals off his provisional territory. This was once referred to by the German magazine *Der Spiegel* as 'der Autobahnkrieg' - the motorway war: who hasn't seen the BMW and Mercedes warriors as they chase each other down the fast lane? This motive can explain the highly emotional character of any debate about establishing a speed limit for German Autobahns: it is limiting territorial conquest, competition and defence. But even this cannot explain the almost tabooing reactions of German politicians and car drivers when one tries to raise that question. So let us look at the unconscious effects of current power levels under our right foot.

As Alfred Adler (1929) and others have explained, the greater the desire for power, the less human behaviour is motivated by community interests and empathy with others. In that sense, when driving a car, man undergoes a personality change and a motivational reverse, no matter how little he may himself be aware of it. The caring parent, the safety-conscious airline pilot, the Christian or Buddhist attempting to live an exemplary life, all of them may become aggressive and take all kinds of risks once they are behind the wheel of a car or driving a motor-cycle. A human being in a car (and particularly a man) becomes a different person, and different motives and behaviour patterns may take over. The extraordinary psychological effect of the speed and power which the car and motor-cycle give to their driver does not receive enough attention in traffic studies and transport policy (Steg et al., 2001, Kroon, 1996). In the car, the individual has an instrument, a weapon - for which a driving licence is the only form of permit required - with which he can threaten the lives of other road-users. Finally, we see

real bullets being used for conquering a parking place, aggression that may have begun by raising a middle finger.

With the coming of the car, a lethal weapon has become generally available without any form of control whatsoever. The freedom enjoyed by the driver - compared, for example, with the restrictions imposed on air traffic - and the speed, design and materials from which the car is constructed make it a costly piece of machinery in terms of human lives. In the current car culture, this and the power motive are justified by legislation which imposes light punishments for negligent homicide or aggressive behaviour on the road compared to offences committed with 'real' weapons. An endless range of technical safety features such as ABS, ASR, ESP, SIPS and collision impact zoning succeeded in making people believe modern cars are safe cars, while in the USA big cars are labelled as "safe" anyway. Despite sustaining casualty levels and differing risk statistics all over the world, even road safety experts neglect the increasing evidence of risk compensation and power & performance-related risk profiles of individual vehicle-driver combinations. Moreover, car manufacturers cover-up the potential gunship character of many powerful modern family cars, using - like Volvo and SAAB - safety records for lower powered models as overall selling argument for high powered new models (Kroon, 1996). The new Porsche Cayenne SUV with 450 HP and 0 – 100 km/h in 5,6 seconds is no doubt the ultimate level in weaponry and macho-ism a modern car can offer for those who need to beat and show-off all others in a so-called "means of transport"!

'The brotherhood' motive

The car's potential to impress satisfies another significant motive - the desire to be heroic. This is known as the 'archetypal' motive, symbolised by the knight in shining armour. It is best illustrated in terms of a variation on the car - the motor-cycle. Motor-cyclists seem to prefer to operate together in groups or gangs which closely resemble medieval orders of knights. Some time ago, one of the authors experienced a clear example of this when passing a coffee bar where a Harley-Davidson club had gathered. There were seven tough-looking choppers parked outside, some with 'sawn-off' exhausts (acoustic power!). The riders were dressed in black leather suits decorated with chrome studs so as to give the appearance of chain mail. They all wore boots with silver spurs. Their enormous gloves were also covered with studs, like the gauntlets that medieval knights wore for jousting. Their black helmets bore the name of the club - *The Gauntlets*. As they left on a tremendous wave of noise, the image conjured up by the departure of the last bike was striking. Behind the driver, whose long blond hair flowed out from under his helmet, sat a young blond girl, without a helmet and with her arms around his waist. Substitute the bike for a horse, the rider for a knight and the young girl for a damsel and you can see how 20th century technology fulfils ancient, archetypal psychological needs.

Related to the need to be heroic and to be admired is often the desire to belong to an elite group. This brings us to the social-cohesion function of the car. In pubs, at parties and on other social occasions the car is a popular topic of conversation. The car itself is also a major source of communication. A new car in the street will attract massive neighbour's attention, unlike a bike or washing machine. Throughout the world there are clubs for owners of particular makes of car or motor-cycle. As with medieval orders of knights or religious sects, the members are predominantly men, they adopt emblems and coats-of-arms, and membership often involves lifelong dedication to a specific make or type of car or bike (and its restoration). In extreme cases this can lead to a celibate existence.

Car personalities and the personalities of cars

There is yet another psychological aspect to the car: the process of fusion through which man and car acquire a single identity. One striking phenomenon linked to the car has been the creation of a new kind of personality typology which is largely ignored in the scientific literature but is bread and butter to marketing people. It is quite common to hear people's personalities described in terms of makes of car. For example, 'he's a real Volvo type', 'a typical BMW driver' or 'a Fiat Panda woman'. People also apply the typology to themselves. They think that they suit a certain make or type of car. The car itself also acquires a personality, becomes a companion or even a partner. This is known as 'anthropomorphisation'. The star of the Herbie films, for example, is a VW Beetle with eyes for headlights, a mouth for a grill, a friendly character and a life of its own. All cars have a face. Car designers are anxious to create individually distinctive faces for every new model in a family of cars, from which every interested car man can tell which car type and year of birth or "facelift" it is.

The driver expresses his emotional bond with the car by talking to it, thanking it, cursing or caressing it, and by feeling guilty for not devoting enough attention to it. Thus the car is even more than a **toy** for old boys, it lives. On the other hand, we can treat our cars as slaves. They will obey and never protest, even if we torture them and treat them without mercy, as is the case in cold winter starts for short trips. Though we might be treated as slaves ourselves at work, in our cars we are the boss.

Hedonism

Not infrequently cars have a kind of erotic effect on their owners and on on-lookers. Expressions like 'hot', 'sexy' and 'exciting' are often used to describe them. Certain models, like the Renault Twingo, are cute and cuddly while sports cars often possess more obvious sexual attributes, such as oval air inlets, huge exhausts, short, racy gear sticks (the ultimate phallus symbol) and wide wings. The macho jargon in car magazines ('nice tail', 'sleek body') leaves the reader in no doubt at all about the intended associations. Indeed, the possession of a car (and in particular certain models) increases the chances of successful seduction and of engaging in 'auto sex'.

The car moreover is a means of self-love when somebody feels he deserves a big or expensive car to reward himself [for a full life of hard work], a grown-up's way to caress oneself.

Cars and speed as 'speed'

In addition to being an object of desire and vehicle of happiness, the car - at high speed - is also a source of stimulation for the central nervous system. The sensation of speed, the sound of the car, the rhythm of the wheels and the continually changing lights and colours induce a trance-like state in some drivers. Many people see driving a car as a form of meditation, feeling at one with the machine. Others are excited by the thrill of speed. Though for many elderly and women driving a car in modern traffic is no thrill at all, the skill of manoeuvring this complex machine through demanding and risky traffic conditions is an experience that only modern times can offer to the masses.

The car - and the motor bike - allow the individual to expose himself to exactly the level of danger he wants. It is not an overstatement to say that, at these times, drivers are experiencing a kind of narcotic effect, which can produce the same addictive response as more conventional drugs. There is sometimes a very fine line between 'speeding' and 'speeding'! This addiction to speed among some drivers is excellently expressed in the term 'speedaholics'.

Cars and time-structuring

The car also helps to satisfy another fundamental human need: to structure one's time - an antidote to boredom, the quest for new excitement and stimulation, driving for the sake of driving. Every Sunday evening, for instance, between 10 and midnight, in Los Mochis, Mexico, half of the local inhabitants cruise around the town, a ritual 'constitutional' on wheels. Business, social or shopping trips can serve the same purpose.

An antidote against vulnerability

Lastly, the car fulfils the human need for protection and security. As well as being a second home, the car is also a second skin, a suit of armour that is stronger than our own vulnerable skin - the weakest part of our bodies - which can protect from the perils of the outside world. Familiar, warm and rocking gently back and forth, the car is the adult's womb, albeit a womb of metal. And so, the feminine Peugeot 205 was labelled by its marketers: "comrade, partner and friend", expressing the emotional protection female drivers may be looking for. Less romantic, during the Yugoslav and Kosovo crisis the small and overloaded Yugo and Lada cars were the last protection against the cold and the enemy for thousands of homeless refugees.

A device of psychological superiority

Rarely, as our analysis shows, has technology provided a more successful satisfier of basic human needs and motives than the car and it is very unlikely that the feat will ever be repeated. Neglecting the car's psychological assets, common in transport research, may lead to considerable harm and ineffective political choices. Large investments in either roads or public transport, when primarily based upon economic reasoning and considerations of public acceptability, let alone pressure from the car-industrial-cultural complex, will not contribute to restraint and control. Furthermore, it may prevent

the necessary R&D into new behaviour-modifying technologies such as ISA [Intelligent Speed Adaptation] and new forms of road pricing. Public transport is clearly at such a great and insurmountable psychological disadvantage that it can never hope to close the gap on its own.

Interventions

The question then remains, how is man to protect himself against the car when it poses a threat to himself and his environment? A psychologist's answer would be to see the car-man as a predator and the pedestrian and cyclist as its prey. It is up to the latter to devise methods of increasing their freedom of movement - and at the same time reducing their fear - while restricting that of the predatory car. These methods must be designed to keep the car-man at a distance, because in hand-to-hand combat, the pedestrian would, of course, always be defeated. The following physical and psychological solutions might be effective.

Psychological measures

The use of psychological weapons and methods which would give those without cars greater power. This would involve devising a system of signs and gestures enabling pedestrians and cyclists to clearly communicate their wishes to car drivers, such as 'slow down', 'stop, I want to cross the road', etc. Ignoring these signals would be an offence comparable to driving through a red light. Such empowerment requires changing traffic laws so that the weaker always have priority over the strong and slow traffic over faster, and the introduction of strict civil liability for injury or damage to non-motorised traffic.

Technical measures

These are measures which would make cars (and drivers) less powerful - and therefore less attractive - including speed limiters, ISA and restrictions on engine power and capacity ('vehicle self-control'; Kroon, 1996). Light signals - and aggressive music levels inside cars which cause drivers to speed - should definitely go and be replaced by instruments that give direct feedback on driving behaviour and its effects, such as an econometer or on-board computer, an emission meter and a 'taximeter' giving the total cost per km. Acoustic feedback should be reintroduced by the introduction of statutory minimum noise levels inside cars travelling at high speed. Finally, very strict CO_2 emission limits must bring about the necessary downsizing of all relevant features of modern cars which are not needed for transport purposes such as very high rates of acceleration. Furthermore, since most 4WD and SUV-type of cars are rarely used for their original function as off-road vehicles, manufacturing and purchasing of these particularly environmentally-unfriendly types of vehicle should be severely limited. A first step towards downsizing these non-transport features could be a EU-directive for built-in speed retarders set at 130 km/h, the general speed limit in many countries.

Infrastructural measures

Such measures would be designed to restrict the freedom of movement of the car and to keep it at a greater distance from people. These include speed ramps, cycle tracks and separate lanes on roads for cyclists, and extension of existing car-free zones and times. Free of charge parking should be limited to rural areas. Decreasing highway speed limits and more effective enforcement of all existing speed limits should be given more political a policing priority, as part of a civil and safe society.

Distributive and fiscal measures

These measures would make the car less attractive than its alternatives. Each car owner could be given a basic kilometre quota per year. If he required more than this he would have to submit an application or pay a surplus charge. If he used less he would receive a certain amount back in the form of a tax rebate. A differentiated kilometre charge could be a first step towards such a system. Every car would be fitted with a black box, which could also be used as evidence of speeding offences. Tax relief could be given on collective ownership and use of cars. Public transport could offer the option of reserving a place in the train or bus for a season or at certain times providing one's own territory in the train, perhaps with facilities for working while travelling. Reducing business car fiscal benefits is a precondition in countries with high rates of business car sales, such as Sweden and The Netherlands.

Ultimately, these measures result in cars that are slower and less powerful, offer less freedom of movement and less fun, while at the same time travelling on foot, by bicycle or by public transport

would become more attractive and safe. People would then be more inclined to leave the car at home. The problem then arises: where are all these cars to be parked? As long as they are outside the front door, abstention will be difficult, given the theory of acceptability/availability, according to which the more acceptable and available something is - like cars, guns, drink or food - the more we will use it. That is why people usually drink more in pubs than at home and why, for example, the use of firearms has reached epidemic proportions in the United States compared with the Netherlands.

As long as the car is under our noses, it is very probable that we will use it more often than is necessary or desirable. It must therefore be removed from the street where we live and left at a collection point somewhere further away than the shops, school and church, to which we used to travel by car. In short, we must no longer be able to see our mobile living rooms from our homes or our offices, because - being the territorial animals we are - we will always take the road of least resistance and greatest autonomy.

Conclusion

A psychological analysis of the strengths and weaknesses of measures aimed at controlling car use is no guarantee that psychologically effective instruments will be applied. The measures described above would lead to a considerable reduction in car use affecting not only the primary transport function of the car but even more so its psychological functions and values, as described above. Given the mass popularity of the car, the effectiveness with which the values associated with it are protected and the economic and other instruments involved, it would be illusory to expect that in a parliamentary market democracy, decisions will be taken that will have any real impact on these values and interests. Taking into account the above-mentioned motivational assets of cars can also help political scientists to explain the 'automobile voting behaviour' of citizens and politicians alike (an area which has hardly been explored) or, in other words, to establish why politicians pay lip service to measures to protect road safety and the environment while doing their utmost not to set effective barriers to the suffocating use of an ever growing armada of cars.

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Soft measures can be used to encourage the achievement of EST using two primary mechanisms:

- By raising support for policy measures that promote EST
- By encouraging a change in personal behaviour towards EST

Supporting EST Policies

There are three kinds of policy initiative that can assist in encouraging EST:

- Cutting the level of investment in new road infrastructure and parking provision
- Increasing the level of investment in public transport provision and walking and cycling infrastructure
- Directly restraining car use through pricing or regulatory means

The first two of these involve gaining public support to change the balance of transport expenditure, whilst the third requires public acceptance of measures that will more directly and immediately impinge on drivers' behaviour.

A UK survey carried out some years ago showed that the level of support for a shift in national transport investment priorities depended on whether peoples' attitudes were being sought in the context of personal interest or national interest. On average, people saw more personal gain in road investment that catered for car use and more national gain in rail investments that encouraged public transport use.

	FOR COUNTRY	FOR SELF
More on rail, less on road	39%	27%
Less on rail, more on road	20%	39%
Same balance as now	37%	27%

Table 1: Views on appropriate balance of national transport expenditure

UK opinion polls carried out during the 1990s showed a gradually increasing support for policies that favoured EST investments over car-based investments, during a period when concerns were growing over the levels of traffic congestion and air pollution. It could be hypothesised that, as car-related problems were seen as getting more severe, people's focus shifted from personal to national interest – and hence a greater emphasis on EST-type investments[1].

Qualitative research during this period found that this shift in priority was also associated with concern about likely future conditions: the expectation was that traffic congestion and environmental deterioration would get worse over time, as traffic levels continued to rise. In more crowded areas such as London, the view was taken that road building would only be a short-term solution – just encouraging further traffic growth – and that high quality public transport (particularly rail-based systems) offered the only long-term solution. It was also recognised by the public that it would take a number of years for patronage to build up to a significant level (see below).

[1] More recently there has been something of a 'backlash', with a concern - at least in the media - that car users' needs are not being met, which has resulted in government again putting a greater emphasis on road building.

Once pro-EST investments have been introduced, with public support, there is evidence in Germany and elsewhere (as noted in the Issues Paper) that levels of use can be boosted substantially by a well targeted public information/motivation campaign.

The third kind of policy initiative is more difficult to 'sell', as it is designed to directly affect the travel behaviour of certain target groups, by discouraging the use of the private car. Here experience suggests that support can be maximised by:

- Relating the proposed measure to objectives that resonate with public concerns. In the UK, support for forms of restraint on personal behaviour are greatest when the objective is to reduce road accidents (e.g. lower speed limits); next in line is reduction in air pollution, usually followed by traffic congestion as the least motivating factor (with the reverse order applying to businesses). Most drivers acknowledge that they contribute to air and noise pollution – but see themselves as victims of traffic congestion caused by other drivers.

- Convincing people that alternative 'carrot' policies have not worked (i.e. that public transport use may have increased, but car use had not decreased) and that 'sticks' are also needed to achieve the desired reductions in traffic levels/pollution/congestion.

- Demonstrating that restraint policies are successful in reducing traffic levels: while most people believe that reducing public transport fares will 'get people out of their cars', far fewer seem to accept that car use will also drop if costs are increased. Similarly, it is only now being accepted by professionals in the UK that some traffic 'evaporates' if network capacity is reduced.

- Dealing with equity issues – the 'fairness' of the proposed scheme. This can apply both geographically (e.g. impacts on people living just outside a restricted area) and socially (e.g. effects of charging on low income drivers). This requires paying attention to the details of scheme design, offering selected concessions and using any net revenues to improve EST alternatives to car use.

Studies in Norway and elsewhere have found that support for restrictive policies (such as the urban toll rings) generally increases after implementation. There are a number of possible explanations for this, ranging from a reduction in 'opposition in principle' once a scheme has been introduced, to discovering that the consequences of the scheme were better than had been anticipated in the run-up to implementation.

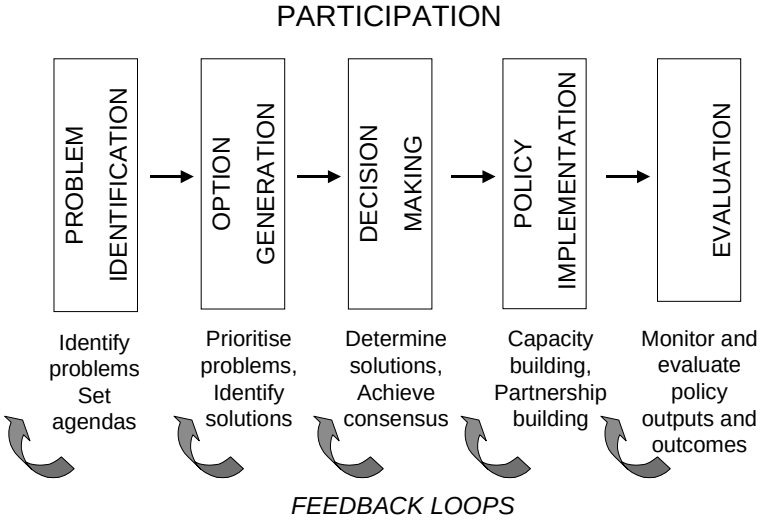

Figure 1: Participation and decision making elements

A new EU DGTREN project called 'GUIDEMAPS' is examining how to encourage the introduction of EST-type policies through well designed decision making processes that combine effective project management and comprehensive stakeholder involvement, in the context of a targeted communication strategy.

Encouraging a Change in Personal Behaviour

Changes in personal behaviour can be encouraged in two respects:

- *Eco-driving*: reducing environmental impacts through the choice of type of car that is driven, and the way in which it is driven
- *Eco-travelling*: encouraging reductions in the use of the car, through:
  - Shorter car trips
  - Fewer car trips (including trip 'chaining')
  - Switch to EST modes
  - Substitution of telecommunications or in-home activities for travel

A range of opinion surveys in the UK have found that most drivers acknowledge that not all their current car trips are essential (though groups range from 'compulsive' to 'forced' car users) – surveys typically come up with figures of between 10% and 30% of car trips that could be made in other ways, or suppressed, without significant hardship. In the case of the journey to school, about half the parents who currently drive their children to school say that they would prefer not to have to do so.

However, for most people, changes in behaviour do not occur overnight:

- It takes time for people to absorb arguments and information, and to react to them
- It may only be practical to change behaviour at certain key points in life (e.g. when next planning to buy a car, or when looking for a new job or home location).

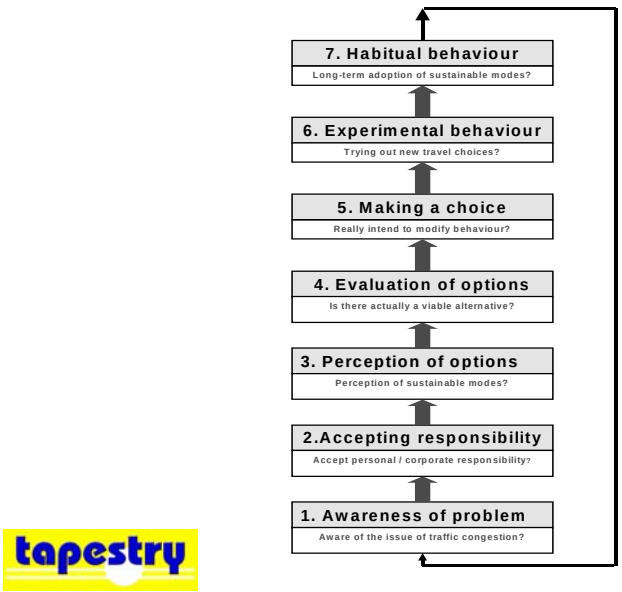

Figure 2: Seven steps in the TAPESTRY "stages of change" model

The EU DGTREN 'TAPESTRY' project has proposed a 'stages of change' model comprising seven steps, from raising awareness of a problem to a change in habitual behaviour:

It is hypothesised that target groups need to be taken through these various stages if sustained changes in behaviour towards EST are to be achieved. Several points follow from this:

- People will already be at various stages along this process. At one extreme, some may not accept that there is a problem that needs addressing by themselves or anyone else. At the other extreme, some people may be willing to change and are only waiting for an opportunity to do so (e.g. when selecting their next home location, to ensure that they can travel to work by public transport).
- Different kinds of marketing instrument will be appropriate to influence target groups at different stages of the process. In general, as we move from general awareness raising to personal behaviour change, there is a need to move from broad-brush techniques (e.g. media campaigns) to more focused and customised initiatives (e.g. using Individualised Marketing techniques).
- There is a tendency to expect that marketing initiatives will lead to immediate changes in behaviour. TAPESTRY stresses that:
  - Changing behaviour takes time, and will lead to a gradual build-up, if a well designed initiative is maintained.
  - It is important to track changes in awareness and attitudes – not just behaviour – in order to see whether target groups are moving up the stages of change, towards changes in personal behaviour.

The encouraging evidence in places such as Perth, is that changes in behaviour triggered by an Individualised Marketing campaign are sustained over several years.

Introduction

Each strategy aimed at changing transport behaviour is based on some, more or less explicit, assumptions on which factors determine behaviour and how behavioural changes may be induced. Unfortunately a comprehensive theory of (spatial) mobility does not exist which is able to explain the phenomenon of movement satisfactorily. The potential efficiency and success of various policy measures for reducing traffic problems largely depends on how people will respond to them. A necessary step is to specify how travel demand management (TDM) measures affect people's travel options and to find out how they react to these changes. First attempts have been made by e.g. Gärling et al. (2002) and Bamberg & Schmidt (1999).

In designing policy instruments to deal with different transport problems possible options have to be evaluated on the basis of clear criteria. Among the most important criteria for selecting policy instruments are effectiveness, cost-effectiveness, fairness, and the existence of possible (positive or negative) side-effects. Recently the public support and acceptance of measures was discussed as a further criteria (Ohta, 1998). Depending on the objectives each measure may be evaluated differently. One of the most necessary although not sufficient criteria is the behaviour effectiveness of the measures (e.g. fewer car journeys, switching from car to public transit. etc.)

There is no widely accepted definition of soft policies available (for an alternative definition see Vlek & Michon, 1992). In a broad sense it compromises all measures of education, instruction and information (applied strategies are: e.g. commitment, modelling, prompts, feedback etc.). In general they are aimed at influencing people's perceptions, beliefs, attitudes, values and norms. Eventually, this might result in behaviour changes. The assumption is that attitudes (e.g. environmental awareness) guide latter behaviour. Unfortunately, there are not many convincing empirical examples available which demonstrate a lasting behaviour effect of soft measures in transport. However, it is common sense in traffic science that only a whole *set* of comprehensive measures is able to reach visible changes.

Acceptability barriers to the implementation of hard measures

A promising but not sufficiently considered alternative approach is the supportive use of soft measures in implementing hard and possibly more effective measures (indirect approach). One of the main barriers for the successful implementation of hard measures and in particular pricing strategies is missing public and political acceptability of these measures (e.g. Jones, 1998). Several good reasons exist for the consideration of acceptability. Firstly, we live in a democratic society, i.e. societal, political and technological innovations must be introduced via the democratic process and prevail against competing innovations (Frey & Eichenberger, 1999). Usually they can not be imposed against public will. Secondly, the acceptability concept stresses the user perspective (Bartley, 1995). It is true that most technological and political innovations might result in societal benefits, but opinions and intentions of the people concerned are often not canvassed when new measures are being considered for implementation. This may lead to "irrational" resistance, not only by the people concerned, and ultimately to the failure of an originally useful innovation. Lacking acceptability of a certain policy may have several consequences: For instance, strong public resistance may inhibit implementation, as political parties fear consequences for their next election. In such a case only minor investment costs incur. Secondly, with a sensitive topic such as mobility, the introduction of road pricing may lead to active resistance by different groups, which might be exhibited in the form of demonstrations, boycotts or even sabotage. Several examples demonstrating the power of resistance are coming e.g. from nuclear energy, information technology, biotechnology and even from transport (Bauer, 1995; Crest, Klaerr-Blanchard & Ellenberg, 1999; Davis, 1993; Renn, 1998). Thus, acceptability of systems is assumed to be of major influence on the effectiveness of the implementation and maintenance of a system (Van der Laan, 1998).

Generally, the construct can be conveniently described by questioning "acceptance of what, through whom and under which conditions and circumstances". The term "*acceptability*" describes the prospective judgement of measures to be introduced in the future. Thus the target group will not have

experienced any of these measures, making “acceptability” an attitude construct. “*Acceptance*” defines respondents’ attitudes including their behavioural reactions after the introduction of a measure.

Research results show clearly that additional non-coercive measures (e.g. improvements in public transit) get high public support whereas restrictive measures get considerably less support. However, some coercive measures like inner city access restrictions are far more accepted than expected (Schlag & Schade, 2000). Least accepted are generally all kinds of road user fees (Figure 1). Therefore research focussed mainly on explaining the low acceptability of road pricing.

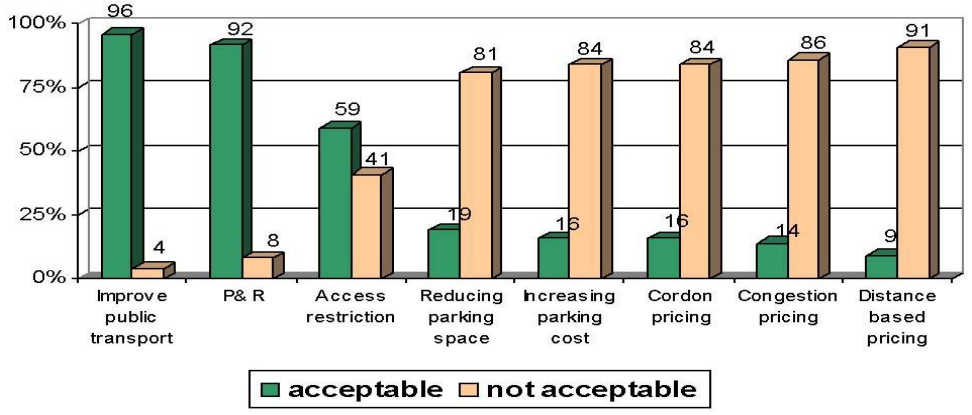

Figure 1: Acceptability of various travel demand management measures (Schade, 2003)

Reasons for the low public acceptability of transport pricing measures

A whole bundle of factors contributing to the low acceptability of pricing measures has been identified (see for an overview Schade & Schlag, 2003; Jones, 1998). This section reviews the main factors which contribute to the overall low public acceptability of pricing measures in transport and hence, hinder its introduction. The presentation follows a model developed by Schlag and others (Schlag and Teubel, 1997; Schade and Schlag, 2000) which defines, among others, the following essential issues determining acceptability:

- Problem perception,
- Important aims to reach,
- Mobility related social norms,
- Knowledge about options,
- Perceived effectiveness of the proposed measures,
- Fairness,
- Attribution of responsibility,
- Socio-economic factors.

Problem perception

The perception of traffic-related problems is a necessary precondition for regarding problem-solving measures as important. Steg & Vlek (1997) assume that high problem awareness will lead to increased willingness to accept solutions for the perceived problems. Several studies have shown that perception of mobility-related problems is particularly high in densely populated regions (e.g. Jones,

1991). Empirical findings on the influence of problem perception on acceptability have to be differentiated depending on the kind of perceived traffic problems. In general, several studies have found a relationship between problem perception and acceptability of various pricing measures (Rienstra et al., 1999). But, more precisely, other results show that the groups perceiving traffic congestion as one of the biggest problems tend to reject road pricing whereas those groups perceiving mainly environmental problems are rather willing to accept it (e.g. Harsman et al., 2000; Schade and Schlag, 2000).

Important aims to reach

There are different, maybe conflicting, aims connected to road pricing measures (e.g. financial aims, ecological aims, demand management etc.). These goal conflicts may exist also on the individual level or even within one person and they are crucial for the question of acceptability. In principle a big number of competitive goals and interests related to traffic and transportation is possible. Derived from the concept of 'social dilemma', social vs. personal aims are distinguished (Dawes, 1980). It is assumed that more socially orientated aims, like preference for bus and railway, or air and environmental improvements, are in accord with those of road pricing. On the other hand, personal aims of gain maximization, like 'I would like to use my car, whenever I want', compete with those of road pricing. It is to be expected that a higher valuation of common social aims will be positively related to acceptability of road pricing, while pursuing personal and gain maximising aims may lead to a refusal of road pricing, because of a threatening restriction of personally important aims (Schade & Schlag, 2000; Jaensirisak, May & Wardman, 2003).

Mobility related social norms

Social norms and respectively perceived social pressure refer to perceived opinions of significant others (e.g. friends, peers) and the importance of the others' opinions for the individual (cf. Ajzen, 1991). In short, this reflects the social consequences an individual expects following his behaviour. Thus, the more favourable the perceived social norm is with respect to a pricing strategy, the stronger should be an individual's acceptability of the strategy. Several empirical examples are available which show the strong influence of social norms on acceptability (e.g. Jakobson et al., 2000, Bamberg & Rölle, 2003; Steg, 2003).

Knowledge of options

Environmental awareness research has established that knowledge about the right action is a necessary but not sufficient prerequisite for conservation-conscious behaviour (e.g. Bell, Fisher, Baum & Greene, 1990). So, any new measure that is to change the demand for traffic depends on good user information. Among other issues, the background of the problem, the aims of the measure, and its concrete realisation have to be clear. Generally, the empirical literature shows that the public is much less aware of the possibilities of pricing policies to solve traffic related problems than of other policies (MIRO, 1995). Although the causal connection of knowledge has not been settled yet, studies show that well-known demand management measures meet with a higher rate of acceptability than unknown measures (Schlag & Schade, 2000). Unfortunately, findings do not allow for final conclusions regarding the influence of knowledge on acceptability. The significance of knowledge seems apparent but its exact functions are still uncertain. However, in general no innovation could be accepted without appropriate and early information (Schlag & Teubel, 1997).

Perceived effectiveness

If someone recognises traffic problems and their consequences (problem perception), and identifies at least in part the aims of changing these problems (reducing traffic congestion, declining environmental damage etc.), he or she has to answer the crucial question, of whether the proposed measures are of appropriate effectiveness and efficiency. Effectiveness refers to the degree to which the aims of the measure can be reached. Efficiency, on the other hand, means the cost-benefit-relation of a concrete measure (e.g. road pricing) compared to other possible measures (e.g. access restriction). Because the efficiency criterion - due to its complexity - is difficult to investigate, up to now mostly perceived effectiveness has been examined (MIRO, 1995; Steg & Vlek, 1997). Many studies have shown that the perceived effectiveness of TDM measures is an influential predictor variable for their acceptability (Bartely, 1995). If a measure is regarded as effective, e.g. as reducing traffic problems, acceptability of the measure is greater and vice versa. In general respondents state that they do not believe that pricing and taxation measures would solve transport-related problems such as air pollution and congestion (Jones, 1998). This has led to an alternative hypothesis, which proposes that acceptability of a

measure influences perception of its effectiveness. This approach is labelled as “strategic response”-hypothesis, when respondents try to justify their rejection of a hurting policy by claiming that they perceive them as ineffective (Rienstra et al., 1999).

Fairness

A key factor affecting the behaviour of almost all groups in one way or another is the (social) fairness of the measure. The perception of impartial distribution of costs and benefits is crucial not only for public acceptability. The concepts of justice and fairness are often used in this context. Distributive equity (justice) has to be distinguished from procedural equity (fairness). Whereas the term fairness attempts to define principles of a just procedure, the term justice is related to the outcome of these procedures (Schade and Schlag, 2000). Several studies indicate that in general fairness considerations are relevant when evaluating alternative allocation mechanisms. If people are asked they do not like prices being used as a mechanism to allocate scarce resources. In a study Frey (2003) performed a random sample of persons living in the city of Zurich was asked how “fair” they take various allocation mechanisms to be in a clearly defined situation of excess demand. Table 1 shows that using a price to allocate the scarce good was not considered to be at all fair.

	Tradition (“first come, first served”)	Government intervention	Price	Random
Fair	76%	43%	27%	14%

Table 1: Perceived fairness of various allocation mechanisms (Frey, 2003,).

In the case of (procedural) fairness research has shown that participation in the decision process increases peoples` acceptance of outcomes considerably even if a better solution would have been possible (e.g. Lind, 1994; Tyler, 1990). This mechanism holds true for several areas of life.

Attribution of responsibility

The construct of responsibility attribution stems from the norm activation theory by Schwartz (1977) and represents a central component for explaining altruistic behaviour. In previous years this model has been used in studies attempting to explain environmental behaviour (e.g. Stern, Dietz & Black, 1986). It is assumed, that environment-preserving behaviour becomes more likely if persons perceive damaging consequences of their own actions on the environment and on others, and at the same time ascribe the responsibility for the consequences to themselves. It may be distinguished between the (attribution of) responsibility for problem causation on the one hand and the responsibility for problem solving on the other hand. But of major importance is to whom the responsibility to solve the problems is attributed to. It can be ascribed to the individual, i.e. internal, but responsibility may also be attributed externally (e.g. to the state). If the individual considers himself as at least partly responsible to solve the problems, this should lead to increased agreement with measures raising the price of or restricting the use of the car. But if only external instances are regarded as responsible for the solution of traffic problems, a negative effect on the support for road pricing measures can be expected. Steg & Vlek (1997) report first results showing a positive connection between responsibility attribution, problem awareness and acceptability of demand management measures.

Socio-economic impacts

It may be assumed that acceptability of road pricing also depends on socio-economic status. Following economic theory, it is to be expected that low income groups should be more opposed to road pricing because of their higher marginal utility of money, and their decreased willingness to pay to reduce externalities (Rienstra et al., 1999). Conversely, road pricing is expected to receive more support from higher income groups because their value of time is higher and their marginal value of income generally lower. Strikingly, Rienstra et al. (1999) found in their study that the lowest income group perceived pricing measures as most effective, and that the income level had no significant impact on the support for pricing measures. Further, they examined the relation between other socio-economic variables and model variables like ‘problem awareness’, ‘perceived effectiveness’ and ‘support of policies’. They summarised ‘that the support for policy measures is influenced to a lesser extent by the personal

features of respondents' (Rienstra et al., 1999, 198). On the basis of such results, in contrary to main economic theories the effects of income and related socio-economic variables on acceptability of road pricing are expected to be rather low.

Results from a European study

The European research project AFFORD aimed at investigating whether the above mentioned factors show any impact on the acceptability of transport pricing strategies (for detailed information about the survey see Schade & Schlag, 2000). A questionnaire survey was conducted in Athens (Greece), Como (Italy), Dresden (Germany) and Oslo (Norway). The sample consisted exclusively of *motorists* (N=952). Regression analyses were applied to investigate which factors contribute to the explanation of acceptability. The following questions have been addressed (e.g.):

- whether the acceptability of road pricing strategies is related to the perception of problems resulting from traffic? The hypothesis is that a high problem perception leads to an increased concern about options for solving the perceived problems.
- whether a higher level of subjective knowledge about TDM leads to an increase of acceptability for pricing strategies?
- whether lower scores in the perceived effectiveness correlate with lower acceptability for a particular measure and vice versa.

Linear stepwise regression analyses were carried out. The independent variables were: level of knowledge, perceived effectiveness, personal outcome expectations, social norm, problem perception, important mobility aims and responsibility-attribution. The variable to be predicted was the measured acceptability of road pricing. Results are shown in Table 2.[1]

Predictor variables	R^2	R	β
Social norm	.236	.269**	.274
Fairness/Personal outcome expectations	.317	.296**	.270
Perceived effectiveness	.343	.164**	.170
Traffic related problem perception	.359	-.179*	-.123
General (societal) important aims to reach	.369	.113**	.083
Internal attribution of responsibility	.376	.078**	.088
Knowledge	.380	.068*	.065
Constant		.320	
F total =80.34**; df =7/918			

* .01 < p <.05 **p < .01

Table 2: Multiple stepwise regression analysis for acceptability of road pricing strategy..

A high acceptability is to be expected mainly if social pressure to accept such a strategy is regarded as high, if personal advantages following the introduction of road pricing are expected and if the impact of the road pricing strategy to reduce inner city traffic is perceived as effective. These variables account for nearly 34% of the criterion variance. A predominant perception of traffic-related problems like traffic congestion or lack of parking space appears to hinder the acceptability of road pricing (cp. Harsman et al., 2000; Schade, 1999). Respondents perceiving socially important aims, like rights for cyclists and

[1] R^2: Coefficient of determination (fit); R: regression coefficient (Estimate of the change in the dependent variable that can be attributed to a change of one unit in the independent variable); β (Beta): standardised regression coefficient.

pedestrians or improvements in urban living conditions, more significantly approve of the strategies than people favouring mainly personal benefits. Furthermore the internal attribution (i.e. motorists) of responsibility for the solution to traffic problems contributes to a higher acceptability of pricing measures. The subjective level of knowledge about TDM does not improve the equation, although it has a significant positive sign. The most interesting result is that social norm has the most predictive value of all factors. Besides the influence of social norm mainly personal outcome expectations predict acceptability of the strategy to some extent. Furthermore the socio-economic impact on all major variables was examined. Results revealed clearly that perceptions, attitudes and evaluations towards pricing strategies are influenced only to a very low extent by respondents' socio-economic status. Income had no explanatory value concerning acceptability. This confirmed the findings of several other studies which all failed to find income effects (Odeck and Brathen, 1997; Rienstra et al., 1999; Harrington, Krupnick and Alberini, 2000).

Conclusions

Two roles of soft measures in achieving Environmentally Sustainable Transport (EST) are identified. Firstly, a direct approach which means that soft measures are directly targeted at influencing people's travel behaviour via a modification of their perceptions, beliefs, attitudes, values and norms. Unfortunately, there are not many convincing empirical examples available following clear scientific evaluation criteria (Rossi et al., 1999), which demonstrate a lasting behaviour effect of soft measures in transport. Therefore, in addition, a rather indirect approach is suggested: the supportive use of soft measures in implementing hard and possibly more effective measures. The main barrier to the implementation of restrictive policies in transport is its missing public acceptability, and related political acceptability. However, research has identified several factors that influence the individual acceptability of hard measures in transport.

The results of the reported study show that in particular social norms, personal outcome expectations and perceived effectiveness of the measures are positively connected with acceptability of pricing strategies. That means, the more social pressure to accept the respective strategy is perceived, the more personal advantages following the introduction of the measure are expected and the more pricing strategies are evaluated as effective means to solve traffic problems, the higher is respondents` acceptability of a pricing strategy. These results are supported by findings elsewhere (e.g. Jakobson, Fuji & Gärling, 2000; Bamberg & Rölle, 2003). Furthermore results confirm that a predominant perception of traffic-related problems like traffic congestion may have a counter-productive impact on the acceptability of road pricing. On the other hand findings reveal clearly that socio-economic characteristics (like income) influence the perceptions, attitudes and evaluations of respondents towards the pricing strategies only to a minor extent.

This information is very important for the development of effective interventions trying to increase people's acceptability of pricing or restrictive policies. Findings can be used in two prevailing ways: firstly, for the design of hard measures themselves. For instance, distributional and fairness aspects should be taken into account. It makes no sense to develop very efficient policies like marginal cost pricing if they are regarded as very unfair. They will be hardly introduced because public resistance will remain stable. Secondly, soft measures like communication etc. should address factors which have been shown as important for acceptability. The perception of local environmental problems tends to have a positive impact on acceptability of restrictive policies but not the focus on time or efficiency gains which is often suggested by economists. Our findings demonstrate the important role of social norms for the acceptability of restrictive policies. If there is a lack of experience and knowledge as a basis for the evaluation of pricing strategies, own tentative ideas and valuations especially refer to perceived social valuations. In an ill-defined but maybe relevant field a kind of striving for concordance between own preferences and the ones of important others emerges. Most people strive for social integration and consonance (Festinger, 1957). This in turn clarifies the importance of social norms. If social norms can be changed in a favourable way, towards road pricing, a respective alignment of personal attitudes could be expected. The pressure towards conformity exercised by relevant others is one of the strongest factors influencing personal opinions, feelings and behavioural intentions, especially in a situation with a rather uncertain physical basis for judgement. But these influences may go in both directions, favouring or opposing pricing strategies. Today, the latter tendency is more probable. Besides social norm especially personal outcome expectations prove to be an influential predictor of acceptability. This is not surprising, but suggests that advantages of the pricing packages and in gen-

eral of EST have to be communicated in a very credible and convincing manner. Communication before introduction much more has to point out future advantages resulting from new policies.

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Shall it be necessary to use centralised economic, technical and administrative control instruments in order to make traffic environmentally sound and sustainable in the long term? Or is it possible to use information and education as a means of control at the grassroots level to achieve changes in travel habits and travel patterns?

General background

The Swedish National Road Administration (SNRA) has been commissioned by the Government and Parliament to ensure that the road transport system develops in the right direction and at such a speed that we can attain the interim goals adopted in such areas as the environment, for instance (Government Bill 1995/96:131).

What are the SNRA's possibilities for achieving this? Although the SNRA is indisputably a large public body with solid resources at its disposal, its authority is nevertheless limited to making decisions on 100,000 kilometres of state roads, including how they are constructed and maintained and to a certain extent on the terms on which they are used by traffic.

Despite this, the SNRA can not, and should not make decisions concerning which modes of transport people are to use, how often they may travel or which roads they may use. Neither can or should the Administration make decisions concerning vehicle design or the fuels that are to be used. All this is determined through individual decisions by road-users and the business community within the framework of a democratically adopted transport policy.

All the same, it is the sum of these very decisions that determine the environmental situation that will prevail within the road transport system. How then can we influence these decisions?

All aspects of the environmental impact of road traffic are the result of individual or collective decisions made by people. This concerns how we design, develop and build up the road transport system and its components: vehicles, fuels, roads and ultimately our entire society. It is also a matter of how we use this system: choice of destination, mode of travel, type of vehicle and fuel, how we drive vehicles and how we look after them. Basically, it is our own ideas, knowledge, desires and possibilities that form the decisions and determine the environmental impact.

The Vetlanda project

Between 1996 and 2000 there was an attempt in Vetlanda municipality to reduce the environmental impact of traffic through primarily communicative means of control. The fundamental idea is that all road-users can do something to contribute. In every situation and when making every decision it is possible to choose an environmentally better alternative, which does not necessarily have to mean any major sacrifice.

Quite naturally, the potential for an individual municipality to deviate from the national transport pattern is very limited. Nonetheless, through creating an understanding about the environmental problems relating to transportation and describing how this can be dealt with, a municipality can be a driving force in the development of an ecologically sustainable society. This is the basis for the project entitled "Environmentally adapted traffic in Vetlanda". The idea behind the project is to conduct a dialogue with the inhabitants in the municipality in order to influence their ideas, attitudes, intentions and behaviour, and thereby induce them to choose more environmentally-friendly means of transportation that consume less energy.

The strategy that was used could be described as some kind of community intervention. Community intervention means, in short, that both existing formal and informal networks within a region or a municipality are used for the purpose of the project as well as newly created constellations.

Work at the local level

Initially, the communication in the project dealt a lot with WHAT and WHY. Since the autumn of 1997 there has been a greater opportunity to work with exemplary models, which has meant being able to start achieving the intented objective in earnest.

The kind of information that has the greatest chance of catching the interest of the target groups and influencing their behaviour is that which is based on their daily transportation problems. WHY should not only deal with better air and less carbon dioxide; it should also deal with better general health and better private finances, preferably expressed in monetary terms. If engine service and “thrifty” driving (eco-driving) reduces fuel consumption by 5-10%, this means a savings of between SEK 600 and 1200 for someone who drives 15,000 kilometres per year.

It is also important to remember that the decision one is trying to elicit from the target groups should not be a once and for all transition to a new mode of transportation, but rather a decision to at least try it once.

Most people have a strong mental block against trying something new. This opposition must be won over, both through the new behaviour being as simple as possible, and more so that it is presented as being as simple as possible.

The project is run in Vetlanda under the leadership of a project manager who has been assisted by a fluctuating number of colleagues employed short-term and some 80 “resource persons”, i.e., people at their places of work, active in various organisations, etc.

Work on the project has been carried out as an integral part of the municipality’s Local Agenda 21 programme. A project group has been created to manage and direct the project and consists of representatives from the SNRA, the municipality, the local business community and the local environmental movement.

The main task of the resource persons has been to involve members in their own network. It could be said that the resource persons are the real nucleus of the project: a kind of environmental ambassador and a link between the project and the company or association.

Important results

Knowledge and acceptance

The knowledge about the project among inhabitants in Vetlanda is fairly high – about 70 %. One third of them have gained their knowledge through conversation with other inhabitants. The project was appreciated by 76 % of the inhabitants. They all considered the project important for the municipality. The share of people who are willing to “sacrifice” something for the environment has increased from 5% to 39 % during the project.

Environmental declarations

22 car and motor related companies have signed environmental declarations or “letters of intent”. Every one of the companies have reached their environmental goals or is making progress in doing so.

Change in behaviour

Carpooling to work has increased from 14% to 21% (self reported).

Measurements of cycling reveal a minor increase - approximately 10%. The self reported growth of cycling to work has increased from 35% to 62%.

The use of public transports has not developed in a positive way. The bus company was not committed to the project.

Cost-benefit analysis

Halfway through the project 1.3 million SEK was spent in various activities. At the same time the value of the particles (PM10) and nitrogen dioxide that was not emitted could be estimated at 2.5 million SEK. The amount of carbon dioxide not emitted was estimated at 4 % of the 20,000 tons of carbon dioxide from cars in Vetlanda municipality.

Conclusions and knowledge gained

Our conclusion is that it is possible to persuade people to travel more intelligently – and that the change implied is environmentally beneficial. In order to succeed, there are things that should be thought about.

Meet people on their own ground

The attempts made to attract people to information meetings, exhibits, courses on road traffic and the environment were only moderately successful. On the other hand, the result was much more successful when the work related to the environmental problems associated with road traffic was linked to people's own work and recreational activities.

Give the project the time it needs

Introducing new ideas, attitudes and ways of behaviour is a laborious and slow process. Results come in little by little and perhaps not at the speed one would have desired. However, a network process belongs to its members and must be implemented according to their prerequisites and on their own terms.

Win the easiest conquests first

It is those who are most motivated who will set the good examples. Working with them at the beginning sets the project off to a good start. Aiming the work at the greatest problems and at those least interested can be exciting, but also fatiguing.

Bring the subject to the fore

An environmentally adapted transport system is as little a "sexy" subject as road safety. It is abstract and difficult to give concrete shape to and has little relevance to the individual. The environmental impact of an individual's behaviour is not felt personally and lies in the remote future.

Avoid moralising "us-and-them" attitudes

A pervading theme in the project has been that "everyone can take part". Even small changes in behaviour are worthwhile – for example it is not necessary to park the car for good, but carpool at least some times during the week, and on a sunny Saturday walk to the town centre etc.

Engage opinion leaders and the municipal organisation

The major portion of the financial resources for a campaign like this one must be put into teaching, activating and motivating opinion leaders and those who set the good examples. The more individual politicians and local government officers can be inspired to believe in the project, the faster it will spread throughout the community.

Connect "soft measures" with hard ones

Often we are asking people to contribute with something in order to mitigate environmental impact. But what do we offer them? Too often nothing at all. If we can offer better infrastructure when we bring forward our soft measurers, they are more likely to be successful.

Personal and collective feedback

Both the resource persons and others living in Vetlanda who are doing something for the project should be rewarded for their efforts. Community residents who participate in some type of pio-

neer activity want to know how things are going for them, what progress is being made and if they are better than their neighbouring community.

Imparting good examples

Even if the spreading of environmentally adapted traffic behaviour is moving along in the right direction, it can be hastened through imparting good examples. Obviously, the local press is the most effective media for this through regularly proclaiming “environmental heroes”.

Adapt objectives and messages to the target groups

When working with members of a motoring club, a sports club or employees in an office or workshop, one must think about the results desired from each group and the prerequisites for achieving them.

A stable local project organisation is needed

At the beginning of the project, the various players in the municipality must become actively engaged. This demands a team of many co-workers within the project. As the project progresses, the need for this employee organisation gradually decreases.

Concluding comments

There is, however another effect of projects such as this one. Many players in the road transport system are of the opinion that there is a lack of courage to make necessary decisions – especially amongst our politicians. A possible explanation could be the absence of a dialogue between politicians and citizens about what was expected of society. Many surveys have also confirmed that politicians feel very uncertain about what direction citizens want transport policy to take, just as citizens are unsure about what politicians actually want.

Implementing a project like this one is also a way to establish that missing dialogue, a way to formulate our common future and a way to give politicians the courage to make the necessary decisions.

SESSION 5: SPECIAL FOCUS ON THE MEDIA, ADVERTISING, AND MARKETING

SESSION HIGHLIGHTS

Werner Brög argued against the importance of the milieu of behaviour, saying it is people that have to change, not their circumstances. The steep increase in the use of motorised private modes has resulted in large increases in the pressures connected with this increase (passive mobility). A major problem is that it does not seem to be possible to make changes as public opinion is seen to favour the car. The media, awareness raising, and marketing can be used to overcome this 'mental blockage'. A public awareness strategy has been developed containing 13 rules.

The strategy has been applied several times. One application is 'individualised marketing'. (A separate paper on this topic has been included in Appendix 2 to this report.) It is a voluntary travel-behaviour change programme based on a targeted, customised, marketing approach. In each application there has been a significant decrease in car use through changing motivation, empowerment, and individualised marketing.

Michael Houben said it's hard to be heard in the media. EST is one of thousands of programs addressing ecological issues, and in any case people prefer watching Michael Schumacher win than hear that driving is a bad thing. To maintain attention, tell stories, use heroes, arouse emotions, normalise desirable setting and behaviour, do it often, and don't rely on advertising, positive or negative.

Claudia Schury described the programme known in English as 'On children's feet around the world'. For a week between May and September 2002, 1,700 groups of four- to 10-year-old children in Germany collected 'sustainable miles' for their environmentally friendly journeys to kindergarten and school. The programme was considered successful in raising children's awareness of environment and transport issues.

The steep increase in the use of motorised private transport has resulted in greater transport distances for the inhabitants of European towns but not in any substantial mobility gain. The time spent on transport has to a large extent remained steady, at about an hour ("active mobility"). But at the same time the pressures connected with this increase ("passive mobility") have become much greater. Since, however, passive mobility takes up an incomparably greater part of our lifetime, town dwellers mainly judge the traffic trend from the passive mobility standpoint. They therefore hope that transport planning and policy will provide relief precisely during the period of passive mobility.

This understandable wish that environmentally friendly transport modes will be encouraged is countered by public opinion which is seen as "pro-car" by city dwellers. Accordingly, the importance of motorised private transport is overestimated and the possibility of reducing it is underestimated. Nonetheless limited changes by individuals in their behaviour would be possible at any time without giving rise to major problems and would have great impact. But it is not sufficient for such behavioural changes to be possible, as they must also be considered possible. And the predominance of the car in public opinion runs counter to this requirement.

The result is, strange as it may seem, that the simple behavioural changes in active mobility, which would make an appreciable contribution to the desired improvements concerning passive mobility, are (wrongly) considered to be so radical that any attempt to initiate them is immediately seen as an unwarranted impairment of the quality of life. These aspects have been summarised in the following graphic.

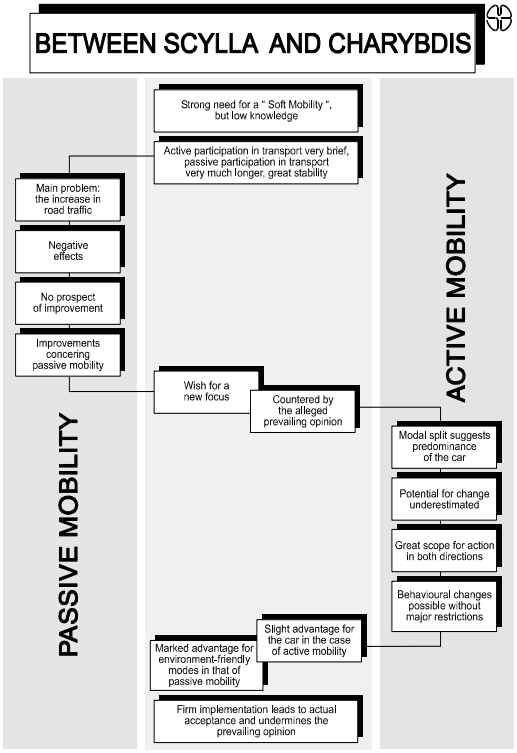

Figure 1: Between Scylla and Charybdis

Accordingly, practical measures to reduce traffic are not taken at all or not taken confidently enough, and the very trend we think we are avoiding (deterioration in the quality of life) actually occurs.

Transport planning does not provide any solution to this “mental blockage”. For, first and foremost, it is not a change in basic conditions which is necessary but a change in people. It is not “others” who have to make a change, but we ourselves. This obviously applies not only to city dwellers but also to opinion-formers and decision-makers. This “mental blockage” can be broken by using media, advertising, communication and marketing as means of communication keeping in mind the aspects above. Socialdata has developed a Public Awareness (PAW) Strategy. It contains 13 “rules” that have to be considered for a successful campaign. As passive mobility plays a greater role on today’s life than active mobility, this is where such a campaign should start. It affects life stronger and as transport planning and policy is not able to offer relief in this area other ways have to be found to come up with a solution.

Communication is an essential part in a campaign fostering “green modes” as part of everyday life. It has to work in such a way that dynamic processes develop. A “network” has to be established between different groups taking part in the communication process. But the contents of this communication do not have to be instructive. They should make people think about the situation and make them act out of their own impetus. Therefore they need to know about the actual opinion of the people. Often there is a great difference between what is thought the others think and what their real opinion is. Public opinion is often based on the opinion of a small minority that is able to better express their views than the actual majority. The following chart shows all important aspects for a successful campaign at a glance.

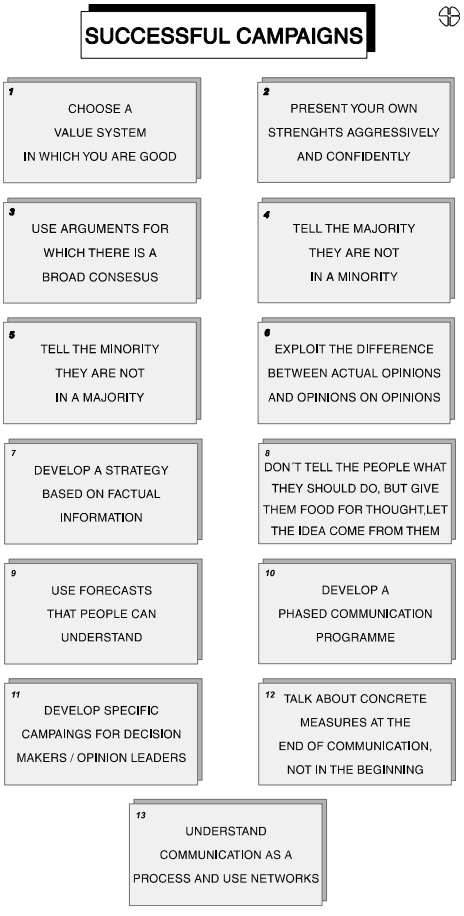

Figure 2: The PAW concept for a successful campaign

A successful application based on the PAW-concept (including these 13 rules), was the campaign to implement a traffic plan in Graz/ Austria with area wide “Speed 30”. A referendum initiated by opponents of this plan showed that it was accepted by the majority of the citizens; 57% of the citizens voted for the continuation of the plan, 43% against it. Looking at those who did not take part in the referendum, the share of acceptance of the plan was even greater (74%). The largest share in favour of the plan (94%) could be found with young people (over the age of 14) and others that were not entitled to vote. About three out of four citizens had a positive opinion on the traffic plan. (Socialdata (1995): Magistrat der Stadt Graz (Graz Local Administration), Mobilität in Graz (Mobility in Graz), Report, Munich, 1995).

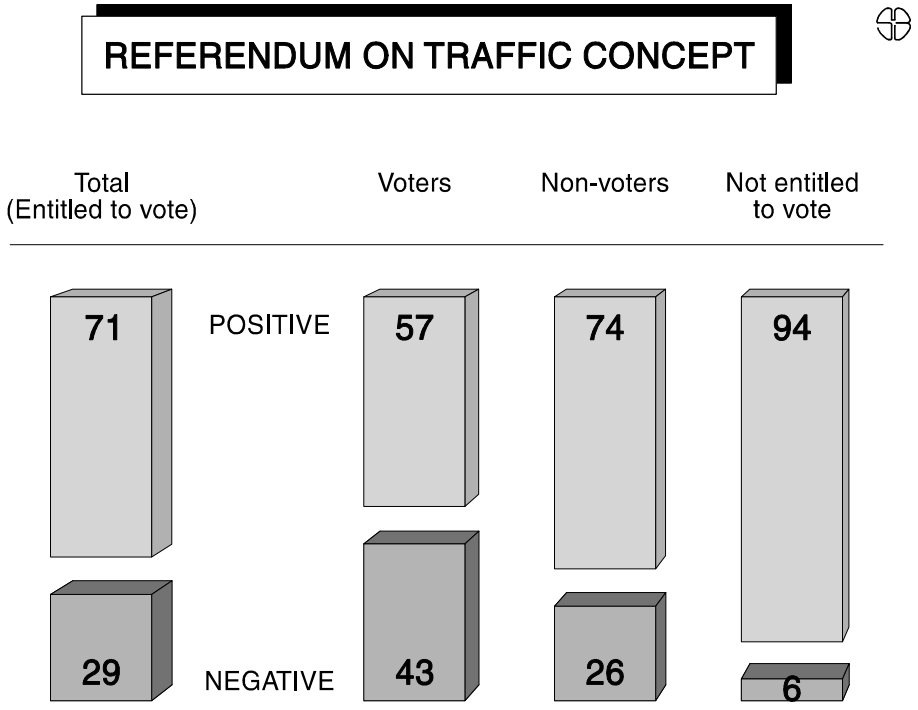

Figure 3: Referendum on traffic concept

This is one of the few cases we know, where a systematic application of soft policies did have a substantial effect on the policy finally applied.

Summary

The dependence on the car in everyday travel has increased enormously in the last decades. This has serious and growing consequences for the environment and health and for many communities damaged by road traffic. At the same time, these consequences are very expensive for business, environment and society. Ways have to be found to overcome this car dependency and make people use other modes of transport.

The traditional approach to achieve mode change has been through the provision of transport services and infrastructure, including pricing and longer term land use policies. They are surely necessary for an increased use of the transport system, but they are only of limited value if people are unaware of the system improvements.

In order to make people change their personal travel behaviour people need to be aware of decent alternatives to car travel. One might think that all necessary information about these alternatives – walking, cycling and public transport – is readily available. But all empirical surveys show that this information does not reach the respective target group. If the concept of customer orientation is taken at all seriously, information has to be brought to the customer instead of expecting him/ her to catch it from the provider.

Recognising this lack of information and motivation that caused an opposition to the use of public transport Socialdata developed the concept of Individualised Marketing (IndiMark®), a dialogue-based technique for promoting the use of public transport, cycling and walking as alternatives to car travel. It is a programme based on a targeted, personalised, customised marketing approach which empowers people to change their travel behaviour. Using these “soft policies” to make people think about their travel behaviour has proven to be highly successful in achieving shifts in mode from the car; shifts that are proving to be sustained in the longer term.

Socialdata conducted many pilot projects in different European countries and in Australia where Individualised Marketing has been applied successfully. In all these projects a reduction of car usage around 10% has been achieved. The increase especially in walking and cycling has been great. In the meantime there have been several large-scale applications with tens of thousands of participants. The evaluation of these projects shows that the reduction of car usage was even greater than in the pilot projects. The use of the car could be reduced by 14% in South Perth. Similar results were achieved in two other large scale applications in Germany (-12%) and Sweden (-13%) and evaluations made one and two years after the IndiMark®-campaign show that the results are sustainable. For environmentally friendly modes a strong increase in usage could be noticed. In the South Perth project for example increases in walking of 35%, cycling (61%) and public transport (17%) were reached. Results from other large scale applications will be available soon.

This shows that Individualised Marketing is a cost-effective measure to reduce the number of car trips sustainably without constraining people’s mobility. It is not necessary to completely change people’s lifestyle. If everyone could change using public transport, walking or cycling just once a week instead of using the car, this would have a great effect overall. Reducing our reliance on cars has many environmental and health benefits – traffic congestion will decrease, air quality will improve, there would be less road trauma, and people will be fitter and healthier.

Perth, Western Australia

By world standards, car use in the Perth metropolitan area, Western Australia, is high, with about 80% of all personal trips currently undertaken as either a car driver or a passenger. Since 1986, the number of car trips as driver has increased alarmingly, and many would think the task of changing travel behaviour in such a car-dominated city as Perth would be difficult, if not impossible.

The municipality of South Perth comprises seven suburbs in close proximity to Perth City Centre, with a population of around 35,000. It provides a wide variety of travel options to residents and visitors, through an extensive network of cycleways, walkways, bus routes and a ferry service.

Existing behaviour trends

A comparison of mobility survey results of South Perth residents on an average day in 1986 and 1997 reveals the changes in main mode share over time in the travel behaviour of local residents (Figure 1). What is interesting, is that the amount of travel has remained virtually the same, only the way people travel has changed.

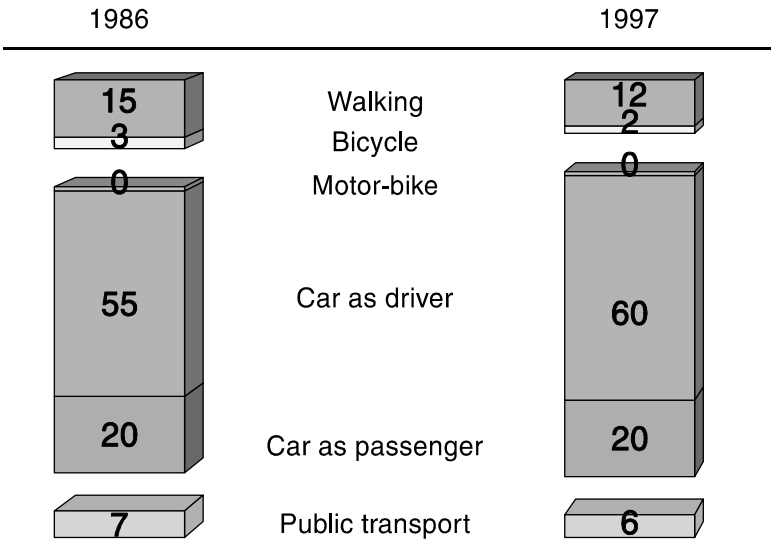

Figure 1: Mode choice in South Perth

The share of all environmentally friendly modes has decreased, walking from 15% to 12%; bicycle from 3% to 2%; public transport from 7% to 6%. These trips have been switched to the car as driver, the share of which has increased by five percentage points (from 55% to 60%) over the eleven years. The use of car as passenger has remained constant (20%).

Potential for change

Further in-depth research was carried out from the 1997 mobility survey to obtain the reasons for an individual's mode choice for each trip. This analysis was supported by follow-up interviews, identifying the awareness, perception and choice barriers currently preventing individuals from using real alternatives. These analyses make it possible to differentiate clearly between people's subjective and objective situations and, with this information, to determine the opportunities for travel behaviour change to environmentally friendly modes.

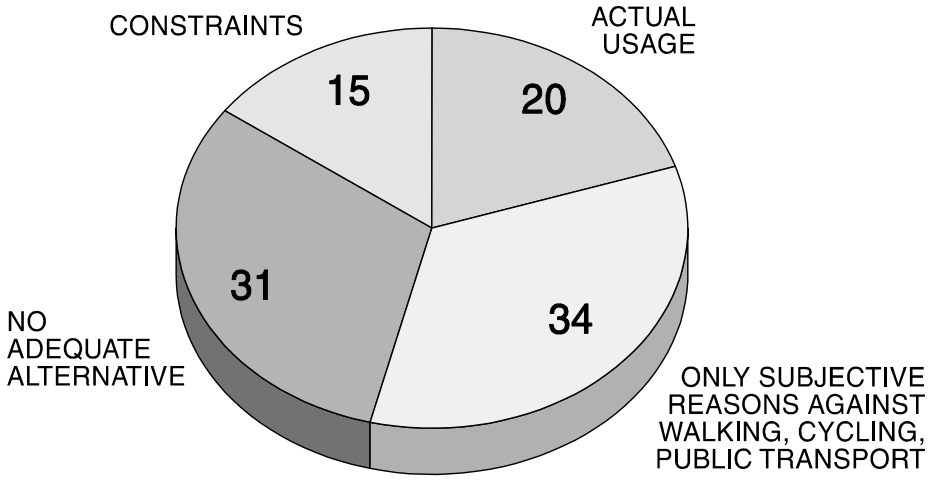

Figure 2: Potential for environmentally-friendly modes

In South Perth, 80% of trips are made by motorised private modes and 20% by environmentally friendly modes. 15% of the trips undertaken by private car, use the car because there are constraints to using alternatives (Figure 2). As these constraints could be because the car is used for business reasons, or to carry heavy parcels, these trips have limited potential for change. A further 31% of trips would require system improvements, such as the provision of an adequate bus connection or improved walking and cycling facilities, before a switch could be made.

However, for about one third of the trips (34%) there are only subjective reasons against the use of alternative modes. For these trips, if a behavioural approach to mode change is applied, changes are possible without the need for system improvements, pricing or changes in land use policy. This group has the greatest potential for change and is the focus for the travel behaviour change programme.

This programme would require no system improvements, only the implementation of a travel behaviour programme to inform, motivate and encourage people to use environmentally friendly modes - including the 20% of trips that already use alternative modes, so that they are not lost to motorised travel.

The lack of information is an important reason why public transport is not used more often, although it is a real alternative. In South Perth half of the population is not informed sufficiently.

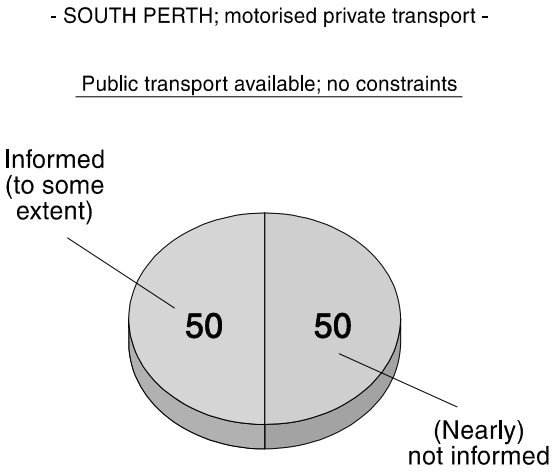

Figure 3: Extent of information

Although one might think that in the information-technology era people should be better informed, research shows the opposite. The extent of information has decreased in the last 20 years.

Besides this lack of information the negative perception of public transport, especially of the travel time, is another reason why alternative modes are not used.

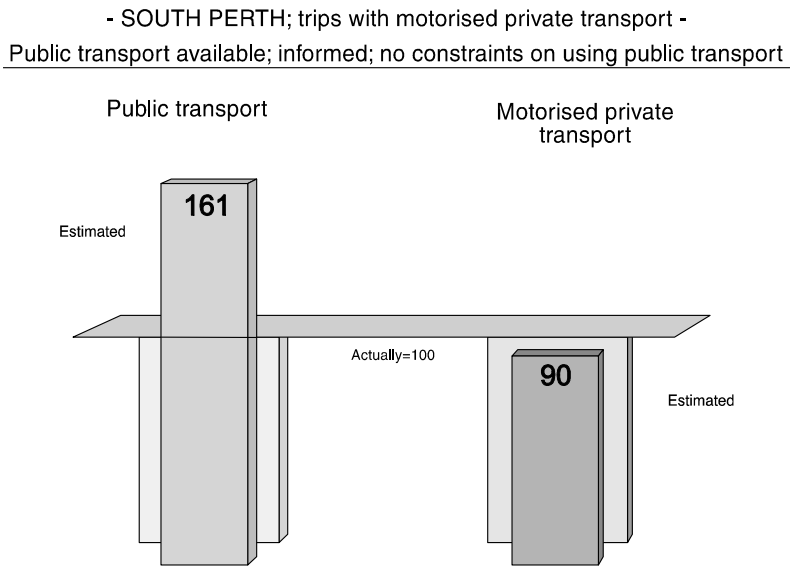

Figure 4: Perception of travel time

The inhabitants of South Perth overestimate the time they would need for a trip by Public Transport by half of the actual time. They believe, the trip by car would be much faster than it actually is.

Individualised marketing - the basic principles

Using the “soft policy” approach, measures to activate these opportunities for change must be professionally adapted to the specific needs of the alternative modes as well as to the potential customers. It might be thought that all the necessary information about alternative modes - such as walking, cycling and public transport - is readily available. But all empirical surveys show that this information does not reach the respective target groups. Even with more sophisticated marketing methods, the (potential) customer is still required to enquire for information (e.g. customer information centres).

Priority has to be given to distributing information effectively. If the concept of customer orientation is taken seriously, information has to be “brought” to the customer instead of expecting him/her to get it from the provider.

In the 1990s *Socialdata* undertook a series of projects of an experimental nature, in order to prove the effectiveness of so-called “soft policies” for public transport. The starting point of these experiments was the recognition that much opposition to the use of public transport is due to a lack of information and motivation.

Potential users of public transport were contacted directly, to motivate them to think about their travel behaviour. They were then thoroughly informed about the availability of public transport to meet their specific needs. As an added incentive, selected test candidates were given a special ticket to use the public transport system free of charge for one month.

The first experiment was carried out in 1991 in the German city of Kassel. This was extremely successful: the use of public transport for the test group nearly doubled, with constant mobility indicators. A similarly encouraging result came from a second experiment in Nuremberg in 1993. These results remained nearly constant for almost four years (without further measures). Both experiments showed that the largest percentage of new trips was won in off-peak traffic periods (the field with the largest potential).

The “switching to public transport” project

These findings led to an International demonstration project called “Switching to Public Transport”, initiated by the UITP (International Union of Public Transport) - an operators’ association, with scien-

tific leadership from *Socialdata*. About 45 projects in 13 European nations were carried out (Figure 3) and these projects were hugely successful (Laconte and Brög 1998, Brög, 2000).

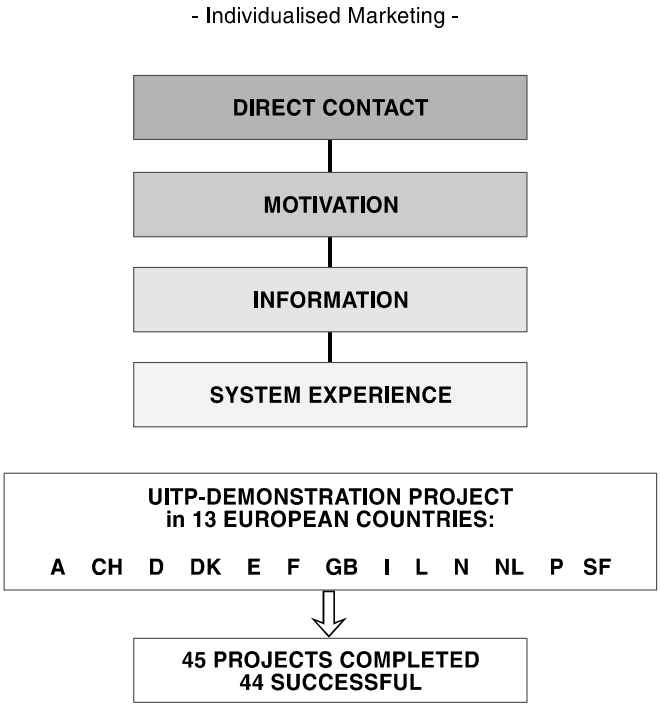

Figure 5: The UITP "switching to public transport" project

This demonstration of Individualised Marketing showed that personalised encouragement, motivation and information could lead to considerable increases in public transport use, that the approach could be applied on a large scale and that it was relevant for many, very different, countries.

The South Perth pilot study

In Western Australia, the Department of Transport has developed TravelSmart®, an integrated approach to encourage people to be less reliant on car usage by providing travel behaviour change programmes. TravelSmart® is a world-first initiative to help preserve Western Australia's environment and quality of life. It is about empowering people, by providing them with localised information, advice and encouragement about alternative modes of transport, and leaving the choice to them. Individualised Marketing is part of this integrated approach (Department of Transport, 1999. Department of Transport, 2001. www.travelsmart.transport.wa.gov.au)

In 1997, *Socialdata Australia* was contracted by the Department of Transport to provide an Individualised Marketing (IndiMark®) pilot study in the City of South Perth.

The pilot study consisted of applying the IndiMark® system, with 'before' and 'after' studies to evaluate changes in travel behaviour. Further evaluations were carried out at a later date to determine whether the changes were sustained (Goulias, 2001).

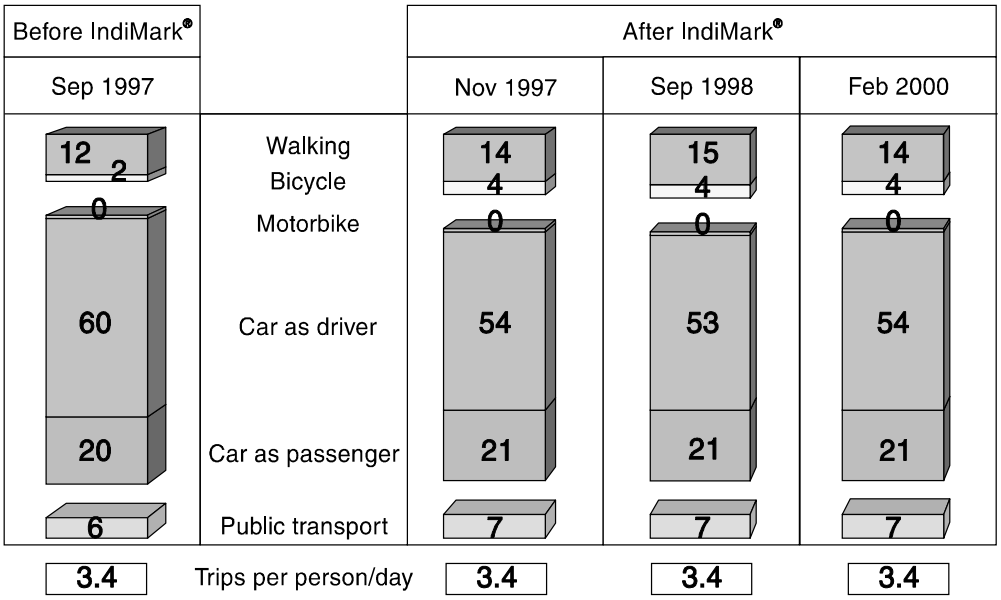

Figure 6: Mode choice in South Perth before and after the IndiMark pilot project

The first “after study”, conducted immediately following the campaign, in November 1997, showed that Individualised Marketing is an effective tool to increase the use of alternative modes and to reduce the share of motorised private transport: car use. Car as driver trips went down by 10%, and at the same time walking increased by 16%, cycling by 91% and public transport by 21% (Figure 6).

A second evaluation in February 2000 found that these figures for mode choice remained constant over more than two years. Walking trips were constant at 14% of all trips, the same as in 1997 following IndiMark®, compared to 12% before. Cycling doubled from 2% to 4% and then remained at this level. The car-as-driver share decreased from 60% to 54% immediately following the IndiMark® campaign and then remained at this level. The car-as-passenger and public transport mode shares also changed following IndiMark® in 1997, and have remained constant to February 2000.

Thus, it is evident that Individualised Marketing has long-lasting effects on mode choice even two and a half years after the campaign. The changes in mode choice proved to be sustained.

From the pilot study results, an extensive cost/benefit analysis was carried out by Ker and James (1999) to calculate the cost-effectiveness of the Individualised Marketing campaign. This showed that for every dollar invested in IndiMark®, there was a cost benefit of $13 (Figure 7).

Costs	**$ 1.3 Mio**
Benefit	**$ 16.8 Mio**

Cost-Benefit-Ratio	**1 : 13**

Figure 7: The South Perth pilot: cost-benefit analysis

Since then further pilot projects have been conducted promoting all environmentally friendly modes (walking, cycling, public transport) using individualised marketing. In all projects the share of car as driver could be reduced significantly.

In Brisbane the reduction of car traffic was 10%, like in Perth. The first project in Germany was in the medium sized town of Viernheim where a reduction of car traffic of 8% could be reached. Two other projects were conducted in England. One in Gloucester with a reduction of 9% and Frome with a reduction of 6% (Figure 8).

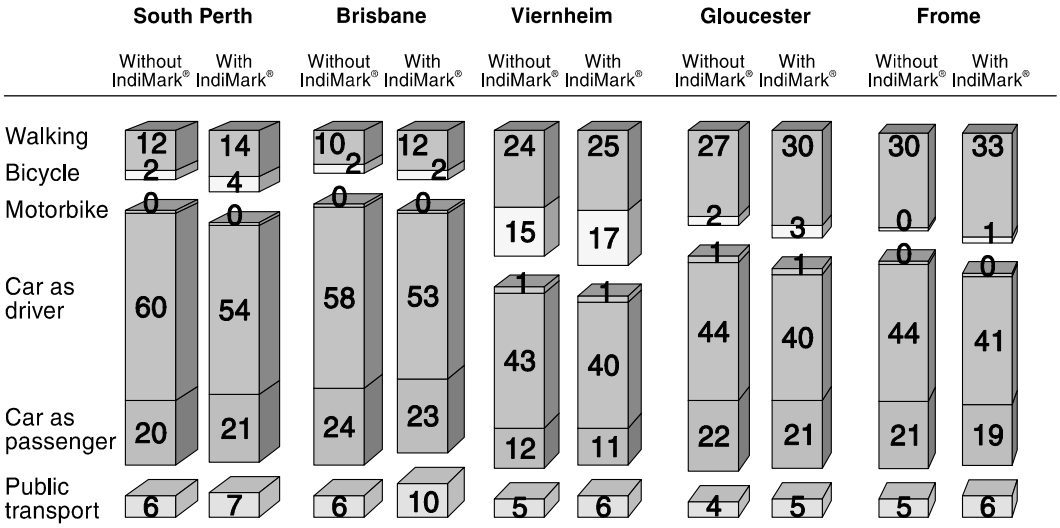

Figure 8: Pilot projects

The South Perth large scale demonstration project

In general, Individualised Marketing means establishing a dialogue through an individualised, direct contact approach via a detailed step-by-step procedure. Through these stages there is a communication process based on personal contact, providing information and further support on an individual basis. This personal contact can motivate people to think more effectively about their daily travel, providing them with information if requested, and supporting their need to try out the alternatives if required.

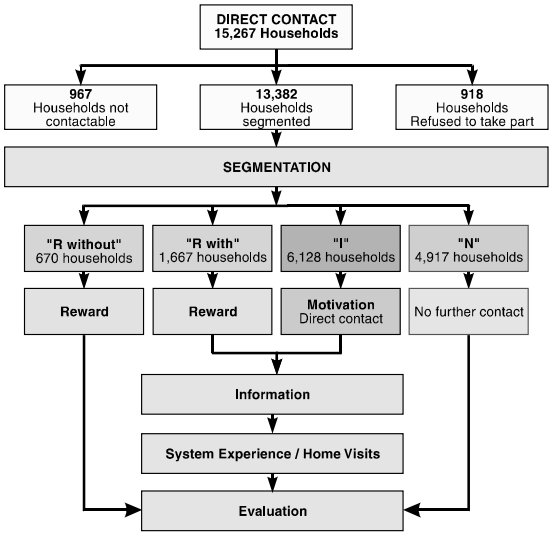

Figure 9: Market segmentation - the South Perth large scale project

The first phase of IndiMark® is to personally contact all households in a given area.
In South Perth there were 15,267 households; some households (967) were not contactable and 918 households preferred not to take part.

The 13,382 households who were successfully contacted were classified into three main groups “I”, “R”, and “N” (Figure 9).

- Group “I”, (interested/interesting households) are households that are not using environmentally friendly modes regularly, but who are interested in doing so. This group is more likely to change and to continue to use environmentally friendly modes with personal contact, motivation and information. There were 6,128 households in this group in South Perth, and they received the most attention.
- Group “R Without” (at least one member of the household is a regular user of an alternative mode, without a need for further information). These 670 households were rewarded with a small gift.
- Group “R With” (at least one member of the household is a regular user of environmentally friendly modes, with information needs). These 1,667 households received a gift, and their requested information.
- Group "N" (not interested / not interesting households) are excluded. In South Perth there were 4,917 households who did not wish to participate or there was no possibility for them to use environmentally friendly modes. This group received no further contact, as it is highly unlikely that any of these households would be able to change their current travel behaviour.
- Group “I” received further motivation, information and the opportunity to receive home visits by specialist staff. For public transport, for example, a household not using buses or trains regularly, may receive a free “test ticket” for a month, to become more familiar with the system.

ca. 37,000	letters
ca. 29,000	phone calls
ca. 42,000	items marketing / information material
3,200	personalised timetables (to 1,200 households)
ca. 6,000	individualised packages
616	home visits by Perth Bus staff
	with
760	test tickets
2,601	personal home contacts by Socialdata (cycling and / or walking)
ca. 9,000	kilogram total weight

Figure 10: The South Perth large scale project - contact record

During the course of the IndiMark® campaign contact with individual households was made through over 3,000 home visits, 29,000 telephone calls and 37,000 letters (Figure 7).

Around 6,000 packages of information were individually collated, packaged and hand delivered to households in South Perth - totalling about 9,000 kilograms.

Random sample surveys of the population were conducted before and after the Individualised Marketing programme to measure its effect. In the 'before' survey, the mode share was: 12% of trips by walking, 2% by bicycle, less than 0.5% by motorbike, 60% as car-as-driver, 20% as car as passenger and 6% by public transport. The second column (Year) refers to the number of trips per person per year undertaken by the different modes.

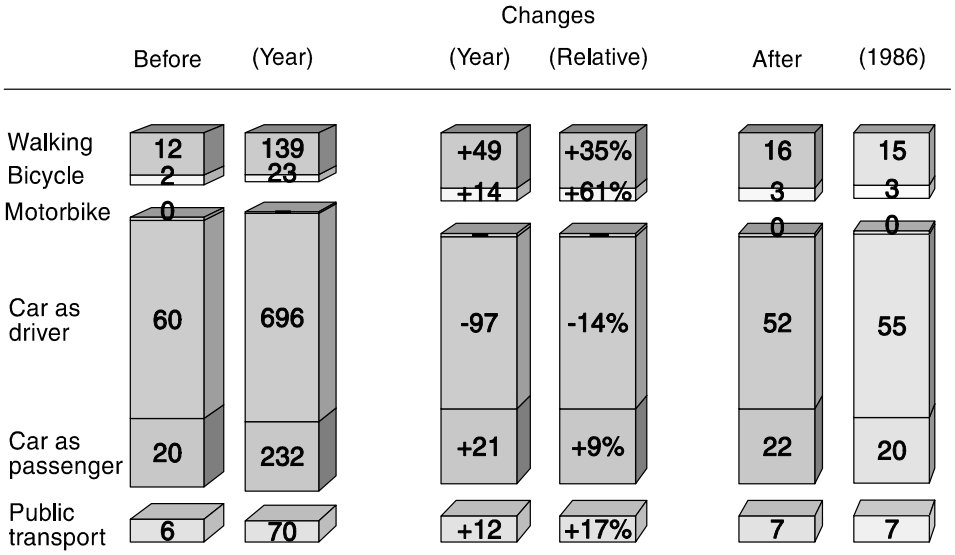

Figure 11: The South Perth large scale project – evaluation

The programme achieved a 14% reduction in car trips, (Changes, Relative) with these trips changing to: walking (up 35%), cycling (up 61%), public transport use (up 17%) and car sharing (up 9%) (Figure 11). The results from the 'after' survey are expressed across the whole population, **not** just those taking part (Figure 11).

Month	1999 - 2000	2000 - 2001
Mar	+25 %	+6 %
Apr	+17 %	-12 %
May	+31 %	+4 %
Jun	+42 %	+3 %
Jul	+26 %	
Aug	+34 %	
Sept	+27 %	
Oct	+25 %	
Nov	+20 %	
Dec	+14 %	
Jan 2000	+25 %	
Feb	+5 %	
Total	**+25 %**	**(+1 %)**

Figure 12: The South Perth large scale project - changes in public transport use

People spent more time exercising through walking and cycling, and overall they made more trips within the City of South Perth than before.

The 14% reduction in main mode share of car-as-driver trips has restored travel patterns to lower car dependence than the 1986 levels of 55%.

Independent bus counts (automatically when people entered the bus) were undertaken as a further measure to evaluate the effectiveness of the programme. IndiMark® took place in February to May 2000. Between March 2000 and February 2001, there was a 25% increase in public transport trips that started in South Perth (Figure 12).

The results from March 2001 to June 2001 show an overall increase (+1%), which indicates that the effect of IndiMark® is sustained.

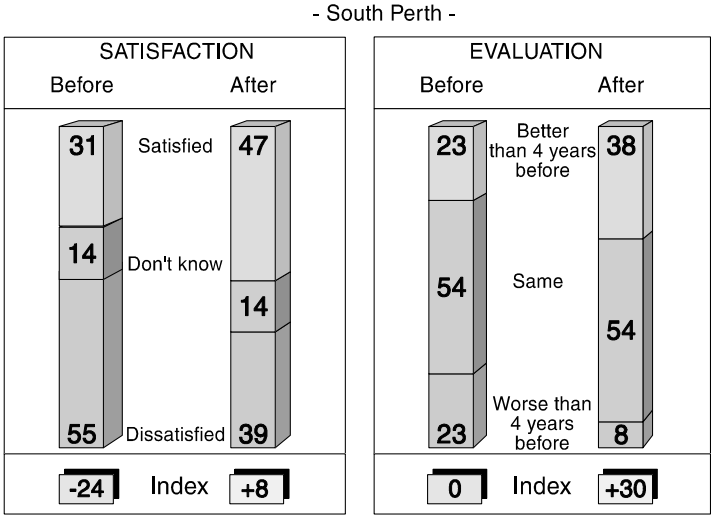

Figure 13: The South Perth large scale project - changes in satisfaction with bus services

During this period in South Perth, there were no system improvements to the public transport system, only IndiMark®. Yet, despite this, the results clearly show that residents were more satisfied with public transport “after” IndiMark® than “before”. The satisfaction-index “before” was -24 (31% - 55%) and rose “after” to +8 (47% - 39%). At the same time the percentage of those which felt that the system has been improved increased from 23% to 38% (evaluation-index “before”: ±0; “after”: +30).

Large scale applications

The application in Viernheim

This large scale application was conducted in Viernheim, Germany from the beginning to mid 2001 in connection to the EU-project TAPESTRY (**T**ravel **A**wareness **P**ublicity and **E**ducation Supporting a **S**ustainable **Tr**ansport Strateg**y** in Europe).

To find out about the impacts of the campaign thorough ‘before’ and ‘after’ studies were made.

The following graph shows the mode choice before and after an IndiMark®-campaign.

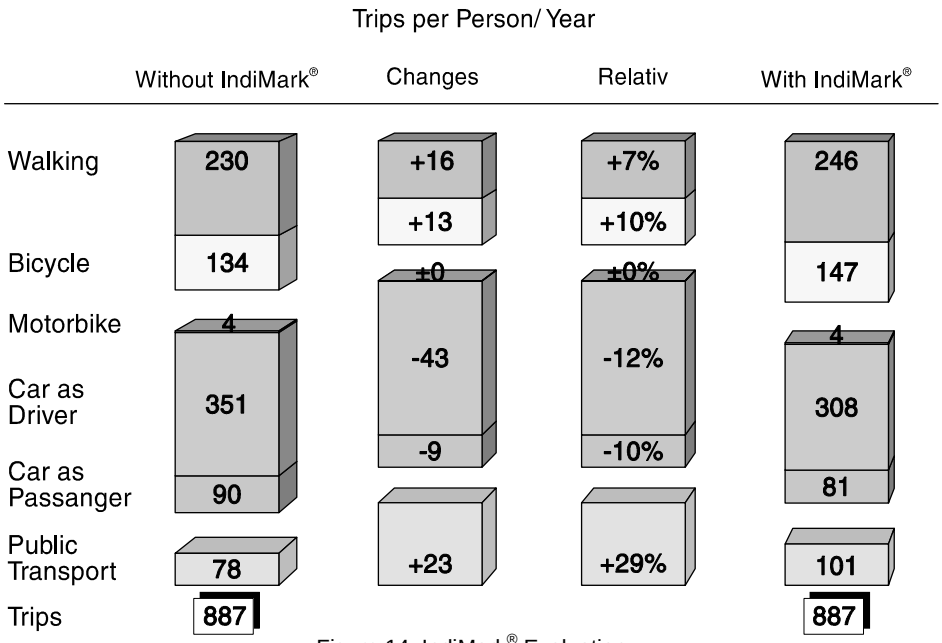

Figure 14: IndiMark® Evaluation

The evaluation shows that without IndiMark® almost the same amount of trips (per person and year) are made as car as driver and car as passenger (441 trips) as by walking, cycling and public transport (442). After IndiMark® the trips that are made as car as driver decreased by 43 and by 9 for car as passenger. A significant increase can be noticed for trips made by public transport (+23), bike (+13) and walking (+16). This means that environmentally friendly modes increased by 52 trips while trips made as car as driver and car as passenger decreased by 52 trips. Relatively this means there is an increase of walking of 7%, of cycling of 10% and of public transport of 29%. Motorised private modes decreased, car as driver of 12% and car as passenger by 10%.

The total number of trips (887) after the IndiMark®-Campaign was the same as before.

The application in Gothenburg

The large scale application in Gothenburg was conducted between February and May 2002, with the 'before' study in January and February and the 'after' study between August and September 2002.

Here a reduction of car as driver of 14% was achieved by individualised marketing, while the share of walking had an increase of 4%, the share of cycling 45% and the share of public transport 4%. The share of all trips made by environmentally friendly modes could be raised from 53% to almost 60% of all trips. The total number of trips (888) after the IndiMark®-campaign was the same as before.

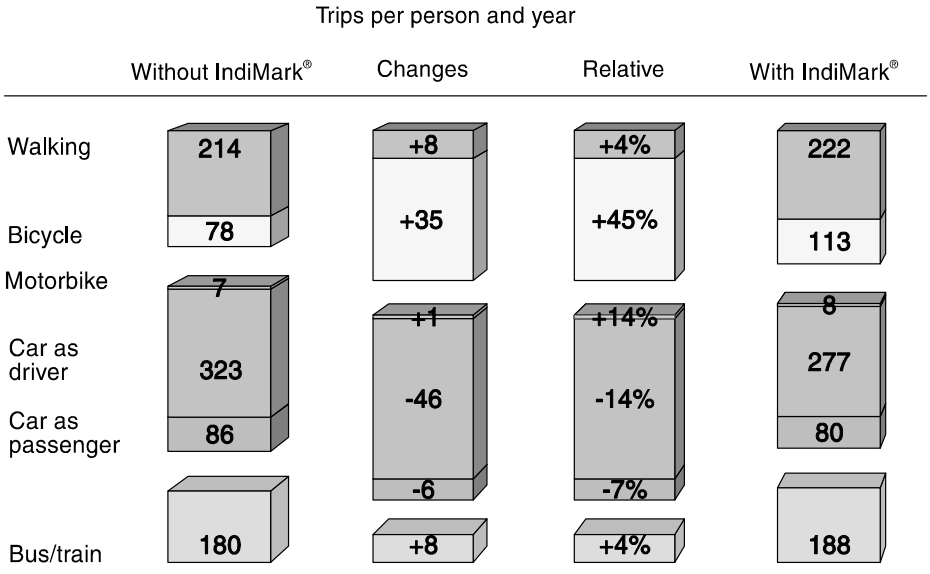

Figure15: Evaluation of IndiMark®

The following chart shows a summary of the results of all large-scale applications evaluated so far for all environmentally friendly modes. It is obvious that in all cases the share of car as driver is reduced significantly after an IndiMark®-campaign. The second evaluation, of the South Perth project, shows that the reduction of car use is sustainable. This shows that it is possible to achieve a sustainable travel behaviour change by individualised marketing.

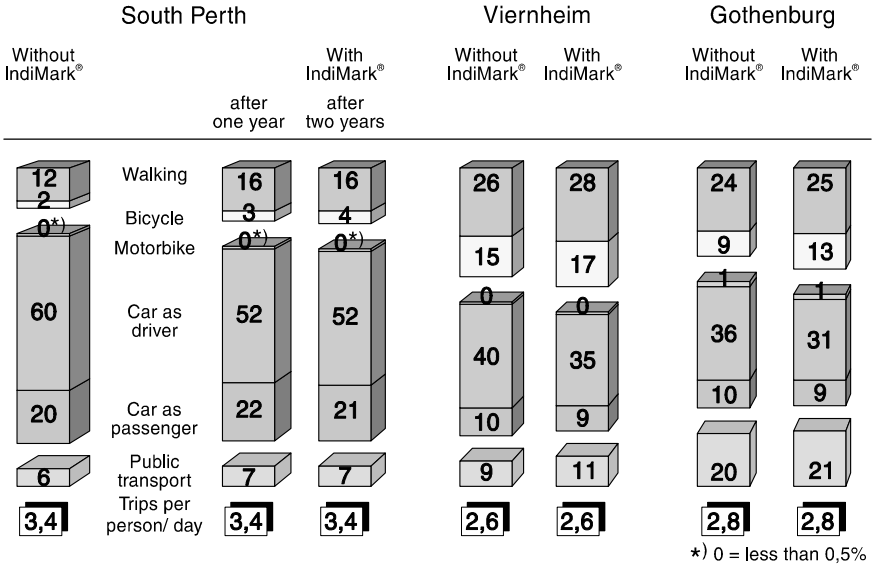

Figure 16: Large scale applications

Individualised Marketing has been used to promote public transport in 15 countries, and over 60 pilot projects and more than 100 large-scale applications (involving nearly 1.5 million people) have been conducted (Figure 17). The South Perth project was the first large-scale application to include walking and cycling, as well as public transport.

	Projects:	Target persons:
Germany West	40	720,425
Germany East	21	455,535
Sweden	23	151,044
Austria	10	140,043
Switzerland	4	15,549
Australia	4	85,000

Figure 17: IndiMark® Large scale application projects

The homeopathic way

Traffic congestion is a real problem. Reducing the number of personal trips made by car will help preserve our quality of life and our environment. To achieve real change, a natural way is necessary.

Our approach is to work with the community and to motivate them to consider alternative ways of travelling.

If the aim of fostering the use of environmentally friendly modes is to be taken really seriously, a “soft policy” approach must be used. People should receive information, which enables them to improve their perception and to motivate them and to empower them to make their own decisions, rather than telling them what they should do.

Figure 18: Changing travel behaviour the homeopathic way

Through direct contact in an on-going communication process, people can be motivated more effectively to think about their daily travel. This personalised approach means that the information needs of people can be identified and provided in a very specific way. They receive only that information which they really need instead of a low-level "flood of material". Providing information tailored to individual situations is far more convenient and motivating than having to filter through and select from multiple possibilities.

Everyone has trips that can be changed. So it is not just a matter of making car trips more efficient. For example, providing improved transport infrastructure will not necessarily encourage people to change their mode choice, only to use the system more efficiently. The decisive factor in improving the transport situation and everyday mobility is to change to alternative modes. It is important for people to identify trips where alternative modes can be used, without having to make huge lifestyle changes – small changes across the population result in large changes overall.

If it is possible in a car dominated city such as Perth, it is certainly possible for London.

Current Projects

The Department for Planning and Infrastructure of Western Australia conducts IndiMark®-Projects annually in different suburbs of Perth (Marangaroo, Subiaco). IndiMark® for all environmentally friendly modes is currently being applied in a pilot in Portland (USA).

Completed but not yet evaluated projects can be found in Bristol (UK) and in the Paris region.

AUS	South Perth	Pilot	Evaluated
D	Viernheim	Pilot	Evaluated
AUS	Brisbane	Pilot	Evaluated
UK	Frome	Pilot	Evaluated
UK	Gloucester	Pilot	Evaluated
F	Athis-Mons*)	Pilot	Completed
F	Montreuil/Bagnolet*)	Pilot	Completed
USA	Portland	Pilot	Completed
AUS	South Perth	Large scale	Evaluated
D	Viernheim	Large scale	Evaluated
S	Göteborg	Large scale	Evaluated
AUS	Cambridge	Large scale	Completed
AUS	Marangaroo	Large scale	Completed
AUS	Subiaco	Large scale	Completed
UK	Bristol	Large scale	Completed

*) Both in the Paris area

Figure 19: IndiMark® projects to watch

Conclusion

The application of the large scale Individualised Marketing in South Perth exceeded the projections that, based on the pilot study conducted in 1997 were thought possible. Following IndiMark®, car as driver trips went down by 14%. At the same time, walking increased by 35%, cycling by 61% and public transport by 17%. These results show that this form of voluntary travel behaviour change is an effective tool for promoting sustainable ways of travelling.

Similar results were achieved in the large scale applications in Viernheim (Germany) and Gothenburg (Sweden). Viernheim showed a reduction of car use of 12%. In Gothenburg a reduction of car use of 13% was achieved and also and an increase in all environmentally friendly modes (walking +4%, cycling +45% and public transport +45%).

It also showed that only small changes were required. Switching two trips a week (for example, walking to the local shops and back) instead of using a car, would achieve these significant effects. Reducing our reliance on cars also has many environmental and health benefits – traffic congestion will decrease, air quality will improve, there would be less road trauma, and people will be fitter and healthier.

In a meeting of the London Assembly in January 2002 in London on "Reducing Traffic Congestion", different ways of reducing car traffic were discussed. As a consequence of this meeting Lynn Featherstone, Chair of the Transport Policy and Spatial Development Policy Committee of the London Assembly, summarises the result as follows:

> "We need to involve directly the people of London in finding ways to reduce congestion – rather than impose solutions on them – and persuade people that with their support we can achieve even more. That, as I see it, is one of the great merits of the individualised marketing approach; people are empowered to contribute to solutions through personal actions. "

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I am a journalist, not a scientist - so what can I possibly tell? I started working for TV in the mid-eighties. From the beginning I focused on ecology colliding with economy. Back then, these topics were new. Just remember 'Ozone-depletion'. I produced a 45-minute documentary about a group of scientists, including Paul Crutzen, doing basic stratospheric research in northern Sweden. At this time there was no private TV in Germany, just three publicly owned channels to choose from. More then ten million people watched this film. A lot of other films followed, many journalists were doing similar things, the political debate grew more intense - and after some years the CFCs had been banned. It seemed so easy to change the world! Just tell the people what scientists found out, start a public debate and people (including politicians) will do the right thing. I was young then. Reality pretty soon got me back from dreaming.

It's not the purpose of journalism to change the world, but when reporting about people who are trying to do it - and the facts are showing that they have a good reason to do so - it sometimes is part of the job.

And it's easy to change the world when you face nothing but a fraction of the chemical industry, and some producers of hairspray or cooling technology. To make it even easier there was a practical alternative for almost every application at hand, nobody had to change habits - and still it was hard enough.

In 1987 I did my first film about climate change, including strategies to slow it down. 'More efficient production and use of less fossil energy' is the best summary I did know then and do know now. But the problem with climate change is more complex than ozone depletion. The EST-Program is one of a multitude of Programs trying to solve it. If you look into the archives of mass media, you will find thousands of articles and films on related topics - but still very slow progress in achieving substantial success. Even if cars and aeroplanes are more efficient today, the growth of traffic makes it hard to think of a decrease of greenhouse emissions. You know your 'business as usual scenarios' better than I do.

But back to the eighties and German TV: Of course we had a kind of professional pride to present a 'nice' film. But when private TV came up and people had a huge variety of channels and programs to select from, we learned that most of the people did not want to see and hear what we had to show and tell. To put it simply: Who wants to hear that driving is a bad thing, when you have the choice to see Michael Schuhmacher win a race on the other channel ... or switch over to see action heroes driving a car while saving the world? (Have you ever seen one riding a bike?) Heroes are important - we will meet them again on the following pages. Today more then 25 channels are waiting for an audience. It's hard work even to reach a million people at a time.

Telling stories few people want to hear!

When only a stable group of three or four percent 'market share' is watching an ecology orientated program you can be pretty sure that this group is mostly well educated, already knows most of the problems and already has seen and heard a lot of strategies to solve them. Most of them will follow you even if you start to discuss details. But after a while you end up in a kind of 'incest' - definitely not a practical way to change the world! Some years ago our rating was down to 4 Percent.. But to prove the necessity of the public money we spend, the prime-time programs should have at least 6.5 percent. They gave us a year to reach this goal. Besides: the program I am talking about was - and is - the one and only remaining show of it's kind within the complete range of German prime-time TV. The editor and her team are working hard to keep it there. Last year our market-share was above 7 percent. Maybe some of the recipes we used may help you to achieve your goal. Let's look at what we did - and what tools we used.

How to know what the audience likes

The most important tool we have is a so called 'minute-curve' showing how many people are watching each minute of our show. You will find some 'switching points' in there. When prominent programs are ending on other channels plenty of viewers are floating around. Some will switch to our program, some

will stay, as long as they are interested. But quite often you find a whole lot of people switching away just in the middle of the show. Looking at the curves next day sometimes gives hints, why they did so. Maybe it was an explanation that went to deep into detail or something hard to understand. Or perhaps an interview-partner who had important things to tell but who told it in a complicated or even boring way. But you don't always see simple reasons like this. You are sure you have made everything right. But still the audience has been switching away. We looked at a high number of curves like this, consulted media psychologists and even a real Hollywood-script-doctor.

Basic findings

When you tell the audience about a problem, but don't give at least a clue towards a possible solution, people get frustrated. That's not a pleasant way to spend an evening. Of course: bad news does sell. But mostly it is the smell of 'blood, sweat and tears' which is attracting people. And there is more than enough of it within the daily news. When you try to sell background information bad news is simply bad news, added to all the problems people have anyway, stealing their precious free time. People don't want to get frustrated. The authors in Hollywood know this and this is why they favour happy endings.

The easiest way to get people watching science and ecology-related programs is to leave out any serious problems and politics. Wildlife will always find its audience - as do science-related shows that concentrate on explaining the world as it is as simply as possible. "Look how fascinating ! We will show you how it works". If you do this with an easy-listening manner people will look, learn and have fun. That is something to start with. But it is getting more complicated as soon as you want to explain 'what does it mean' or even start presenting ideas of how the world 'must be changed to be saved'. Even this may be possible, as long as others have to act. 'The industry', 'the government', But nobody wants to be told that he has to change his beloved habits. Worst case is preaching sufficiency. "Hey you! You can save the climate! Just use less gasoline! - And stop spending two holidays each year in distant locations!" If you look at the minute-curve of such a TV feature you would see most of the audience run away. Ironically the same line would work fine within a dialogue between two action heroes, best placed in the middle of a car chase when one of the heroes is driving the car while the other one prepares to jump into the landing- gear of a starting aeroplane to catch the bad guys.

Wrap a 'nice' package

But sometimes you have to 'sell' bad news like this without having action heroes at hand. Having good pictures, smoothly edited, is basic craftsmanship. Alas, as long as the budgets are low it is hard to look as good as Hollywood. But there is some wrapping material in most of the stories themselves. For example: efficiency. An efficient car may be good for the environment - but you will convince more people to buy it, by explaining what a nice piece of high-tech it is. And most will be won over, if you can also prove it to be saving money. The more positive benefits for themselves they find within your concepts, the more people will be willing to spend their time listening.

A story to tell

If you want to convince people to drive less often you may start by showing them struck in the midst of the daily rush-hour jam. The problem is 'their' problem and the audience would love to hear an idea how this daily waste of time could be ended. Their first idea will be to ask for more roads - but you may convince them that this new road may be built near to their own house bringing lots of noise and polluted air. At this point you may introduce the idea of using public transport. This definitely is bad news for most people. But you may steal one of their first arguments by mentioning that most of the villages today are poorly connected to public transport. Start asking for the government to change this. The audience will calm down again. Somebody else has to act before they have to change habits! But now you let the ball bounce back. The government won't spend money for additional public transport as long as the people don't even use the existing capacities. Up till today more railway lines are closed than (re)opened - at least in Germany. At this point it would be nice to have a group of citizens who really fought for the reopening of a railway line, they worked hard, they were successful, and in the end some glad citizens are telling that they feel much better since they can reach their work without stress - having nice chats with their neighbours while travelling to work - and even save money by having sold their second car. That is good news hiding the bad news. The viewer may feel invited to

do like they did because their argumentation sounds logical - and success is always sexy. When reading the case study for the alpine region I found some of these ideas within the scientific text - a good step in the right direction. Like our anchor man often is saying: you have to use ‘stories’ as a kind of ‘trojan horse’.

Emotions are stronger than arguments

If this reopening would have happened after some scientists analysed their statistics and convinced the government to do the right thing, it would be just one of the things which happen from time to time. But if the audience has the chance to see real people with real emotions, working hard to reach their goal, fighting against stupidity, overcoming disturbing drawbacks, - then you have a story where people will want to know the outcome. Here you have all this blood sweat and tears - and the happy ending - people love to see when looking at Hollywood stories. And even if the people acting in this story do not look like Brad Pitt, the audience will accept this, as these people are real heroes in the real world. Even better, they are ‘riding a bike to save the world’. Now the viewer might become willing to accept a dose of theory - but it’s safer to keep most of it ‘between the lines’. It’s the same with advertisement: If you look at successful campaigns they use emotions, not arguments.

One hero is stronger than any group of teachers

The next step may seem a step too far - but it is sometimes a necessary one. Even if you do have a perfect example to illustrate your concepts they are mostly brought to existence after people like you worked with papers and convinced the local governments to do the right thing. No Hero, no Story? Sorry for that - but maybe you have to be heroes yourself. Like the citizens of our imaginary example you have to show that you had to fight for your ideas, against some stupid ignorants, had to solve problems. Not every detail should be discussed in public - but if you present a story with up’s and down’s, with at least some suspense and emotion, you will reach far more people compared to any attempt at teaching them. If you get in contact with a journalist who is trying to find at least a facet of adventure in your story: don’t be shy. As long as neither he nor you are overacting, he is doing you a favour. Besides, politicians do not work as ‘heroes’, the audience would soon smell a sour taste of ‘election-campaign’ . If there is absolutely no hero at hand you may even invent one. For presenting the EST! Scenarios and findings I am actually producing a completely fictional story, sending an actor into the future. Hero and ‘story’ are fictional: the facts aren’t. He will be a ‘brother’ of Mr Alpinetree of the ‘alpine case study’... to be broadcasted on January 14th.

Steady drop is carving the stone

Very few single publications have the power to change the world. The Watergate-publication was one rare example. Another one is ‘silent spring’ by Rachel Carson. She was a master in touching the souls of her readers. And even they had thousands of follow ups to ‘carve the stone’. You will need a whole bunch of publications. Again and again. There seems to be a kind of critical mass. When more than 5 different major newspapers or news-shows cover a topic within one week you can be pretty sure that everyone will be covering this topic the following week - but the more complex a topic is, the smaller the chance to get such a chain-reaction. To start it, you need a kind of incident which is ‘big’ enough to attract many eyes. Just think of the Elbe-flood which started a slight revival of the old discussion about climate change in the German media. But even with things like this - it will take dozens and more such incidents, years and years of steady media presence to make the step from ‘being heard’ to ‘being understood’ - and much more work on any aspect of public awareness until this will change habits and trends. Of course it gets easier the more people do feel a need for change by themselves. It is cynical - but each flood is doing a better work on this then any TV Feature will ever be able to achieve.

Once more: the role of ‘stories and heroes’

Do you know the TV serial ‘Ally McBeal’? It’s quite popular in many parts of the world. It was the first TV-serial featuring a washroom as a regular part of the set. Not any washroom, but a unisex-one. Man and woman talk together through thin walls between each closet and meet afterwards washing their hands and fixing their makeup. Why do I mention this? Some years after the show started, I found

several articles about unisex-washrooms. Small, innovative companies started to implement them as part of their ‘corporate concept’. They seem to become trendy wherever this serial is shown. What might have happened if these popular figures would have had some of their dialogues in the ‘bicycle lot’ of the company ? Maybe even discussing the advantages of not needing a car in the city? (Again: don’t overact - if people feel ‘teached’ the show will be a flop). If your concepts find their way into these ‘everyday stories’, into the subconscious of the society, then the process has a chance to get rolling.

I will finish by trying to answer Question 12 and 13 of your issues paper:

How does advertising support unsustainable transport behaviour and how could it be used to make transport behaviour more sustainable ?

In my eyes the role of pure advertising is quite small. It is the least credible kind of media presence. It may help to support a climate, a consciousness, but it won’t have any measurable effect without the more subtle paths, from journalism to everyday entertainment, including popular figures giving positive examples for the behaviour you want to achieve. If you want to use advertisement you should try a more indirect approach. A ‘commercial’ for public transport will have less effect on peoples behaviour than a commercial promoting new jeans - assuming that a popular brand is presenting these jeans in a public tram instead of a sixties car.

Are counter-advertising and denormalisation plausible strategies for reducing car ownership and use?

They may be parts of a campaign and may work if backed up by additional paths as described above. But you won’t change the habit’s of a passionate driver by telling him that driving is a bad thing to do. If you try too hard, he will get angry at you and never listen again! You need to work with emotions, positive identification, clever solutions - and never ever let the audience know that you are teaching them!

Sustainable Miles for the World Summit

"Auf Kinderfüßen durch die Welt" was a campaign for sustainable mobility in the run-up to the World Summit in Johannesburg (Aug./Sept. 2002).

From the end of May until the beginning of the summit, four to ten year old children from all over Germany collected "Sustainable Miles" for their symbolic journey to Johannesburg. 8877 miles - which matches the distance from Berlin, Germany to Johannesburg - was the destination to reach. More than 155,000 sustainable miles by some 25,000 children in more than 180 German cities and towns have finally been collected!

Throughout one week the children could collect "Sustainable Miles" by using climate- and environmentally-friendly means of transport for their daily journeys to school or kindergarten. During this activity week the children explored their everyday environment and worked out suggestions and solutions for local decision-makers and planners, which aim to increase the safety on their daily journeys and encourage transport policies less harmful to the environment and fairer to kids. Furthermore, they heard about other children's school journeys, about use and waste of resources - especially concerning transport- and many other issues helping to understand connections between problems of people in the southern hemisphere and our way of living.

After the activity week the children presented the "Sustainable Miles" as well as their solutions and suggestions to their local decision-makers. Many children wrote their wishes for the politicians on paper-footprints, others made big posters or drew their own city-maps to show clearly where the "hot spots" on their everyday journeys are. Some groups even organised a protest-march toward the town hall.

All "Sustainable Miles" and footprints were collected and handed over to the Ministry of Environmental Affairs in Berlin. From there they started their official journey to the World Summit in Johannesburg, where the German Minister of Environment presented them to the participants.

The Concept

On the one hand, the campaign aimed to raise awareness among children and their parents about the effects their modal choice for journeys to school and kindergarten has on the environment and quality of life. By discovering their everyday environment they should experience the enjoyment of movement and independent mobility. On the other hand the campaign wanted to give children a voice: to express their mobility requirements, to pillory hindrances and problems in their direct environment and to develop their own initiatives, proposals and solutions.

The campaign addressed in particular the following groups:

- Schools / kindergartens / day homes for children
  Schools and kindergartens participating in the campaign were acting as "demonstration sites" on the capability of children to contribute to sustainable development by creating visions, starting concrete actions and representing their specific requirements towards local policy makers.
- Local authorities
  Local authorities had the opportunity to offer a frame for the activities of their schools/kindergartens during the activity week. They got a possibility to learn about children's requirements on design and organisation of transport and urban environment, to receive concrete proposals on how to improve the situation for children in their area of responsibility and could commit themselves to consider children's demands in future planning procedures and measures. By organizing closing ceremonies they had an individual opportunity to inform the general public about themes addressed in the campaign and about the number of "Sustainable Miles" being delivered as the city's contribution to the campaign's success.

The following Aids and Tools were offered to participants:

- A promotional leaflet addressing all target groups.
- A toolkit for schools, including sticker albums as well as stickers with the different means of transport to collect sustainable miles in, posters to visualise the group collected miles, a brochure with detailed instructions, learn modules and support materials for teachers as well as a "check list" for local authorities that want to carry out the campaign.
- A website as a communication and learning platform for teachers and children on the themes addressed in the project as well as a place to public the results, the ideas and proposals from the participants.

The Elements

Discover your everyday environment (environmental attitudes and behaviours)

The campaign called on schools and kindergartens to organize a project week dedicated to sustainable transport. One element of the campaign was to call on all children (and their parents) to use other means of transport than the car for their trips to and from school/kindergarten – the least for that one week. While making these journeys on foot or by bicycle the children were invited to discover their everyday environment, to learn the benefits of moving by special games and to raise awareness about their specific requirements in urban transport.

As a guide, a toolkit for teachers and parents had been developed which lead them through the activities foreseen for the project week. It presented a topic every day, actively involving the children in exercises and games. These topics were: discovering the everyday surrounding, looking for new and other ways of movement, finding out effects of different transport modes on the environment, thinking of health benefits of walking and cycling and - in order to cover the global aspects of sustainability - learning about climate change and resource use and its connection with our way of life as well as its effects on people who live in the Southern Hemisphere.

Therefore the campaign's element "Discover your everyday environment" could be called a short and intensive "lesson" on the environmental and social effects of transport. At the same time, it served as capacity building for the other elements of the campaign.

Collecting "sustainable miles" involvement of the children in initiatives for the protection of the environment

The children's journeys to and from school during the project week were recorded as "Sustainable Miles (Grüne Meilen)". By visualising these "Sustainable Miles" by green stickers in sticker albums (miles of each child) and on posters (miles of the whole group), the progress of the campaign was present to children throughout the whole week. Publishing all collected miles from all children as "Green Footprints on their way to Johannesburg" on the campaigns website further illustrated the big effect many small efforts can have. In the end, the children were asked to send us the collected "Sustainable Miles" as well as their footprint having written or drawn their wishes and advice for the politicians. The German-wide collected miles as well as the footprints were handed over to the Environmental Ministry to be brought to the World Summit to make the children's efforts recognized at the negotiations.

The objective of this element of the campaign is to:

- demonstrate the effects small changes in behaviour have on the protection of the global climate,
- support children to discover how they as citizens can contribute to the fulfilment of the commitments for Climate Protection and to a more sustainable future in general.

In addition, the children developed possibilities and opportunities to make a change from being brought in parent's cars to walking, cycling or other terms of sustainable transport. As the children explored joint trips, worked out compromises with their parents, actively involved their

parents in developing joint models (walking bus, cycling pools,...) the activities carried out within the campaign will hopefully result in permanent changes of behaviour. Therefore it is intended that the campaign made a contribution to more sustainable mobility patterns according to the local context in the long term.

Children's health and environment

Comfort, being one of the main reasons why children are being brought to school by car, will have to stand against the creation of an environment favourable to children's health. Respiratory problems and allergies due to air pollution, obesity and damaged posture due to lack of physical exercise, sleep disorders and poor school results due to exposure to noise, negative effects on psychosocial development due to permanent escorting of children, lack of exercise and opportunities to socialise, ... One of the campaign's central aims was to raise awareness among the parents about the effects their habits and modal choice have on the physical, social and psychological development of their children. With the children participating in the campaign, the parents were automatically addressed as well: they had to promote the campaign's success themselves by not driving their children to school – at least for one week.

Mobility-detectives moving along

The habit of parents to escort their children (by car or not) has another important reason which is the perceived danger posed by traffic. It is here that the local decision-makers entered the scene: The third element of the campaign was the children to identify areas of concern (so called "hot spots") in their surroundings and to work out concrete proposals, solutions and suggestions aiming at increased safety and encouraging independent mobility of children. The results of this research comprised the "children's evaluation report", which was handed over to the local decision-makers. With the help of these reports concrete improvements in local transport organisation should be achieved and the specific requirements of children should be considered in planning and urban design.

In the concept of the campaign, local authorities were supposed to play an active role by:

- inviting their schools and kindergartens to participate in the campaign,
- providing a stage for the presentation of the children's findings and proposals by organising a closing ceremony (for instance in the framework of the "In town without my car!" day or the European Mobility Week), and
- committing themselves to consider these results in future planning procedures by signing the "Declaration on a Sustainable Future for our Children" jointly with the children as a highlight of the closing ceremony. By organising rallies, benefit runs or contests, the closing ceremony is also the chance to increase the amount of "Green Footprints" before delivering them as a contribution of their city to the European coordination of the campaign.

This consultation and involvement process offered an opportunity to influence present and future local decision making in the field of sustainable mobility and quality of life in the urban environment. In addition, it was a chance for local decision makers to listen to childrens', but also parents' and teachers' expectations in a 'non-electoral' context.

The Results

To make it brief, the campaign was a success: More than 1700 groups collected "Sustainable Miles", and in the end there were enough miles to surround the earth more than three times. Many children had to make sticker albums themselves as we hadn't enough materials to equip all interested groups. We were sent "tones" of children' footprints in all colours an shapes on all kind of materials, drawings from journeys to school, city maps with hot spots, wishes for the future, advice for politicians, tips on how to care about the environment, ...

Some of the pictures and material the children sent us are publicised on the campaign's website www.kinder-meilen.de , You can find them on the adults' pages behind the key word "Ergebnisse" (unfortunately these sites are only in German). A campaign report will be available soon.

Due to the success of the project, a similar campaign named “ZOOM – kids on the move to Kyoto” will be organized all over Europe in the run-up to the UNFCCC Climate Conference in 2003. Materials and a multilingual website will be available soon.

SESSION 6: DEVELOPING ADVICE FOR POLICYMAKERS ON THE USE OF SOFT MEASURES

SESSION HIGHLIGHTS

Axel Friedrich, the session chair, introduced the session by presenting examples of advertising by the car industry. One was an advertisement proposing that people move to the countryside so that they will have a longer drive to work or to shop. Such advertising contradicts the principles of the World Business Council on Sustainable Development, in which the car industry is well represented.

Werner Reh said it is necessary to deconstruct the myth of mobility and focus on access. He offered the following prescriptions for action: Develop policy measures that are consistent at several levels (supported by well-functioning public transport). Use public personalities. Integrate environmental, economic, and social arguments. Puncture infrastructure myths. Educate widely. Use professional marketing, but not product marketing. Involve youth.

David Banister set out four principles for achieving EST. Acceptability of the measures is a necessary condition. It is better to enact measures gradually, over the longer term. They should be well sequenced. They should be allow situational flexibility. Above all, the scope of public discourse should be enlarged through an interactive and participatory process.

He added that politicians are highly risk-averse and mostly lack vision. It's necessary to move beyond demonstration projects to city-wide application, and to demonstrate how progress towards EST could improve the health of the city. He stressed the importance of intervening at critical times, when behaviour is more malleable.

Jörg Beckmann said his paper **s**upplements Chapters 4 and 5 of the EST Phase 3 report, which concern the economic and social implications of EST, barriers to attainment, and gaps in knowledge. He said these chapters comprise "a substantial contribution to making sustainable transport a reality". He proposed seducing transport users rather than advising them, breaking the linking between modernisation and mobilisation, and applying technology to integrating transport modes and reducing demand for travel. He added that the trend in the European Union is to tax vehicle use—e.g., as greenhouse gas emissions—rather than vehicle ownership.

Introduction

There has been much discussion over delivering environmentally sustainable transport, and the measures available are well known. There is even agreement between the main actors concerned about what should be done. There is also an increasing literature on the barriers to implementation and why outcomes never match up with expectations (www.ucl.ac.uk/~ucft696). The commonly used economic arguments of rationality and complete knowledge do not seem to apply in transport[1]. Much of the debate has centred on awareness raising, information, education, the use of the media and advertising as the means to achieve environmentally sustainable transport (www.oecd.org/pdf/M0001900/M00019258.pdf). But there always seems to be a reason for not changing and maintaining the status quo. However good public transport is, there will always be an additional reason for still using the car. The manufacturing business is adept at selling the symbolism and seductiveness of the car.

Ownership of cars as with all other consumer goods will always become cheaper over time, so that more people can afford to own one. The main barriers to entry are not the cost of the vehicle, but the costs of insurance and the need to pass the driving test. Charges to use the car may increase substantially, but political pressures are always present (at least in democracies) to moderate any substantial rises in price so that motoring remains relatively cheap. The same types of pressures are being successfully applied in the air industry to ensure growth through increasing supply of routes and charging fares that in no way reflect the full social and environmental costs of travel.

It is easy to become pessimistic and much of the literature relates to the difficulty if not the impossibility of achieving environmentally sustainable transport. Hence one can understand the attractiveness of technological solutions with the promise of clean motoring through hybrid and fuel cell vehicles[2]. In this short thought piece, I present two positive options, one relating to community values and healthy transport, and the other to the means by which potentially controversial policies can be introduced, thus releasing powerful demonstration effects.

Community Values and Healthy Transport

Conventional wisdom emphasises the importance of habits and routinised behaviour, suggesting that only a major change in the system will induce modification in travel patterns. But congestion is now accepted as a major constraint on individuals' quality of life and the efficiency of business. Increasingly, surveys of public opinions are indicating that change is essential and that action is expected. Both the general public and business support priority being given to environmentally friendly modes, and even decision makers agree (usual levels of support are about 80%). Yet the same people are less positive in their views of others support for the same policies (typically around 40%) – a Factor 2 argument. This suggests that there is a greater than expected willingness to experiment to reduce trip lengths, to combine trips, to switch modes, or to cancel trips altogether and reduce the need to use the car. This is not an anti car argument as any such proposal is doomed to failure. It is an argument about individuals and firms reducing vehicle kilometres travelled, particularly where there is only one person in the vehicle (or empty return trips for freight vehicles).

Small initial change, if sufficiently well supported and publicised (like a Car Free Day – 22nd September 2002), can lead to new attitudes to the car. It is through the active involvement of users of transport in

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1 Note that the recent (November 2002) Nobel prize for economics has been awarded to Daniel Kahneman. His research in the 1970s argued against rationality, suggesting that people worry more about losing what they have rather than about winning a bigger stake. Although his work focused on behavioural finance and the way in which markets sometimes have "bursts of irrational exuberance", prospect theory still seems relevant to individuals' transport decisions today, as it relates actions to uncertainty and risk.

2 General Motors has released its revolutionary new Hy-wire car at the Paris motor show (November 2002). This car runs on hydrogen and is built on a fuel-cell chassis that lasts 20 years. Customers can add any body they like (and change it according to requirements). There is no conventional engine, or steering wheel or pedals and brakes (there is a multifunctional joy stick).

a partnership that change can be realised. There are many such events happening in cities through direct action (Reclaim the Streets), through the reallocation of spaces and streets to people (the World Squares initiative, pedestrianisation, street closures), through lowering speed limits (Home Zones), through travel plans, and through cycle networks and exclusive bus networks. It must be seen as an active process that is participatory and inclusive. Simple passive advertising and promotion will not work.

One soft means by which such a change can be facilitated is to demonstrate that sustainable transport improves city health (individually and collectively). Increasing evidence is linking transport induced emissions with declining health, and there are now the new arguments about the links between exercise (or lack of it) and obesity. Walking, cycling and public transport are all more healthy than using the car. Physical activity "almost halves the risk of cardiovascular disease and also reduces the risk of diabetes, osteoporosis and colon cancer as well as relieving anxiety and depression" www.warren.usyd.edu.au/transport. Active transport is good for you, but there are still the indirect effects emanating from pollution, which damages health and causes problems relating to asthma, bronchitis, leukaemia and lung disease. There are also the wider effects of increases in CO_2, ozone depletion, acid rain and smog. Environmentally sustainable transport seems to offer individual health improvements and a better quality of environment. Surely this is a message that can and should be easy to sell?

Healthy transport means strong action on separating people from traffic and having exclusive routes for people and cyclists. It also means the promotion of travel plans in all locations that are major generators of traffic. It is often thought that such policies would result in political suicide, but there now seems to be strong support for action and many decision makers have underestimated the strength of feeling for change. It requires decision makers with a clear vision, and the power and commitment to make radical decisions.

Demonstration Effects

To many people, environmentally sustainable transport requires a radical change in the way in which travel decisions are made. Naturally, people feel nervous about it and they are reluctant to alter their behaviour. High quality implementation of radical policy alternatives will have substantial positive demonstration effects. Congestion charging in Central London is the most radical transport policy being proposed in the UK in the last 20 years. It represents a watershed in policy action. The idea has been around for many years, but no politician has had the conviction of actually taking it forwards. Even with a new Mayor hugely committed to congestion charging, it has been a struggle to get it through the legal, planning and political processes within a 30 month period (1st July 2000 to 17th February 2003). This relates strongly to the issue of the conflicts between long and short term strategies. The long term view is that congestion charging is an essential element of a sustainable transport strategy, whilst the short term view is that it is almost impossible to introduce in a four electoral cycle (as exists in the UK).

To achieve implementation, there has been an extensive consultation process with all parties and a substantial amount of compromise. For example, under half (45%) of vehicles will actually pay the full charge (£5), with a further 29% having discounts of varying kinds, and the remaining 26% of vehicles being exempt. The large number of discounts and exemptions reduces the effectiveness of the policy, and they can create problems later if they are to be eliminated. Other changes include the reduction of a proposed charge of £15 for lorries to £5, minor boundary changes, and a slight shortening of the charging period (0700-1830 on weekdays). A substantial amount of analysis and monitoring will be carried out to determine both the transport and the non transport impacts of congestion charging, both within the cordon area and in the London conurbation as a whole.
(www.open.gov.uk/glondon/transport/rocol.htm and www.cclondon.com)

Such an example raises important policy dilemmas. The demonstration effects of the congestion charging scheme are substantial as many other cities will follow London if it is seen to be successful. But in order to achieve implementation, many concessions have been made, and these may in turn reduce the effectiveness of congestion charging. A balance must be struck between the desired scheme and an acceptable scheme. The potential risk is substantial, but such choices have to be made if radical environmentally sustainable transport polices are to be introduced at all. Conversely, implementation of a scheme could be seen as the first step in a process where incremental changes

are then added to the basic scheme until the final goal of a full electronic road pricing scheme in London is achieved.

Principles of Advice

To achieve environmentally sustainable transport through soft measures, four concepts need to be considered and resolved. The first is a necessary condition, but the other three also need to be addressed.

Acceptability

The measure should not be too controversial as it must be accepted or at least tolerated by the majority. There must be positive outcomes in terms of new money for investment or a measurable improvement in the quality of life. Politics is about reflecting prevailing preferences and also about forming opinions. Acceptability requires the involvement of all actors including residents, businesses, interest groups and institutions so that each of them can take on responsibilities and give a commitment to change through action. It is only with the support of all (or a substantial majority) of stakeholders that effective action will take place. It requires individuals to move away from simple self interest to accepting the wider societal benefits of change. All parties must buy in to the proposals. It is here that leadership is essential at all levels of decision making from the EU level to the national and local levels.

Long Term Perspectives and Holistic Views

When thinking about measures to achieve sustainable transport, there are some (like pricing) that are common to all futures. Such measures need to be implemented now, even though their impacts might be slow in the initial stages. For example, the UK government has increased the costs of driving through raising fuel duty by at least 5 per cent in real terms each year. In the transport sector, this is the main policy being pursued to meet the stabilization target for CO_2 emissions. Over the past six years, this has increased the price of a litre of fuel from 45 pence to 85 pence (1994-2000), of which 70 pence is tax and duty. Without the fuel price escalator, the pump price would only be about 60 pence and there is now considerable public resentment, particularly from industry, that petrol prices in the UK are uncompetitive. UK fuel prices are the most expensive in Europe and over 4 times as high as prices in the USA (Table 1).[3] The escalator has been removed (2000) after pressure from industry and other interests, particularly those in rural areas. So the long term commitment was terminated, and it seems that only through concerted action at the EU level will a European escalator be introduced.

Country	Unleaded Petrol		Diesel	
Austria	87	(68%)	68	(62%)
Belgium	96	(74%)	68	(63%)
Denmark	102	(73%)	80	(61%)
Germany	93	(74%)	68	(67%)
Finland	106	(74%)	73	(63%)
France	101	(79%)	73	(73%)
Greece	69	(63%)	56	(64%)
Ireland	80	(68%)	75	(64%)
Italy	102	(73%)	81	(70%)
Luxembourg	74	(64%)	58	(60%)
Netherlands	107	(73%)	74	(65%)
Portugal	86	(68%)	58	(63%)
Spain	75	(67%)	60	(62%)
Sweden	101	(73%)	81	(60%)
United Kingdom	113	(81%)	117	(81%)

Table 1: Retail fuel prices in the EU and tax levels (1999)

[3] Note: Prices given in US Dollars per 100 litres and percentage tax levels in brackets.
Source: www.transtat.dft.gov.uk

A second element here is that even though the science is not well known, the precautionary principle should be followed, particularly on the global warming effects of transport emissions. Some measures may have unexpected results, and these need to be accommodated. For example, a major change in the built form has an enormous potential to influence travel patterns and mobility, but it will take time to actually happen. Location decisions made now on where to build new houses, schools, hospitals and shops will substantially influence future travel patterns. Many of the problems created for the transport system do not emanate from the transport sector, but from other sectors. So a more holistic perspective is needed that integrates decision making across sectors and widens the public discourse.

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Trigger Effects and Sequencing of Implementation

Simple decisions can act as triggers and generate new forms of activities. For example, telecentres can encourage more local patterns of activity as the journey to work is replaced by local movements. If sufficient uptake happens, it would be worthwhile to open local services such as cafes and shops creating self contained local centres. Alternatively, controversial policies such as road pricing could be introduced in a series of stages, rather than in one action. Initially, road space could be reallocated to public transport services and parking charges in the city raised substantially, but new park and ride facilities would also be provided to give the motorist a choice. In stage two, cars would be allowed in the bus lanes if they pay and gradually more of the road space would be allocated to the paying motorist and public transport. As public transport is now more reliable, patronage would rise and further investments would be initiated to again increase capacity. Eventually parking charges would be reduced, and all the road space would be paid for by those continuing to drive their car. Such a dynamic facilitates implementation, gains public acceptability and gradually familiarises users with road pricing, whilst at the same time provides choice through high quality public transport.

Adaptability

Decisions today should not unnecessarily restrict the scope for future decisions. When the impact of strong measures is hard to predict, a good strategy may be to make piece-meal changes and to test several solutions in small-scale experiments. As with all of these conditions, there is no prescription or blueprint for the correct procedures to follow. Each situation requires separate analysis and implementation, including flexibility to change policy measures if intentions and outcomes do not match up. Assessment of risk and reversibility are both strong components of environmentally sustainable transport. However, the goal of sustainable mobility must remain with support from all political, business and public decision makers. But adaptability is not an excuse for inaction or weak action. It is an argument for clear decision making, leadership, supported by analysis and monitoring to check on the effectiveness of policy action.

The messages are clear. There is a strong support for enlarging the scope of public discourse and empowering the key stakeholders through an interactive and participatory process. This is a much more effective active involvement of all parties and it would be far more effective than conventional passive means of persuasion. There must be a willingness to change and an acceptance of collective responsibility. To achieve environmentally sustainable transport, the arguments must be sufficiently powerful to overcome the dependence on the car and the fact that the costs of delay and congestion have already been internalised by drivers. If the driver still resents paying more for something that has already been discounted in their travel decisions, then the battle has only just begun.

Introduction

This paper is a response by the European Federation for Transport and Environment (T&E) to the draft OECD report on "Policy Instruments For Achieving Environmentally Sustainable Transport (EST)", and in particular to Chapters 4 and 5 of this document. T&E welcomes, and has done so on other occasions, both the EST process and its highly valuable outcome. This latest report on policy instruments supports many of T&E's own positions and arguments and represents an excellent scientific reference for environmental NGOs working on sustainable transport.

T&E welcomes the emphasis the report places on the social, cultural and political dimensions of transport, while still addressing transport economics and transport technology (from a social, cultural and political angle). This approach well illustrates the cultural role of mobility and the meaning that transport has in society.

The report also reveals that any partial (technical or fiscal) solution to contemporary transport problems will not reform the transport sector as a whole. Therefore, what the document implicitly asks for is a "Mobility Reform", that is to say a transformation of the way people travel. This reform can only come about if OECD countries are able to agree upon changing the way in which they plan for, and govern, the everyday transport of goods and passengers.

By defining EST, addressing its barriers, and suggesting measures to overcome them, the report outlines the essential features of a different transport system, of another mobility regime. The kind of "New Mobility" that the document is proposing turns away from "automobility" as the dominant kind of modern mobility, i.e. the kind of individual transport that solely rests on the private car, and instead promotes a variety of other more sustainable and integrated ways of travelling. Because of both its visionary dimension and concrete suggestions, T&E welcomes this report as a cornerstone in achieving a global sustainable transport system.

Apart from comprising a comprehensive catalogue of measures to implement environmentally sustainable transport systems in OECD countries, the report also contains a crucial chapter on possible barriers to attain EST (Chapter 4). This chapter is important because it points at some problems that are often overlooked by transport planners and engineers – i.e. the rational and especially the irrational responses with which different communities react to changing their mobility patterns.

This and the subsequent chapter on how EST concepts and strategies can be translated into action, are a substantial contribution to making sustainable transport a reality. However, T&E feels that there are a number of issues in these chapters, which deserve a closer, and maybe even different look, than the one offered by the contributing experts. Hence, the purpose of this statement by T&E is not to question any of the suggestions made in the report, but to further stimulate the discussion on how to achieve EST in the OECD countries. Below, we turn to the three key terms of chapter 4 – the individual, the society and the technology – and address a few points, which, according to our view, deserve more scrutiny.

The individual – from advising transport users to seducing them

The report communicates a clear message by addressing the lack of awareness, concern, information, adequate professional advice, and rational behaviour within the transport sector. It points at the need to stimulate cognitive-rational responses of individual transport users to the environmental problems of motorised transport. The focus is on "explaining" why there is a need to change transport patterns, and that doing so is of benefit to the environment as well as future generations. Undoubtedly, this approach is an important step to achieve EST.

However, it should be emphasised that, because much of what underpins contemporary modal choice is simply based on habits, affection and emotion, providing information and hoping for so-called rational behaviour has its limits. Hence, instead of providing more "professional advice and public education", as the report argues, we would also suggest offering more "professional co-operation and public seduction". What does that mean?

Firstly, rather than trying to generate new (and thereby often merely reproducing old) professional/expert knowledge, it is necessary to facilitate co-operation between transport experts from different disciplines. Nowadays, each discipline has a number of experts dedicated to transport matters. It is no longer the case that transport is only an issue for economists, planners and engineers. Art historians are employed by car manufacturers, transport sociologists work for environmental NGOs, and behavioural scientists conduct questionnaires for public transport companies. It is vital to bring these professionals together and allow for exchange and co-operation between the different knowledge cultures.

Secondly, helping the citizen to understand the environmental problems of unsustainable transport behaviour is the precondition of changing it – but seducing the car driver to use a bike or take the train is the key to inducing change. Rather than changing the transport attitude of citizens, their actual transport behaviour ought to be addressed directly – since a specific attitude does not necessarily determine a specific behaviour.

One way to bring about this behavioural change is, for instance, to seduce car drivers into walking, biking or using public transport. Once the virtues of "not having to drive or park a car" are experienced first hand, a change of attitude will follow more or less automatically. Helping the citizen to "feel" and not just "understand" the advantages of leading a car-free life, will as well have repercussions on individual attitudes towards and cultural myths about motorised transport. Positive examples and best practices that support this approach are provided by research on the changing behaviour of transport users who "converted" from owning a private car to sharing a public car. More support can be found in research on the experienced gains in quality of life amongst the members of car-free households. Most important, though, are the insights into the aesthetic, emotional and non-rational dimensions of transport that are offered by the car industry itself. It could very well be argued that the ongoing success of the car is a result of an "awareness campaign" that seduces rather than informs and that appeals to an instinct rather than to an enlightened concern for health and the environment.

The success of such a campaign is illustrated by the continuous reproduction of "car-myths[1]" like the one that a "car-based life can be extraordinarily rewarding. Those who live it travel with comfort, convenience, and privacy unknown in times past even to royalty" – a quote that could be part of a contemporary car-ad, but is unfortunately found in the draft version of the OECD report. It is equally important for any attempt to overcome individual barriers and attain EST, to emphasise the inconveniences that come along with car-ownership and point at the personal benefits derived from walking and biking.

The society – breaking the link between modernisation and mobilisation

According to the report, the second major barrier to attaining EST is society itself. Modern societies have given rise to solid political, economic and cultural institutions that frame and govern the current transport system. Examples are the structure of current administrative systems, the world-view of political decision-makers, the urban form and fabric, or a value system that equates more mobility with more freedom. These institutions are not easily subject to change – so states the report.

From a social-scientific perspective, the common feature of most modern institutions is that they are self-referential, that is to say they are able to constantly reproduce themselves. The best example is given by the automobile and the spatial formations it has given birth to: by reinforcing urban sprawl, the car has created the preconditions for its own reproduction – it creates its own demand by transforming space into "auto-space", i.e. spatial formations that make it difficult to travel without a car. Similar mechanisms are in place when we look, for instance, at aviation and tourism. Here as well a certain form of transport is constantly fuelling its demand by providing mass-access to ever-more distant and exotic areas.

This self-sustaining process is indeed difficult to interrupt. Nevertheless, it is possible – as, for example the "blip" in air-traffic growth in the aftermath of WTC-Attacks has illustrated. Disregarding, for a moment, the tragic causes that led to a preliminary decline in air-travel demand, the incident has

[1] For demystifications also see the T&E publications on "car-myths" *Transport and the Economy* (2001) and *Transport and the Society* (forthcoming).

shown that economies do continue to exist – even with less physical travel. Obviously, in certain cases and under certain conditions, change is possible.

In order to bring about a change in the way modern societies organise their mobility, the "mobility view" of decision-makers – or their world-outlook on transport, as the report says – has to change. What this essentially means is that we need a new social contract on mobility – a contract questioning the general belief that *modernisation means mobilisation*. Modernising the way we travel cannot automatically be tantamount with "speeding-up" and "moving more". Especially not when personal time-gains as a result of faster means of transportation are continuously reinvested into ever-more travel, movement and mobility. If modernising individual transport means travelling more in less time – then social development enters a vicious circle that will eventually prove of no benefit to anyone.

A mobility view that seeks to break the current link between modernisation and mobilisation has already been translated into transport economics by emphasising the need to decouple transport from economic growth. The core measure to bring about this decoupling is "getting the prices right", that is to say internalising the external costs of transport. But apart from using economic instruments to render the transport sector more sustainable, new socio-cultural visions and distinct political targets have to be devised. Already, there are a number of available approaches upon which to hinge a more reflexive, i.e. self-critical, mobility view. They comprise instruments such as "sufficiency" and "transport avoidance" or more radical notions such as "slowness" (as, for example, employed by the "slow city" movement and "street reclaiming").

What these themes have in common is that they advocate a mobility reform that is essentially social, because they question the way we interact with and relate to each other. As a result, they often reward the communities that seek to slow down and travel less, with a perceived increase in life quality. This sort of instant gratification must be seen as a crucial point when communicating EST in contemporary society. It is an important addition to the argument that sustainable transport is of benefit for *future generations*, because it as well highlights the immediate benefits from EST for *current generations* – a theme which is not fully explored in the draft report.

The technology – integrating transportation's large technological systems

In modern societies, technological systems play an immensely important role – because they accompany and accelerate social change. In fact, within the transport sector, technological innovations have been a major driving factor. In the beginning of the 20th century, it was the automobile – at the end, it was telecommunications, which transformed and further mobilised society. Clearly, sustainable transport cannot be achieved without or even against technological innovations.

Current transport policies, though, often seem to favour technological developments, which run the risk of having an adverse effect on sustainability. Two examples may clarify this problematic relationship between transport and technology policies.

- The technological improvement of the car that was brought about by tougher emission and fuel standards has improved air-quality in many European cities. Other technical interventions have increased fuel-efficiency and lowered GHG-emissions of the single car. Although these technical fixes are cherished by the industry as environmental successes, they have severe repercussions on the whole car system. The environmental gains from making the single car cleaner have been out-weighed by a growing production of cars, leading to, for example, an increased land-take for transport infrastructure and rising noise levels in urban areas. Here, environmental success is only partial.

- Another very dubious policy is to direct substantial resources towards the construction of "Large Technological Systems" that do not fit into the existing transport system. For example, the ongoing attempts to install a magnetic train in Germany ("Metrorapid", formerly "Transrapid") are questionable because similar results can be achieved more cost-efficiently by improving existing rail-infrastructure. Moreover, this project illustrates another problem of technological development within the transport sector, that is to say the creation of new demand. So far, most of the technical innovations within transport have generated their own demand rather than re-directed existing demand to more sustainable modes of transport. This policy needs to be revised if the long-term goals of EST are to be attained.

What is needed is a substantial shift in the development and implementation of transport-related technologies. On the one hand, priority ought to be given to technologies that enhance the integration of different modes of transport and hence promote more sustainable mobility. Examples of this are “integrated/electronic ticketing” or the use of so-called “smart cards” in relation to car-sharing. On the other hand, technological development must be coupled with demand management policies in order to their merely increasing capacity to generate new demand for travel. Any new technology that receives public funds should be subject to an assessment that considers the overall effects on transport demand and volume – this will also help to question dubious claims such as the one that teleconferencing, teleshopping or telecommuting will essentially lead to a reduction of transport.

Recommendations

Against the background of the above comments, we outline a number of recommendations on the use of soft measures with respect to EST. Particular emphasis is given to the European perspective, which is to say the steps that are necessary at EU-level to enhance the use and impact of soft measures.

1. Develop more mid-term and long-term visions of sustainable transport and combine them with strict environmental targets. Such ambitious targets should resemble a political goal rather than scientific limit value (an example is the “vision zero” in road safety debates). Tough political targets may as well involve sensitive issues such as a “cap” on air-traffic volume or even on private car-ownership, in order to create awareness.

2. Provide for cross-cultural knowledge transfer, that is to say, let experts from different disciplines exchange their ideas on sustainable transport. It is important to realise that expert knowledge and first-hand experience is often already out there - but insufficiently recognised and integrated. In particular, include experts from disciplines that are normally placed at the fringe of transport studies. Social scientists, for example, are increasingly contributing to the knowledge production within transport science. Here lies a huge potential for knowledge-transfer.

3. Explore and test alternative technical innovations that will improve sustainable transport. Many of the current R&D efforts are “auto-oriented” and seek to provide new technical solutions for the car and its complementary infrastructure only (examples are the fuel cell, or intelligent road guidance systems). Therefore, more technical applications, which will facilitate a better use of sustainable modes of transport (examples are “smart cards” and electronic ticketing) are needed.

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The following few considerations refrain from giving the "red-green" federal government any advice. Not only because this is done by some 80 million persons in Germany at present (some of them with friendly motives indeed). Rather because the environmentalist NGOs are not in a very strong position themselves, as they are in need of a strategy debate: Numeric growth of the BUND – and other NGOs – which result from professional methods of member recruitment cover up the disappearance of unpaid activists and the "member association" and leaves as options only

- professionalisation,
- personalisation (both enhancing centralization) or
- network structures that make shorter and emotionally more rewarding periods of commitment of members possible, instead of lifelong membership from the cradle to the grave.

The first two options are very much in line with the requirements of the media, talkmasters and virtual reality. The third has considerable subversive potential, is open to multiple strategies and is in any case decentral. In the area of transport policy, ecological problems are more evident than in others and more difficult to handle because of ideological or even religious lines of conflict.

2nd preliminary remark: I doubt whether "soft measure" can be dealt separately from "hard measures" (cf. chart on page 5)., except for analytic reasons. Whether public relations of carriors are convincing depends on their performance and the public responds far more critical to delays and break downs of public compared to private enterprises, e.g. rail over urban traffic than air traffic. Or: the sticker on the rear side of a bus "40 / 90 cars could be running in front of you in my place" is counterproductive when the bus is empty.

3rd preliminary remark: technical solutions have provided environmental successes in the field of transport policies - reducing limited emissions e.g. - yet they fall short of reaching EST-goals. Problems of energy consumption of vehicles or of land use for transport purposes are however far more difficult to deal with. They require a policy mix of different instruments including soft measures which must address individual behaviour.

Instead of presenting a multitude of arguments and hypotheses, I shall try to concentrate on a few points.

1. During the last 15-20 years, the environmental side has lost public support and dominance in the public debate. This is due to a common effort of the "Conservatives" which was successful in conquering, occupying and manipulating relevant key concepts. Whereas the vocabulary of public transport and sustainability is unpoetic, abstract, dull, and complicated the vocabulary of individual mobility is onomatopoetic, short and concrete. The concept of mobility was narrowed from its original meaning of social mobility (symbolizing advancement, access, participation, respect) to a purely physical and spatial concept. It replaced the concept "traffic" almost completely and freed it from negative connotations such as noise, emissions, accidents. It is possible to speak of the necessity to expand mobility or even to guarantee mobility as some sort of human right whereas a person who postulates more traffic would be called a lunatic.

   We need efforts to deconstruct the myth of "mobility" and to develop a set of key concepts of sustainable behaviour (perhaps around the concept of "access").

2. Consistent policy measures and concrete visions, broken down to reachable steps and "milestones" including fixed dates and a strategy to move forward in the right direction are an indispensable part of EST-policies. These might be moulded in national plans or a cascade of global, European, federal, regional or local goals that leave the choice of tools open

to the policy unit concerned. Even good communication strategies will fail when confronted with incentives favouring non-EST-behaviour (e.g. urban excise and planning mechanisms, grants for excessive land use or long distance for work travel, eco-taxes used for temporary relief of social burdens). Consistent goals and measures of transport-policy must also include effective performance goals for mobility-providers: standards for customer-orientation (management of complaints, service quality …), standards of operation (Punctuality, … deficits must be punished by lowering of subsidies), selection of offers suiting best the EST-goals. An important EST-aim must be: Higher occupation of existing public transport.

No EST-communication will be possible against the background of crowded and unpunctual trains … etc. A public transport with relevant share can argue from a better and self-confident position.

3. Convincing public personalities that serve as a model – not necessarily recruited from the political staff over the media, that have obvious problems with a resource- and traffic-saving lifestyle – are essential for EST-communication. Otherwise we keep captured in the vicious cycle of wrong expectations of public expectations (politicians expect less positive attitudes of the public toward EST-policies). Commercialized media will continue to weight advertisement customers against public interest such as EST and will not be advocates of EST. The competence of mass media will probably decrease rather than increase in the future as well as the share of entertainment compared to information.

   Measure: new standards for the selection of staff in political parties – a change that is necessary anyway (achievement criteria instead of local over regional presence).

4. Direction of scientific efforts: The underlying paradox: Although even all leading politicians know (and admit in private discussion), that present traffic policies are not sustainable and move forward in a dead end street (or: leads to congestion irrespective of any amount of investment in road construction) the politician who is honest probably loses public support. The myth of economic growth and even more importantly: decrease of unemployment as a result of a growth of transport volume is very powerful in public debates.

   - Integrated scenarios transport & employment: The state of discussion resembles the energy debate of the 1960s or that of the “climate alliance” in the USA: economic growth by growth of energy consumption, i.e. neglecting the decoupling of energy consumption and economic growth. Efforts in the direction of “jobs by climate protection / Arbeitsplätze durch Klimaschutz” or integrated scenarios of traffic- and economic development. Without catastrophic events such as climate change, traffic-policy must be legitimised by economic terms. And by economic success within rather short terms. The definition of transport goals must take economic aims into consideration from the very start.

   - There is no substantial discussion about negative social effects of narrowly defined economic efficiency orientation and rising traffic volume especially with regard to employment. On the contrary: deregulation, more flexibility, lowering of (labour) costs has severe repercussions on social and human factors but is publicly acclaimed with hardly any doubt. Yet, the prospect of immense mobility and flexibility (see Richard Sennett) is not very benign.

   - We need constant evaluation of all traffic measures especially in the field of infrastructure. Myths flourish on the basis of disinformation. Ex post evaluations show that even the common aim of increasing safety by road construction is reached by only half of the projects investigated.

   - Post-industrial society, knowledge-society: Far reaching efforts should be taken to bring EST-themes into schools and universities in an ambitious yet comprehensible way. As Eucken already knew, these – relatively independent - actors are able to give orientation. PISA has shown that education is a massive societal challenge. EST could profit from a strong policy stream for better education.

5. Professional marketing strategies can be used for EST-communication but must avoid copying product marketing insofar as they refer to substantial contents and targets. Public Awareness-Measures using testimonials and communicating simple messages could bring EST nearer to professional non-EST-advertising yet should remain distinct from that.

   Topics should be used that are absolutely un-debatable such as safety, avoiding accidents involving children etc. Cities with a clear profile in traffic safety rank better than comparable cities. Other "loans" of legitimacy for transport measures could be taken from urban or from cultural projects.

   As Tony Blair's "Whitebook" showed, the fundamental aim when improving public transport should be to give the people a choice, thus a message compatible with the megatrend towards personal freedom and individuality.

6. Supranational, European policy framework: Supranational Solutions in Transport policy under full participation of the European Parliament are helpful in most policy areas: securing cross-border infrastructures ("interoperability"), safety, environmental regulation, internalisation of external costs, fair competition-regulations, integration of environmental targets … White- and Greenpapers but also binding regulations give ample opportunity to national governments to line up with European policy and develop a strategy of formulation and implementation of an environmentally ambitious transport strategy. In addition: European activities for scientific research and for the branding new words and concepts help national actors to less controversial policy options.

7. Target group participation: By using the tool of participation as precisely as possible, for instance working out proposals for improving in project groups, in common representative bodies over integrating new groups into existing bodies environmentally sound ideas and concepts may be developed. That does not mean that every target group has a distinct approach and distinct interests in traffic. Essential is the provision of expert advice, professional support for the process of self organization, a work style that allows for results in a rather short time and that a learning process takes place before policy options and decisions are taken. For instance, traffic very rapidly becomes an important topic, when "Kinder- und Jugendparlamente" (Kids- over Youth-Parliaments) are founded.

   As an example of a participation strategy of young people between 15 and 15 years I show some pictures of the competition "Jugend macht mobil in Nordrhein-Westfalen – YOU-move.nrw" that ran from May til the end of October 2002. Especially school classes, Youth-Parliaments, Sport-Teams etc. were asked to develop projects with positive impacts on environment and traffic safety to 4 themes:

   - New mobility
   - Young tickets
   - Managing traffic
   - Public transport as an event ("Erlebnis Nahverkehr")

   The winners were celebrated in Düsseldorf on 22nd of November. One project which won the traffic safety award wanted improvements on their route to school, amongst them a zebra-crossing. Last week the zebra crossing was installed. The claim for that zebra crossing is slightly older however, namely about 15 years.

FURTHER POINTS MADE DURING THE WORKSHOP DISCUSSIONS

There were numerous opportunities for discussion at workshop sessions. The discussions were animated, constructive, and generally overflowed the time available. This session notes several points made during these discussions.

- Attempts to change transport activity, whether by soft or hard measures, or both, have mostly had modest objectives. EST's objectives over 25-30 years are not modest. They include, for example, an average 65-per-cent reduction in travel by "less environmentally friendly modes" by 2030, and a 100- to 200-per-cent increase in travel by "more environmentally friendly modes". Thus, use of familiar measures in familiar ways may not be appropriate; new measures and combinations of measures may be required. On the other hand, a 65-per-cent reduction can be the result of cumulative annual four-per-cent reductions over 26 years. Likewise, a 177-per-cent increase can be the result of cumulative annual four-per-cent increases over the same period.

- However appealing it might be made, the vision of EST may not be sufficiently compelling to induce the needed changes. A more urgent matter could be production constraints on fuel for transport that could arise during the next decade or two. Preparation of transport-dependent societies for such constraints could provide stronger motivation for action than attainment of EST. The required changes in transport activity are essentially the same.

- Progress towards EST can involve classic conflicts between individual and societal objectives that have no simple resolution. The answer may lie in early education about the importance of society, including refutation of political positions such as "There is no society, only individuals and families" (quoted in Section 4.3 of the issues paper).

- There is an important distinction to be made between changing transport behaviour itself and changing the behaviour of decision-makers about transport. Soft measures may be much more important in changing the latter behaviour.

- The lack of interest in freight transport during the workshop reflects the relative lack of interest in this topic among those seeking to change transport behaviour. The movement of freight to, from, among, and within OECD countries may be responsible for almost as much resource use and emissions as the movement of people, and yet very much more attention is given to changing the way people move than to changing the way freight moves. (Indeed, if freight movement by personal vehicles is included—e.g., in shopping trips—freight movement may be responsible for the largest part of transport's resource use and emissions.) The potential roles of soft measures in changing freight transport require urgent investigation.

- Aviation is another topic almost ignored at the workshop. It poses huge challenges because often there are few realistic alternatives, especially for inter-continental travel. Aviation may be disproportionately responsible for numerous environmental impacts, notably climate change.

- Several institutional issues require attention. Key requirements are moving environmental ministries and agencies into more central positions with respect to transport policy-making and ensuring that 'soft-measures work' has adequate funding.

- Transport cannot be considered in isolation from broader societal issues and concerns. Perhaps the most important is attitudes toward economic growth, which may be inexorably linked to transport activity. Attitudes towards globalisation may also have to change. Local production may be a way of decoupling transport activity and economic activity.

- Soft measures are likely to be more effective, whatever their designated role, when they are directed towards people receptive to change. They include young people and people whose life circumstances are changing. More such targeting of soft measures is required.

RESPONSES TO QUESTIONS POSED IN THE ISSUES PAPER

The table below and on the next page sets out the 18 questions posed in the issues paper, and the answers to them provided during workshop presentations and discussions. (The answers set out here are necessarily brief and, as a result, often overly simplistic. Reference should at least be made to the papers presented at the workshop—reproduced here in Appendix 3—to capture the richness and scope of the arguments made.)

QUESTIONS	ANSWERS
Question 1. What is an appropriate definition of 'soft measures'?	Participants were divided. Some said the distinction between soft and hard measures is false. Others said it is valuable even if only to highlight the need for use of both kinds of measure.
Question 2. What maintains unsustainable transport behaviour?	As well as the proposition in the issues paper—unsustainable behaviour is maintained by its consequences—two views were expressed: one was that unsustainable behaviour is part of a quest to reduce personal energy expenditure; the other was that it is the result of activities of the car-industrial complex.
Question 3. Can the strategies involving soft measures designed to reduce car use also be applied to reducing car ownership?	This question was not addressed. Participants mostly seemed to believe that it is more important to address car use than car ownership. The suggestion was made that car purchases could be reduced by reducing the power of cars, i.e., their acceleration and speed.
Question 4. If increasing settlement density is an appropriate way to address some transport issues, how might soft measures be used to help achieve denser patterns of land use?	This question was not addressed. Some of the challenges posed by high densities were noted.
Question 5. When appropriate facilities are available, what are the best ways to use soft measures to influence mode choice in favour of public transport, walking, and cycling?	Advice was given to focus on the *effects* of transport activity rather than the transport activity itself. Also, soft measures should be used to secure acceptance of hard measures, gain support for policies favouring EST, and raise problem awareness.
Question 6. How can soft measures be used to give additional value to sustainable transport behaviour?	EST could be made desirable through providing appealing visions of EST and emphasizing the advantages of EST to individuals.
Question 7. How can young adults be induced to *not* consider car ownership as an important goal?	The question was not directly addressed. The suggestion was made that soft measures could be used to reduce the value of driver's licences to young people.
Question 8. Is some transport behaviour—e.g., non-habitual transport behaviour—more amenable to influence by soft measures?	Habitual (automotive) behaviour was considered to be less sensitive to soft measures.
Question 9. What causes decision-makers to underestimate public support for environmental friendly transport modes, and how could soft measures be used to correct such underestimates?	The decision-makers' world was said to be the world of the car. Moreover, most decision-makers are middle-aged white males, meaning that the interests of most population groups may not be recognised and reflected when decisions are made.
Question 10. To what extent is acceptance of measures a necessary or sufficient requirement for their effectiveness?	Acceptance of effective measures was considered useful and desirable, although not necessarily essential.

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Question 11. How could soft measures be used to increase the acceptance of measures that have been introduced?	Soft measures should be used to raise problem awareness, with a focus on the concern about transport rather than on the transport activity itself. Key factors are social norms, personal expectations, and the perceived effectiveness of hard measures.
Question 12. How does advertising support unsustainable transport behaviour, and how could it be used to make transport behaviour more sustainable?	The question was not directly addressed. Advice was given that advertising *per se* should be avoided as a tool for changing transport behaviour.
Question 13. Are counter-advertising and denormalisation plausible strategies for reducing car ownership and use?	This question was not addressed.
Question 14. To what extent are soft measures effective in changing transport behaviour?	Participants were divided. A minority said soft measures are ineffective or minimally effective. A majority said they are essential components of strategies for attainment of EST, and in some cases noted success in using soft measures to change behaviour.
Question 15. Can soft measures be used to facilitate the effects of 'hard' measures designed to make transport behaviour more sustainable?	Yes, chiefly through increasing acceptance of hard measures (see Question 11).
Question 16. How can soft measures best be used to achieve sustainable transportation?	Through increasing acceptance of hard measures (see Questions 11 and 15), and also through facilitating public participation in problem definition and solution, making EST appealing, and shaping the actions of decision-makers.
Question 17. Is interest in soft measures a way of avoiding unpalatable use of hard measures?	This question was not directly addressed.
Question 18. How can soft measures best contribute to the creation of human environments in which car ownership and use are not the norm?	This question was not directly addressed. Two relevant suggestions were made. One was to physically separate people from their cars. The other was that behaviour's milieu is unimportant; it is people that have to change, not their circumstances or the consequences of their behaviour.

CONCLUSIONS FOR POLICY-MAKERS ON THE USE OF SOFT MEASURES

At the end of the workshop, participants reached the following conclusions of interest to policy-makers about the use of soft measures in securing progress towards EST.

1. Soft measures—including information provision, education, and marketing—can and do have **productive roles** in the essential work of making progress towards Environmentally Sustainable Transport (EST).

2. Soft measures should be used to **provide an appealing vision of EST, illustrate its benefits, and promote its acceptance**. Doing these things may require presentation of realistic portrayals of the effects of continuing with 'business as usual'.

3. Soft measures can contribute in specific ways to an appealing vision of EST, for example, by illustrating the benefits of living without a car.

4. Soft measures have important roles in **facilitating public participation** in the characterisation of transport problems and in the specification, development, and implementation of solutions to the problems.

5. Soft measures are similarly important in **shaping the actions of decision-makers**, in part so that they gain better understanding of public attitudes and perceptions

6. Soft measures **complement hard measures** such as taxes, regulations, and the provision of infrastructure and public transport services. Soft measures can be used to facilitate the acceptance of hard measures, and to enhance their effectiveness. Use of soft and hard measures should be carefully coordinated and integrated.

7. Soft measures have their more obvious roles in **changing individual transport activity**, as in the promotion of public transport. They can also be used to help make freight transport more sustainable, as in the promotion of mode shifts to rail and water. Above all, they can help create a climate in which progress towards EST becomes easier.

8. Soft measures require **specification of the purposes** of their use, specification of target groups, fashioning to help meet the objectives in the most effective and efficient ways, and **careful monitoring of outcomes**, as do all measures designed to change transport activity.

9. It is usually cost-effective to **dedicate a portion of the budgets of transport projects** to the strategic deployment of soft measures. The cost-effectiveness of such dedication should be assessed in relation to the cost-effectiveness of all spending on transport projects.

10. Development of expertise in the use of soft measures should be **part of the training of transport professionals**.

APPENDIX 1

ISSUES PAPER

SOFT MEASURES AND TRANSPORT BEHAVIOUR

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SUMMARY

This paper was provided to participants in advance of the workshop to help set the scene for the workshop discussions. First it discusses what is meant by hard and soft measures, the former comprising financial and regulatory instruments and the latter comprising other instruments, notably provision of information and persuasion. The paper then overviews the EST project, notes some of the major contributing factors to the motorised movement of people, discusses the effects of advertising, reviews some of the data on the effectiveness of soft measures, and draws several conclusions. A feature of the paper is a series of 18 questions posed at appropriate parts of the paper designed to help frame consideration of the roles of soft measures in changing transport behaviour.

As an aid to discussion, the paper is deliberately provocative in that it presents a perspective at odds with much current thinking about how behaviour changes. It is written from the perspective that transport (and other) behaviour is maintained mostly by the environmental consequences of the behaviour. Accordingly, management of transport behaviour requires above all changes in its consequences. This perspective can be antagonistic to the view that information and persuasion play strong roles in changing behaviour.

A particularly pertinent product of this perspective is the view that *acceptability* of hard measures, which is believed to be facilitated by soft measures, may be more likely after rather than before hard measures are introduced. This conclusion finds support in the literature on changing transport behaviour. It has important political implications. It is consistent with implementation rather than consultation, so as to provide early exposure to the beneficial outcomes of the measures implemented.

The paper concludes that most soft measures are not effective. Exceptions may be ‘soft measures plus’, which include community-based social marketing, tailored information, individualised marketing, and other intensive processes that seek to engage individuals in face-to-face or individualised settings. Soft measures directed at changing the consequences of transport behaviour, positively or negatively, could also be effective but they have not been used explicitly. In general, there is only weak evidence one way or the other about the effectiveness of soft measures. The European Commission’s TAPESTRY project may shed light on some of these matters during 2003.

The paper also focuses on the importance of both car ownership and residential density as setting factors in high levels of car use. Car ownership is important not simply because a car must be available before it is driven, but more because possession of a car appears to compel its use rather than use of alternatives such as public transport and bicycling. Residential density is important because of its strong negative correlation with car ownership, and also because it appears to influence how much an owned car is driven.

The suggestion is made that in as much as soft measures are effective they should be used to increase residential density and reduce car ownership. More specifically, urban environments could be planned with the deliberate objective of obviating car ownership. This could be achieved through application of the EANO principle (Equal Advantage for Non-Ownership): every part of an urban region should be such that the advantages of not owning a car are at least as great as the advantages of owning a car.

Finally, the paper sets out a list of draft recommendations. These were the starting point for development of the workshop recommendations. The much better final set differs considerably from the initial set. The difference between the two sets is a measure of the substantial contribution made by workshop participants.

CHAPTER 1. DEFINITION OF TERMS; SCOPE AND PURPOSE OF THIS PAPER

It's easier to understand the term *soft measures* by first considering its complement, *hard measures*. A *hard measure* is an action taken by government to change behaviour that involves the use of taxes (or incentives) or the use of regulations or the provision of infrastructure or transport supply. Examples of hard measures designed to change transport behaviour are:

taxes: high fuel taxes are imposed in part to discourage excessive vehicle use

regulations: speed limits are imposed to reduce dangerous driving or fuel use

infrastructure: bicycle paths are introduced to encourage cycling.

Soft measures are other actions taken by government to change behaviour. They usually involve the provision of factual information or the linking of behaviour with positive or negative outcomes. Examples of soft measures are:

factual information: provision of information about a new bus service to increase bus use

positive association: portraying bicycle use as conducive to good physical health

negative association: portraying car use as a contributor to poor air quality.

Other terms used to characterize soft measures include attitude change, education, and persuasion. Soft measures can be directed at communities rather than individuals. A program designed to raise a community's awareness of the health consequences of traffic noise, and perhaps even stimulate political action, is an example of the use of soft measures.

Some authors have used the term 'hard measures' to refer to changes in vehicle fleet or infrastructure, or both, and use 'soft measures' to refer to other means of securing a change in transport activity or transport's impacts. According to this usage, taxes and regulations could be soft measures.[1†] Thus, care should be taken to note what is being meant when the term *soft measures* is used.

In the usage of the present paper, **a distinctive feature of soft measures is that they are non-coercive and relatively low in cost**; i.e., they do *not* include taxes, regulations or major investments in infrastructure.[2]

This paper's focus is on the use of soft measures to change transport behaviour towards Environmentally Sustainable Transport (EST). What is meant by EST is set out in the box on the next page. The OECD's work on EST and the need to make progress towards EST are discussed further in Chapter 2 of this report.

Access is a key concept in the definition of EST. It refers to acceptable levels of availability of social and business contacts, goods and services, realisable with or without travel or other physical movement. An aspect of access is availability of destinations, which has been estimated for west Germany for 1960-1990—a period of extraordinarily rapid motorisation—as shown in Figure 1.[3] While the number of cars rose more than sevenfold, the number of destinations reached hardly changed at all. Data from two recent major surveys of urban travel support the finding of increased mobility without much increase in access; they show that in the 1990s trips by car replaced walking and public transport trips with hardly any increase in the overall number of trips made.[4]

† Superscript numbers refer to End Notes that begin on Page 171.

Environmentally Sustainable Transport: definition, criteria, goals and targets

Consistent with the broad definition of sustainable development,[5] the specification for a sustainable transport system requires that the movement of people and goods is provided in an environmentally, socially, and economically viable way; mobility for any purpose is to be considered as a means rather than an end. Environmentally sustainable mobility implies changes in behaviour and new innovative approaches at all levels of society and sectors of the economy. Important prerequisite for realising an EST system in the long term are conformity with ecological limits (critical levels and loads) and the prevention of pollution.

A sustainable transport system is one that

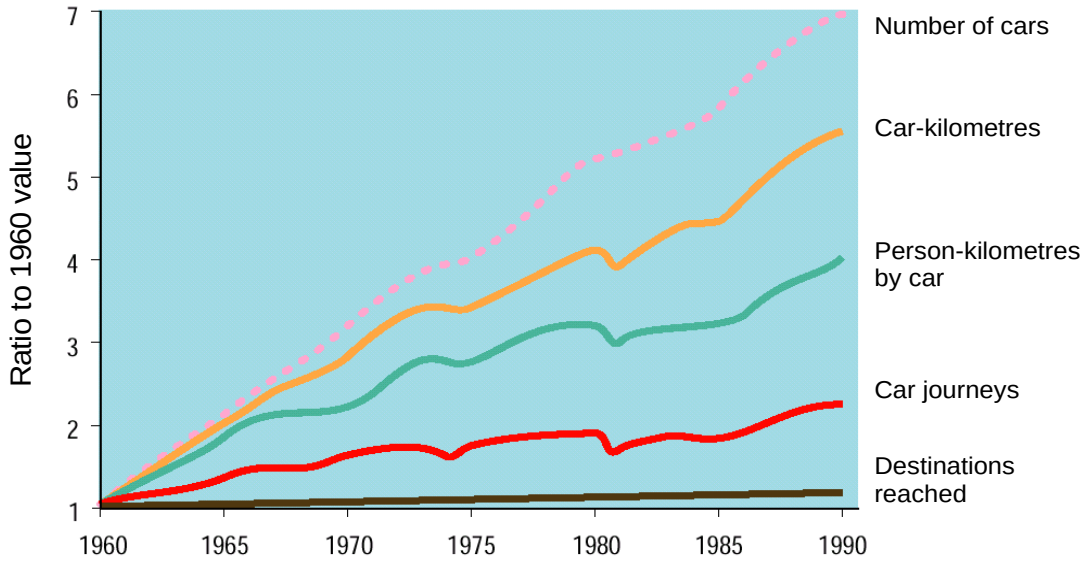
- provides for safe, economically viable, and socially acceptable access to people, places, goods, and services;
- meets generally accepted objectives for health and environmental quality (e.g., those concerning air pollutants and noise put forward by the World Health Organization);
- protects ecosystems by avoiding exceedences of critical loads and levels for ecosystem integrity, e.g., those adopted by the UNECE for acidification, eutrophication, and ground-level ozone; and
- does not aggravate adverse global phenomena such as climate change, stratospheric ozone depletion, and the spread of persistent organic pollutants.[6]

Alternatively, an environmentally sustainable transport system is one where

> *transportation does not endanger public health or ecosystems and meets needs for access consistent with (a) use of renewable resources below their rates of regeneration, and (b) use of non-renewable resources below the rates of development of renewable substitutes.*

Internationally agreed goals, guidelines, and standards—such as those defined by WHO and adopted by the European Union, the UNECE Convention on Long-Range Transboundary Air Pollution, and the UN Framework Convention on Climate Change—have been used to operationalise this definition and to set goals and long-term environmental and health targets.

Figure 1. Mobility in west Germany, 1960-1990



Transport behaviour includes anything that people do that is related to the movement of people or the movement of freight. Hard and soft measures are mostly used to change the transport behaviour of individuals and communities. They can also be used to change what vehicle manufacturers and infrastructure providers do. This kind of behaviour is not discussed here.

Changes in transport behaviour that represent progress towards EST include the following:

Movement of people

- More careful driving
- Higher occupancy; car-pooling
- Downsizing cars
- Shifting from the car to public transport
- Shifting within public transport from air and bus to rail
- Shifting from motorised to non-motorised modes
- Reducing travel; replacing it with electronic communications

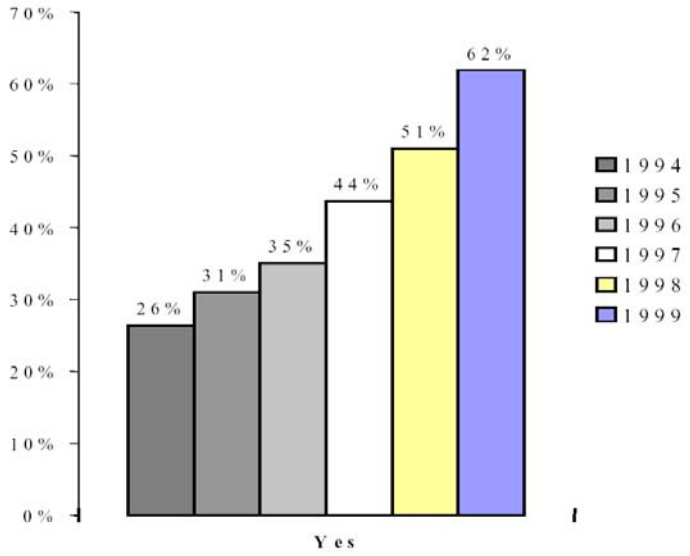
Movement of freight

- More careful driving of vehicles
- More complete loading
- Shifting from air and road to rail
- Reducing material flows; replacing them with electronic communications

Although the movement of freight can have comparable environment effects to the movement of people (see Figure 3 and Figure 4 in the next chapter), this paper focuses much more on the movement of people. This is done because of data availability and also because soft measures are usually thought of as acting on travellers rather than on shippers or carriers of goods. However, soft measures may have as much application in the movement of freight as in the movement of people.[7] Figure 2 provides an example of changing behaviour with respect to freight transport.[8]

The purpose of this paper is to help guide and even provoke discussion at the workshop to be held in Berlin on 5-6 December, 2002, entitled *Communicating Environmentally Sustainable Transport—The roles of soft measures in achieving EST*. In places, the paper errs on the side of pessimism as to the opportunities provided by soft measures. This has been done in the hope that workshop participants will be stimulated to contradict what is in the paper and bring forward important evidence of soft measures' positive effects. Moreover, the paper presents a point of view that favours management of transport behaviour through manipulation of its consequences. This is seen by some as antagonistic to the view that information and persuasion can play strong roles in changing behaviour, and thus may help further to provoke discussion.

Figure 2. Environmental demands by Swedish customers for freight transport services



The elaboration of the OECD's work on EST in Chapter 2 in-

cludes some justification for using soft measures as an alternative or complement to hard measures. Chapter 3 sets out some the key factors in car ownership and use. Chapter 4 discusses other factors, including social and individual factors, attitudes and acceptability, as they may be relevant to transport behaviour. Chapter 5 comprises a discussion of advertising in relation to car ownership and use. Chapter 6 provides an overview of some research on the effectiveness of soft measures. Chapter 7 draws some conclusions concerning the use of soft measures, and Chapter 8 provides additional discussion as to how transport behaviour can be shaped in desired directions by changing its context. Finally, Chapter 9 sets out draft recommendations for consideration by the workshop.

At several points in this paper, questions are posed for workshop participants as in the example below. These are brought together in Table 1 arranged by the session in which each question might best be considered.

> Question 1. What is an appropriate definition of 'soft measures'?

Table 1. Questions posed for the workshop panellists,

Sessions in which questions are to be addressed	QUESTIONS	Page of this document where question is found
All sessions	Question 1. What is an appropriate definition of 'soft measures'?	Page 128
Session 2	Question 2. What maintains unsustainable transport behaviour?	Page 137
	Question 3. Can the strategies involving soft measures designed to reduce car use also be applied to reducing car ownership?	Page 138
	Question 4. If increasing settlement density is an appropriate way to address some transport issues, how might soft measures be used to help achieve denser patterns of land use?	Page 142
Session 3	Question 6. How can soft measures be used to give additional value to sustainable transport behaviour?	Page 145
	Question 8. Is some transport behaviour—e.g., non-habitual transport behaviour—more amenable to influence by soft measures?	Page 149
	Question 14. To what extent are soft measures effective in changing transport behaviour?	Page 163
	Question 15. Can soft measures be used to facilitate the effects of 'hard' measures designed to make transport behaviour more sustainable?	Page 163
Session 4	Question 5. When appropriate facilities are available, what are the best ways to use soft measures to influence mode choice in favour of public transport, walking, and cycling?	Page 143
	Question 7. How can young adults be induced to *not* consider car ownership as an important goal?	Page 146
	Question 10. To what extent is acceptance of measures a necessary or sufficient requirement for their effectiveness?	Page 153
	Question 11. How could soft measures be used to increase the acceptance of measures that have been introduced?	Page 153
	Question 16. How can soft measures best be used to achieve sustainable transportation?	Page 163
	Question 18. How can soft measures best contribute to the creation of human environments in which car ownership and use are not the norm?	Page 166
Session 5	Question 12. How does advertising support unsustainable transport behaviour, and how could it be used to make transport behaviour more sustainable?	Page 156
	Question 13. Are counter-advertising and denormalisation plausible strategies for reducing car ownership and use?	Page 156
Session 6	Question 9. What causes decision-makers to underestimate public support for environmental friendly transport modes, and how could soft measures be used to correct such underestimates?	Page 150
	Question 17. Is interest in soft measures a way of avoiding unpalatable use of hard measures?	Page 164

CHAPTER 2. THE EST VISIONS AND THEIR IMPORTANCE

2.1. Overview of the EST project; visions and conclusions

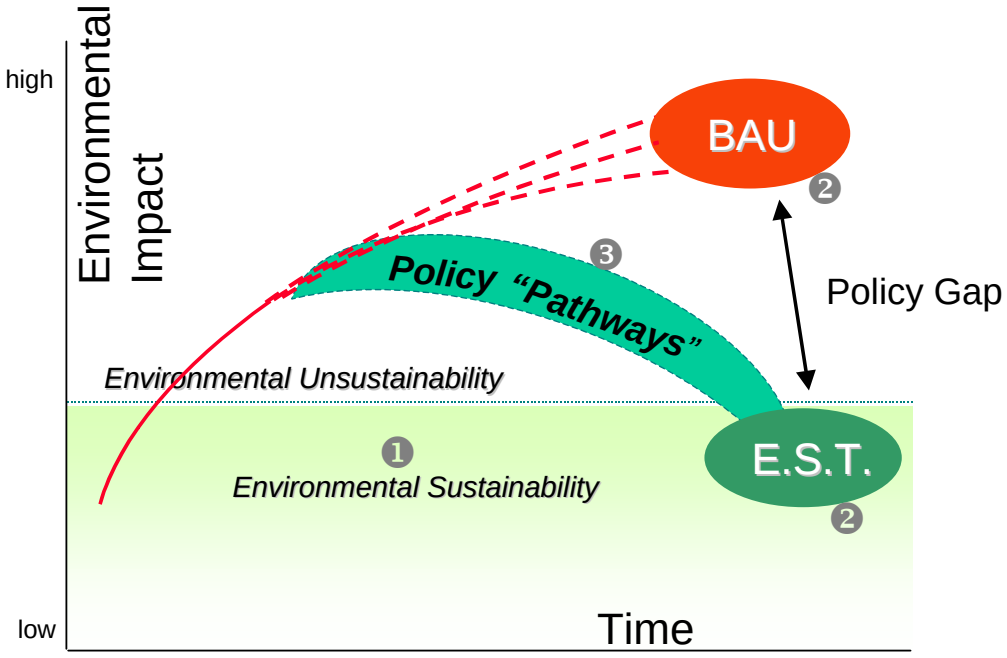
Concerned that current policy frameworks seemed unlikely to be able to move transport systems towards sustainability, OECD's Environment Directorate initiated a project on Environmentally Sustainable Transport (EST) in the mid-1990s. It aimed to give some precision to the concept of EST by defining it in terms of quantifiable, environmentally significant criteria. More important, it aimed to help determine how EST could best be attained. At the core of the EST project were nine national case studies, although a total of 25 OECD Member and other countries were involved in different aspects of the project. The project was completed early in 2002.[9]

The criteria used to characterise EST were derived from existing international goals, guidelines, and standards relevant to local, regional, and global concerns, notably land use, local noise and air quality, regional acidification and eutrophication, and tropospheric ozone and global climate change. The six EST criteria are set out in Table 2 on the next page, together with a brief indication of the derivation of each criterion in the notes below the table.[10]

The central concept in the EST project was that of *backcasting*. A desirable transport future (EST) was envisioned, as was a future in which 'business as usual' (BAU) prevailed. Working back (backcasting) from the desirable future to the present, alternative policy pathways were identified consistent with attainment of EST rather than BAU. The process is illustrated in Figure 3, which shows the three critical backcasting steps: (1) defining the environmental dimension of EST; (2) developing a vision for EST in 2030 and comparing it with likely trends; and (3) elaborating possible policy pathways, policies and strategies for achieving EST.

The backcasting approach is driven by the need for attainment of specific goals (the EST criteria) within a designated time period, i.e., by 2030. Present policy, by contrast, is driven more by what are considered to be feasible improvements over current arrangements. The goal-driven

Figure 3. The EST concept and approach



nature of the backcasting approach helped ensure that policies and the measures used to implement them were appropriate to attainment of EST.

Figure 4 on the next page portrays significant outcomes of transport activity in the 1990s and as projected for 2020 with 'business as usual' on the one hand, and adoption of the EST concept and approach on the other hand.[11] In this chart, attainment of EST —and corresponding objec-

Table 2. Illustrative long-term environmental and health-quality objectives, criteria, and derived operational targets for EST

CO_2 Climate change is prevented by reducing carbon dioxide emissions so that atmospheric concentrations of CO_2 from transport are stabilised at or below their 1990 levels. Accordingly, total emissions of CO_2 from transport should not exceed 20-50% of such emissions in 1990, depending on specific national conditions.[a]	***NO_x*** Damage from ambient NO_2 and ozone levels and nitrogen deposition is greatly reduced by meeting WHO Air Quality Guidelines for human health and eco-toxicity. This implies that total emissions of NO_x from transport should not exceed 10% of such emissions in 1990.[b]
VOCs Damage from carcinogenic VOCs and ozone is greatly reduced by meeting WHO Air Quality Guidelines for human health and ecosystem protection. Total emissions of transport-related VOCs should not exceed 10% of such emissions in 1990 (less for extremely toxic VOCs).[b]	***Particulates*** Harmful ambient air levels are avoided by reducing emissions of fine particulates (especially those less than 10 microns in diameter). Depending on local and regional conditions, this may entail a reduction of 55% to 99% of fine particulate (PM_{10}) emissions from transport, compared with 1990 levels.[c]
Noise Noise from transport no longer results in outdoor noise levels that present a health concern or serious nuisance. Depending on local and regional conditions, this may entail a reduction of transport noise to no more than a maximum of 55 dB(A) during the day and 45 dB(A) at night and outdoors.[d]	***Land use/Land take*** Land-use and infrastructure for the movement, maintenance, and storage of transport vehicles is developed in such a way that local and regional objectives for air, water, biodiversity, and ecosystem protection are met. Compared to 1990 levels, transport activity will likely entail the restoration and expansion of green spaces in built-up areas.[e]

[a] The Second Assessment Report of the Intergovernmental Panel on Climate Change (1996) maintains that, in order to stabilise atmospheric CO_2 concentrations at near current levels, world-wide CO_2 emissions would need to be reduced by 50% to 70% with further reductions thereafter (IPCC, *Second Assessment Report*, page xi, Intergovernmental Panel on Climate Change, 1996). However, in order to allow for increases in emissions in developing countries, OECD countries should reduce their emissions by 80% or more so that a global reduction of 50% may be attained (OECD, *Environmental Criteria for Sustainable Transport*, OECD Environment Directorate, Paris, France, 1996). A reduction target of 50% might be more appropriate for certain countries that benefit from a favourable (e.g., a more environmentally friendly) modal split, as was suggested by the EST pilot study for the countries of the Central and Eastern European region.

[b] These criteria are set in line with the WHO guidelines for human health regarding NO_x, VOCs, and ozone (WHO, 1996) and the UNECE protocols under the Convention on Long-Range Transboundary Air Pollution for ecosystem protection regarding critical loads for nitrogen deposition and critical levels of ozone (UNECE, LRTAP Convention, 1999)

[c] WHO advises that there is no ambient level of fine particulate matter (smaller than PM_{10}) and ultrafine particles (smaller than $PM_{2.5}$) below which health effects (including cancer) do not occur. Countries should set targets based on dose-effect considerations. The targets set here are preliminary due to the ongoing research on the health effects from ultrafine particulate matter (WHO, Air Quality Guidelines, World Health Organization Regional Office for Europe, Copenhagen, Denmark, 1998).

[d] This criterion is based on the former WHO recommendation on noise that has been recently updated in the WHO Guidelines for Community Noise (WHO, Guidelines for Community Noise, World Health Organization, Geneva, 1999).

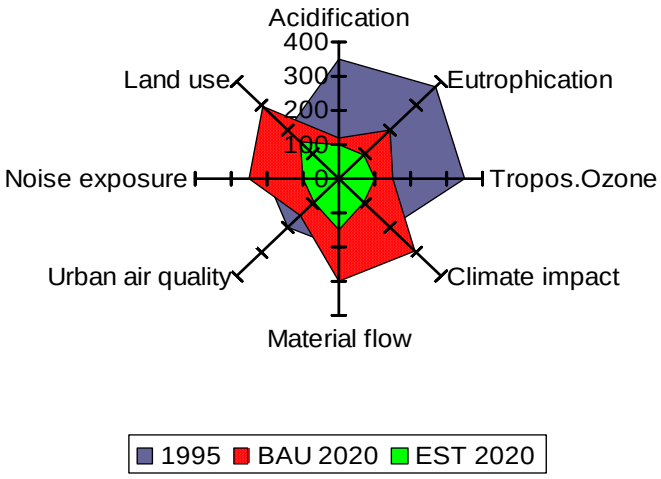
[e] The quantification of the land-use criterion will require further research.

Additional note: In practice, quantitative criteria need to be confirmed by appropriately designed benefit-and-cost analyses and should seek to equalise marginal costs of reducing environmental pressures across sectors.

tives for other relevant activity—is set at 100, with larger numbers representing exceedances.

Figure 4 suggests that 'business as usual' will result in improvements in some areas (urban air quality, acidification, eutrophication, and levels of tropospheric ozone) but not others (land use, noise, material flow, and climate impact). But even where there will be improvements, they will usually not be sufficient to result in attainment of the respective EST criteria.

Figure 4. Recent impacts, and impacts with 'business as usual' and with EST



The quantified EST criteria provided the formal characterisation of EST, but the project also generated *visions* of what EST would be like. These included the following:

- A significant change in the type of passenger transport provided. Many passenger cars would have more fuel-efficient conventional engines, hybrid-electric engines, electric engines (e.g., powered by fuel cells). There would be much greater use of non-motorised means for short distance trips together with supporting infrastructure.
- Public transport, including new forms of integrated public and individual transport such as 'public cars', would increasingly provide integrated mobility services.
- Significantly more efficient longer-distance freight movements due to increasing load factors, better logistics, and more use of rail-based modes. Hydrogen would be used as a fuel both directly and in fuel cells.
- Almost all rail transport would be electric, with increased use of high speed modes, especially for freight.
- More efficient and less polluting inland and coastal shipping vessels would be used; hydrogen may also be used as a fuel.
- Long-distance air travel for business purposes would be largely obsolete, with information technology used for communication instead. Multi-modal freight logistics would be used for air cargo. Aircraft in use would be much more fuel efficient, conventional types, and rigid airships may be used for specific purposes.

Additional policies and measures in other sectors of the economy would support and accompany the shift towards more environmentally sustainable transport, while not necessarily decreasing economic and social welfare. They could include the following:

- Electric power for transport would be generated with much greater efficiency than at present, using a high proportion of renewable fuels.
- Relatively small changes in the form of settlements would have been implemented to reduce the need for movement of people and freight.
- Greater use of telecommunications would help avoid both passenger travel and the movement of goods.
- Economically efficient regionalisation of production would help avoid long-distance freight movement, and there would be a greater focus on service provision.

Similar visions have been generated in other exercises.[12]

2.2. Scale of challenges involved in achieving EST

Further to the achievement of the long-term criteria illustrated in Table 2, Figure 5 shows the scale of the changes in transport activity required for attainment of EST, for both passenger and freight transport.[13] Compared with BAU, there would be increases in the use of more environmentally friendly modes (public transport, rail freight) and decreases in the use of less environmentally friendly modes (aviation, cars, lorries). Overall transport activity would increase, more for the movement of freight (+53 per cent) than for the movement of people (+4 per cent).

Compared with BAU, the changes to be made by 2030 for attainment of EST concerning the movement of *people* are these:

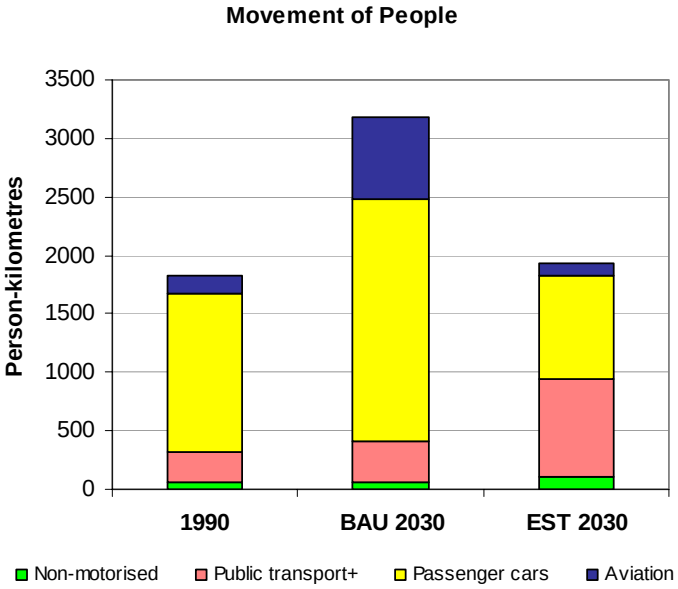
- *increase* in the use of public transport, including new access schemes to individual public vehicles, by 139 per cent (+3.5 per cent annually)
- *increase* in the use of non-motorized modes by 82 per cent (+2.4 per cent annually)
- *decrease* in the use of single-occupancy vehicles by 57 per cent (-3.3 per cent annually)
- *decrease* in short-haul aviation by 85 per cent (-7.3 per cent annually)

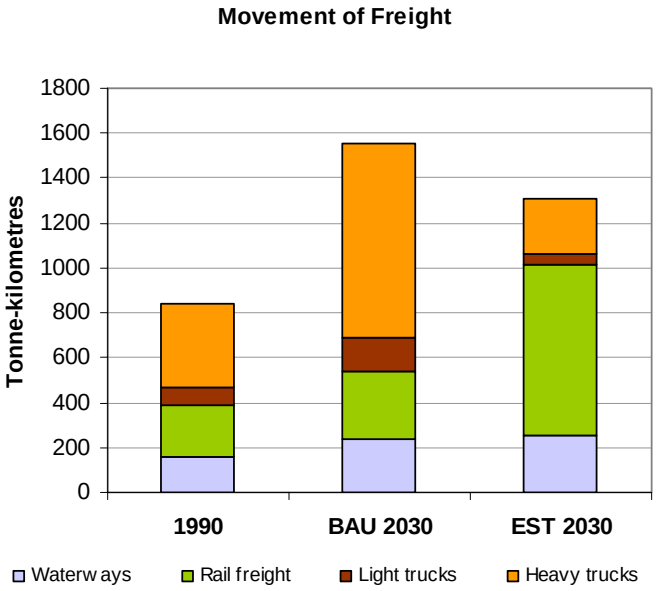
Compared with BAU, the changes to be made for attainment of EST concerning the movement of *freight* are these:

- *increase* in the use of rail freight by 151 per cent (+3.7 per cent annually)
- *increase* in the use of waterways by 8 per cent (+0.3 per cent annually)
- *decrease* in the use of road freight by 71 per cent (-3.7 per cent annually)

The indicated changes are large overall, although ready attainment of the indicated annual rates—based on a 25-year implementation period—seems feasible except perhaps for aviation.

Figure 5. Comparison of changes from 1990 to BAU and EST in 2030





2.3. Soft measures identified during the EST project

Overall, only eight per cent of the instruments developed by the EST project teams came under the category 'Education and hortatory'. They are listed in Table 3, organised by the intended effect of their use.

Although the number of such instruments was numerically few over all, they were accorded considerable importance by some of the teams. The difference among the teams is represented in Figure 6, which suggests that the project teams struck similar although not identical balances

Table 3. Soft measures identified during the EST project, by intended effect

Reduce the impacts of motorised transport activity on the global environment by specific measures
- Fuel-efficient driving training
- Provision of consumer information about CO_2-efficient cars
- Voluntary agreements to improve environmental performance
- Education: Training drivers in eco-efficient driving
- Strict control of speeds and driving times of heavy-duty vehicles
- Promote use of biofuels in the public sector
- Voluntary CO_2 emission level standards for passenger cars
- Consumer information on CO_2-efficient cars

Reduce the impacts of motorised transport activity on the regional and local environment by specific measures
- Promote penetration of alternative fuels
- Develop a Memorandum of Understanding with vehicle manufacturers for development of a new generation of vehicles
- Address cold-start issue with voluntary requirement for pre-heaters

Improve the environmental performance of motorised transport activity by mode shifts
- Mobility management for enterprises: pilot actions, then promotional programmes and incentives, then potential mandatory implementation
- Implementation of a nation-wide travel information system
- Establishment of mobility management centres: pilot actions, then potential implementation on a large scale
- Encourage employer sponsored trip-reduction programs
- Implementation of a nation-wide travel information system

Minimize overall motorised transport activity by increasing occupancy or otherwise improving logistics
- Freight consolidation

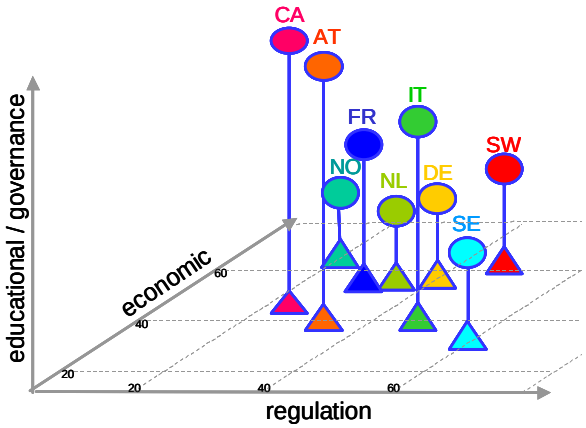
Minimize overall motorised transport activity by favouring non-motorised alternatives
- Implement walking school bus programs unilaterally

Make land use or economic arrangements more conducive to sustainable transportation
- Campaigning and marketing for preference changes in housing and land use
- Land use: promote housing and town development
- Land use: promote compact urban development

Other types of effect including changing attitudes, culture, ways of living, and acceptance of strong measures
- Raising public awareness of traffic-related environmental impacts
- Incorporation of environment impact and sustainable mobility into teaching materials, methods, and lessons from kindergarten to university: pilot actions, then potential implementation on a large scale
- Establishing a database impacts of transport on environment
- Public participation in transport planning: pilot action, then potential implementation on a large scale
- Require EST instruction in schools
- Implement nationwide awareness programme
- Recognize community "champions"
- Education/information (especially with respect to CO_2 tradeable permits)
- Implement nationwide awareness programme
- Education and information programmes
- Public awareness raising for traffic-related environmental impacts
- Car-free day initiatives
- Introduction of environment impacts and sustainable mobility into teaching materials, methods, and lessons

between economic and regulatory instruments, but differed more in their use of educational and governance instruments.[14]

Figure 6. Typology of principal policy instruments in the EST project



2.4. Barriers to attainment of EST

During the course of the EST project several barriers to attainment of EST were identified, in three categories. **Societal barriers** were said to concern human behaviour "more from perspective of societal organisation than from the view of an individual in a physical and social world". They comprised the following: political factors, institutional barriers, ongoing societal trends, urban form, methodological barriers, and professional barriers. Some of these barriers are discussed below in Section 3.3 (settlement density) and in Section 4.2.

Individual barriers were said to concern "how human nature and people's perceptions can impede changes towards sustainable practices in transport activity". They comprised the following: lack of awareness of the need for change, cognitive dissonance , lack of concern for future generations, fear of change, and thus resistance to change, attractiveness of present transport modes, absence of transport alternatives, resistance to collective alternatives, car ownership, and lack of adequate professional advice. Some of these barriers are discussed below in Section 3.1 (car ownership) and in Section 4.3.

Technological barriers were said to be associated with the significant component of the effort towards attainment of EST that will have to come from improvements in technology. Some of the contributing factors are as much human factors as those contributing to the other two types of barrier—e.g., investment in technology and resistance to the adoption of new practices—but are more logically considered with technological issues. Technological barriers that were identified comprised the following: Four types or sources of barrier were identified in the EST project: costs and lead times for development of appropriate technology, lack of common standards, inappropriate safety requirements , and barriers associated with telecommunications.

2.5. Conclusions from the EST project concerning implementation

The significant conclusions of the EST project can be summarised as follows:

- EST could be attainable, although only with a concerted *commitment* involving many sectors of society.
- A wide range of strategies could be used for moving towards EST. The most important challenges lie in the *acceptability* of the need for EST strategies and of their component measures for moving towards EST. Aside from considerations of acceptability, the effectiveness of the measures themselves is often not in question.
- Present transport practices have a formidable momentum that has deep psychological, social, and technological characteristics. Lack of relevant knowledge about human behaviour and societal organisation that could help policy-makers secure needed changes is a major barrier to attainment of EST. Three things are required. One is a better understanding of how to make the welfare of future generations relevant to present circumstances

(*intergenerational equity*). Another is a more appealing *vision* of sustainable transportation. The third, following from the first two, is greater *interest* among the public generally, and transport industries in particular, in moving towards sustainable transportation.

These highlighted words attest to the potential importance of soft measures, which may be required to secure *commitment* and *acceptability*, promote a *vision* of EST and *interest* in attaining it, and, perhaps above all, secure greater *intergenerational equity*.

Several conclusions were drawn from the EST project as to the kinds of strategies that will be required. One key point was that *packages* of measures will be required, mostly involving well-balanced mixes of fiscal, regulatory, and other measures, including soft measures. Another key point was that implementation would be phased, partly to avoid the need for dramatic change (see Section 2.2) and partly so that earlier stages can prepare the way for later stages.

Soft measures were thought to be of special value during the early stages of implementation. They would be used to secure understanding and acceptance of and even commitment to the need for EST. As well, they would help prepare for the use of effective hard measures such as market-based rationing and restrictions on the use of road vehicles.

The conclusions were captured in a set of ten guidelines developed to help policymakers working towards attainment of EST and adopted by OECD Environment Ministers in 2001. They are listed in Table 4.

Table 4. The EST Guidelines

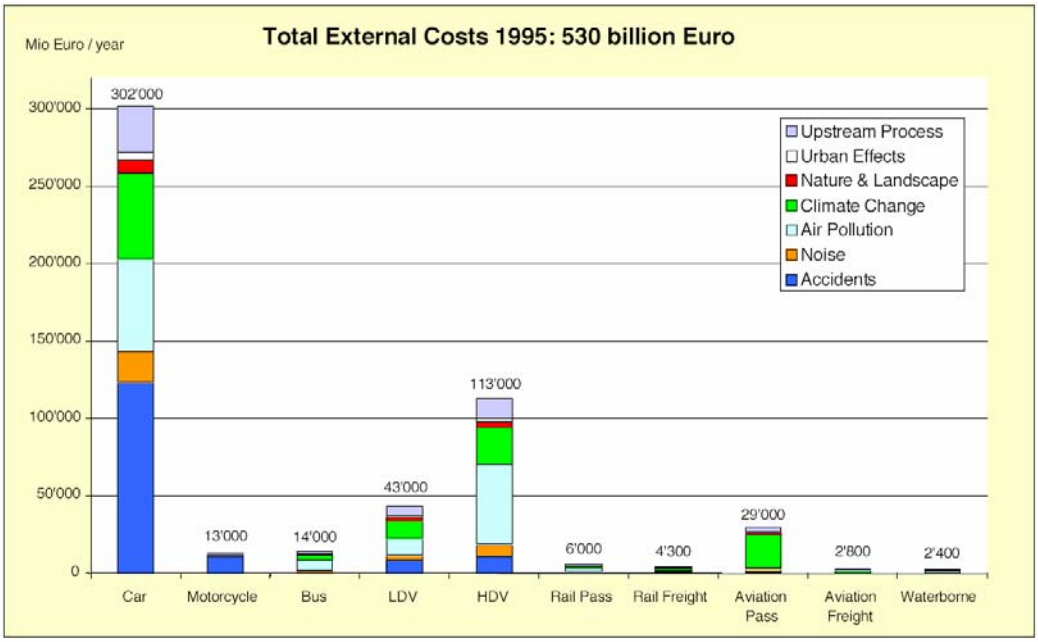
1. Develop a long-term vision of a desirable transport future that is sustainable for environment and health and provides the benefits of mobility and access.
2. Assess long-term transport trends, considering all aspects of transport, their health and environmental impacts, and the economic and social implications of continuing with 'business as usual'.
3. Define health and environmental quality objectives based on health and environmental criteria, standards, and sustainability requirements.
4. Set quantified, sector-specific targets derived from the environmental and health quality objectives, and set target dates and milestones.
5. Identify strategies to achieve EST and combinations of measures to ensure technological enhancement and changes in transport activity.
6. Assess the social and economic implications of the vision, and ensure that they are consistent with social and economic sustainability.
7. Construct packages of measures and instruments for reaching the milestones and targets of EST. Highlight 'win-win' strategies incorporating, in particular, technology policy, infrastructure investment, pricing, transport demand and traffic management, improvement of public transport, and encouragement of walking and cycling; capture synergies (e.g., those contributing to improved road safety) and avoid counteracting effects among instruments.
8. Develop an implementation plan that involves the well-phased application of packages of instruments capable of achieving EST taking into account local, regional, and national circumstances. Set a clear timetable and assign responsibilities for implementation. Assess whether proposed policies, plans, and programmes contribute to or counteract EST in transport and associated sectors using tools such as Strategic Environmental Assessment (SEA).
9. Set provisions for monitoring implementation and for public reporting on the EST strategy; use consistent, well-defined sustainable transport indicators to communicate the results; ensure follow-up action to adapt the strategy according to inputs received and new scientific evidence.
10. Build broad support and co-operation for implementing EST; involve concerned parties, ensure their active support and commitment, and enable broad public participation; raise public awareness and provide education programmes. Ensure that all actions are consistent with global responsibility for sustainable development.

CHAPTER 3. KEY FACTORS IN THE MOVEMENT OF PEOPLE

Present transport trends in the OECD Member countries that participated in the EST project are clearly unsustainable. Their trends in activity are indicated in the '1990' and '2030 BAU' columns in Figure 5. Anticipated trends in *impacts* are illustrated in Figure 4. Present transport trends in other OECD countries are also unsustainable.[15]

This chapter discusses what may be the three key factors that contribute to the motorised movement of people and thus to the unsustainability of present transport trends: car ownership, economic factors, and settlement density. The next chapter concerns factors such as attitudes that may be seen as being more obviously relevant to human behaviour in transport situations and thus to the use of soft measures. However, the present chapter is equally about aspects of human behaviour. It is about the purchase and continued ownership of cars, about their use and non-use, and about settlement practices.

Figure 7. External costs of transport by mode, 17 Western European countries



The focus here is on car use because **the central issues in the sustainable movement of people concern the use of cars**. Notwithstanding improvements in energy efficiency and emissions control relative to other modes, car use is responsible for the largest part of transport's adverse impacts. This is exemplified in Figure 7, which shows that car use (including vans, SUVs, etc.) was responsible for by far the largest share of external costs in western Europe in 1995 (57 per cent of the total; 48 per cent if accidents are excluded).[16] The EST project teams saw attainment of EST as requiring not only reductions in car use below expected values but also substantial reductions—approaching 50 per cent—below 1990 use levels (see Figure 5).

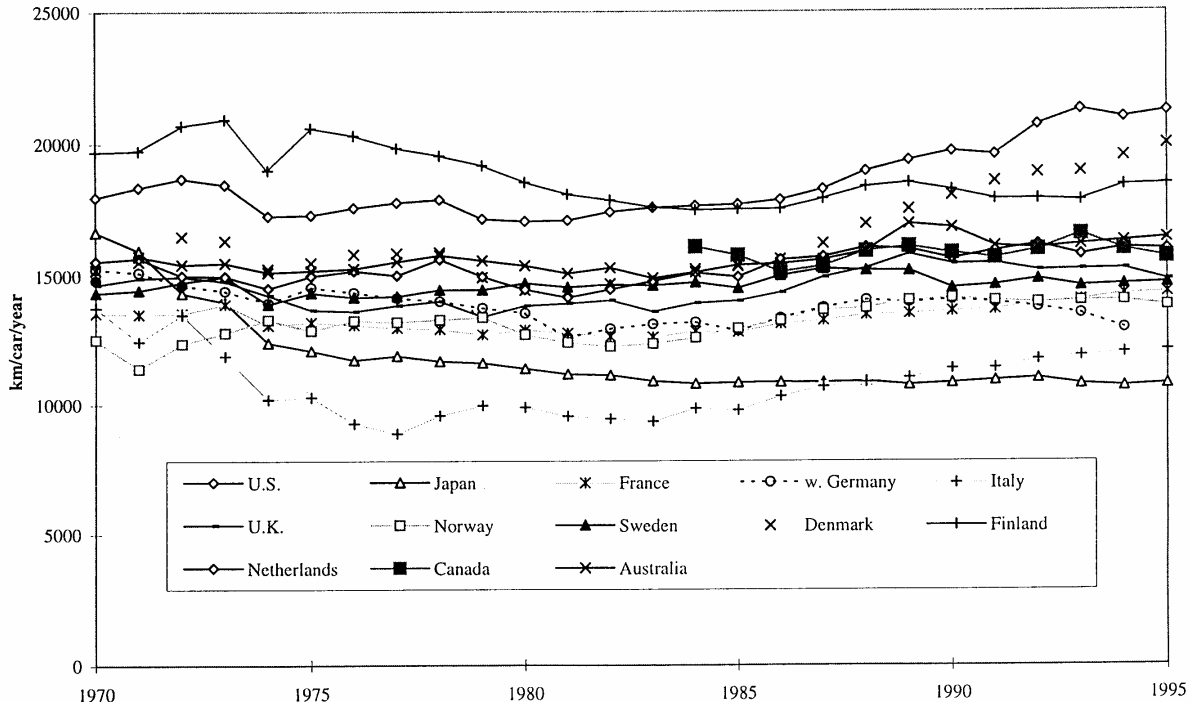
This paper focuses on the movement of people rather than the movement of freight. This is done partly for space reasons, partly because there are fewer good data and poorer understanding generally about freight transport, and partly because there is less certainty about the roles soft measures might play in the movement of freight than in the movement of people.[17]

Question 2. What maintains unsustainable transport behaviour?

3.1. The importance of car ownership

A key factor in the use of cars is ownership of them. In one sense this is a trivial observation; a car must be available before it is used. But the relative constancy of the relationship between ownership and use across time suggests something more profound: that *cars are used because they are owned*. The constancy is illustrated in Figure 8, where it can be seen that within a country the distance travelled per car changes very little from year to year even across decades.[18] If, say, 10 per cent more cars are owned, close to 10 per cent more kilometres will be driven, and vice versa. This leads to the conclusion that **car ownership is a major determinant—perhaps the strongest determinant—of car use**.[19]

Figure 8. Annual distance travelled per car, 13 countries, 1970-1995



Even though the relationship between ownership and use seems strong, research and policy initiatives tend to focus on how car use can be reduced, without giving much consideration to reducing ownership. Indeed, ownership without use often appears to be a desired outcome of policy prescriptions.[20]

Car use rather than car ownership is evidently the major immediate cause of transport's unsustainability. However, the position taken here is that understanding of car use above all requires understanding of car ownership. Moreover, the most effective restraints on car use may be those that seek to reduce car ownership.[21] Thus, **in what follows there is a stronger-than-usual focus on assessment of the factors involved in car ownership**, as well as consideration of car use. Reviews of what contributes to car ownership usually focus on economic factors, and these are considered next.[22]

> Question 3. Can the strategies involving soft measures designed to reduce car use also be applied to reducing car ownership?

3.2. Economic factors

Car ownership in a country rises with growth in its per-capita wealth, as is illustrated in Figure 9.[23] However, straightforward comparisons among countries on the basis of wealth may not be useful because of large differences in the costs of car ownership and use. These costs are allowed for in Figure 10, which relates car ownership to travel costs by car in 52 affluent urban regions, including ownership and operating costs.[24] Cost per car trip rather than cost per kilometre serves as an indicator to allow for the different geographic sizes of the regions. A negative correlation between ownership and cost can be noted, but the correlation is evidently not strong.[25]

Surprisingly little publicly available work has been done on how car purchasing changes with purchase price. One study estimated the short-term price elasticity of demand for new vehicles in the U.S. to be -1.07, meaning that for every 10-per-cent increase in overall price, overall purchases of new vehicles would decline by 10.7 per cent. The long-term elasticity was estimated to be -0.36, suggesting relative insensitivity of demand to purchase price except soon after a price increase.[26] More recent studies have confirmed that the short-term price elasticity is near 1.00, but there appears to be no new evidence one way or the other as to the longer-term effect of price increases.

Research has focused more on what impels purchase of one car model rather than another. A recent survey of over 30,000 owners of new vehicles in the U.S. produced a hierarchy of reasons for *not* purchasing particular models, shown in Table 5 on the next page.[27]

Figure 9. Car ownership and per-capita income, eight countries, 1970-1995

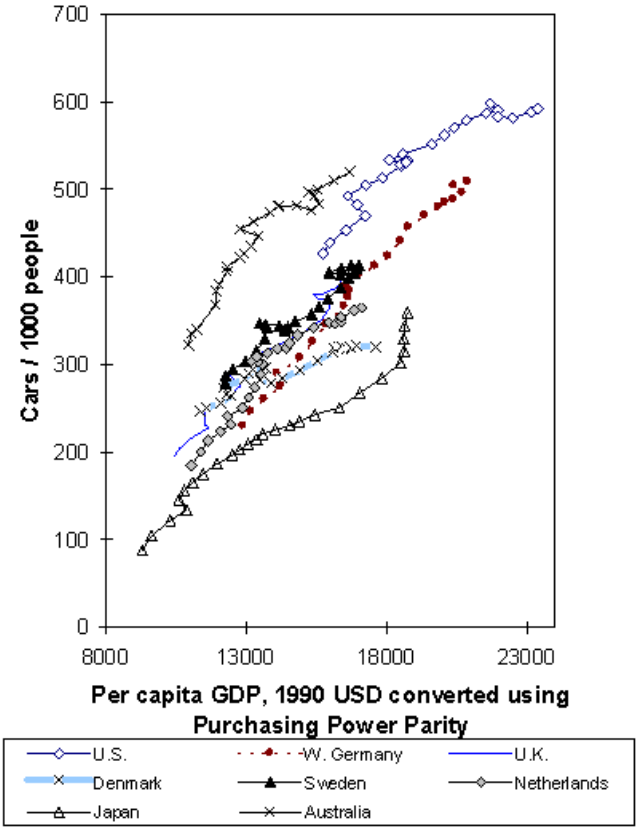


Figure 10. Car ownership rates and user costs of car trips, 52 affluent urban regions, 1995

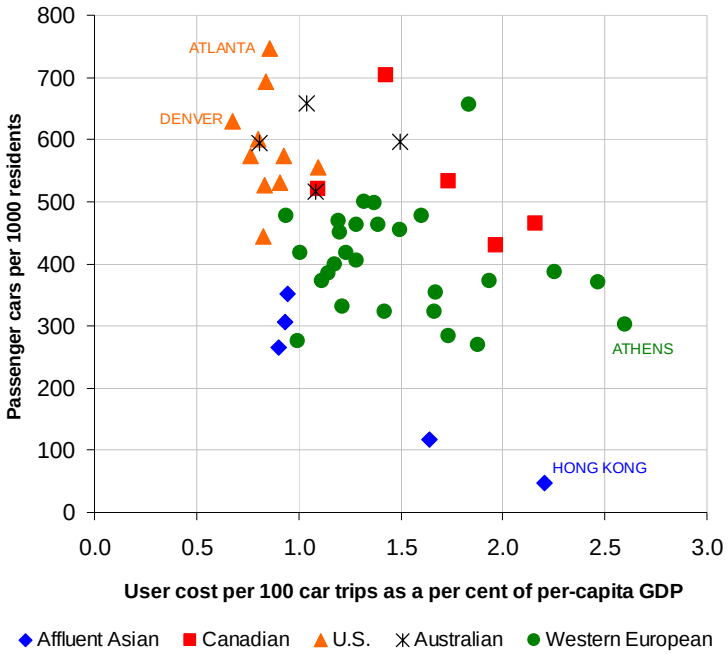


Table 5. Reasons for not buying a particular model of car

1.	Total price too high	6.	Was not available with rebates/incentives
2.	Total monthly payment too high	7.	Didn't like look/design of interior
3.	Didn't like style/design of exterior	8.	Concerned about reliability
4.	Limited availability on dealer lots	9.	Was not available with low-interest financing
5.	Salespeople didn't act professionally	10.	Vehicle was too small

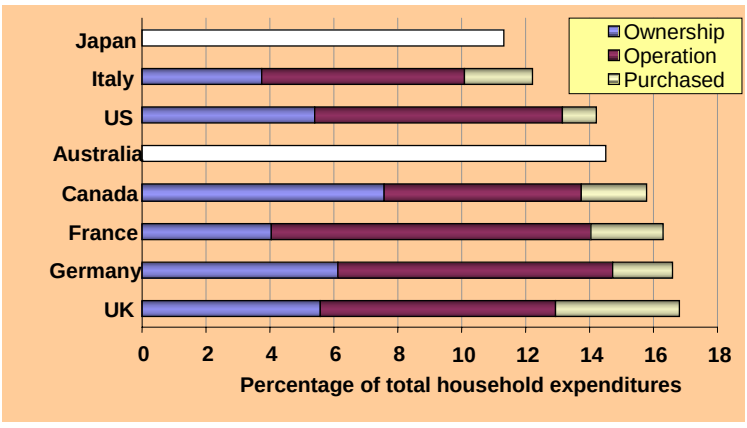
To the extent that the statements in Table 5 reflect effective aspects of respondents' purchasing behaviour, it can be concluded that economic factors—Nos. 1, 2, 6, and 9 in the table—are important determinants of which car model is purchased.

Thus, economic factors may strongly affect which car model is purchased, and indeed in the short term whether a car is purchased at all; but in the longer term economic factors may be relatively less important.

What may be the most discussed in terms of impacts on car *use* is the price of fuel. A recent review of work on the elasticities of car travel in relation to changes in fuel price concluded that the short-term elasticity is about -0.15 and the longer-term elasticity is about -0.30.[28] Elasticities of demand for fuel appear to be negatively larger in each case, meaning that when prices change fuel use changes more than car use. This suggests that one effect of raising fuel prices is more efficient use of fuel. The higher longer-term elasticities may reflect the purchase of more fuel-efficient vehicles in response to fuel-price increases, or even foregone ownership.

The findings that car travel is relatively insensitive to fuel price, even in the longer term, are consistent with the importance of ownership as a factor in car use.

Figure 11. Household spending on transport, eight countries, mid-1990s.

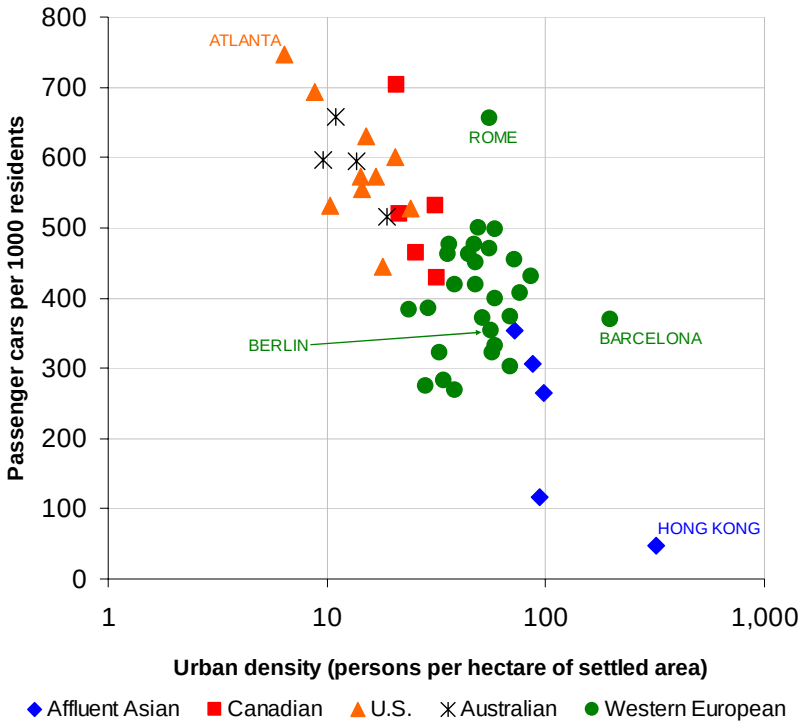


To add to the picture of economic factors in car ownership and use, Figure 11 shows data on household spending. Proportions of total after-tax spending going to the ownership and operation of private vehicles are shown together with spending on purchased travel (e.g., travel by public transport, taxi, intercity rail and bus, and air).[29] Of the countries for which breakdowns are shown—by car ownership, car operation (i.e., use), and purchased transport—only in Canada was spending higher on car ownership than on car use. The generally higher spending on car use suggests there may be scope for reducing car use by increasing the costs of ownership.

3.3. Settlement density

Figure 12 suggests that, at least among urban regions, settlement density could be an important factor in determining car ownership in that there is a strong negative correlation between the two variables.[30] However, other factors are at play, as suggested by a comparison of Rome and Berlin. These two urban regions both have settlement densities of 56 persons per hectare, but quite different rates of car ownership (655 vs. 354 cars per 1000 persons). GDP per capita was similar (Rome, US$26,125; Berlin, US$23,462), as was the cost of 100 car trips as a per cent of per-capita GDP (Rome 1.8 per cent; Berlin 1.7 per cent); thus, these two economic factors would seem not to account for the differences in car ownership.[31]

Figure 12. Car ownership in relation to settlement density, 52 affluent urban regions, 1995



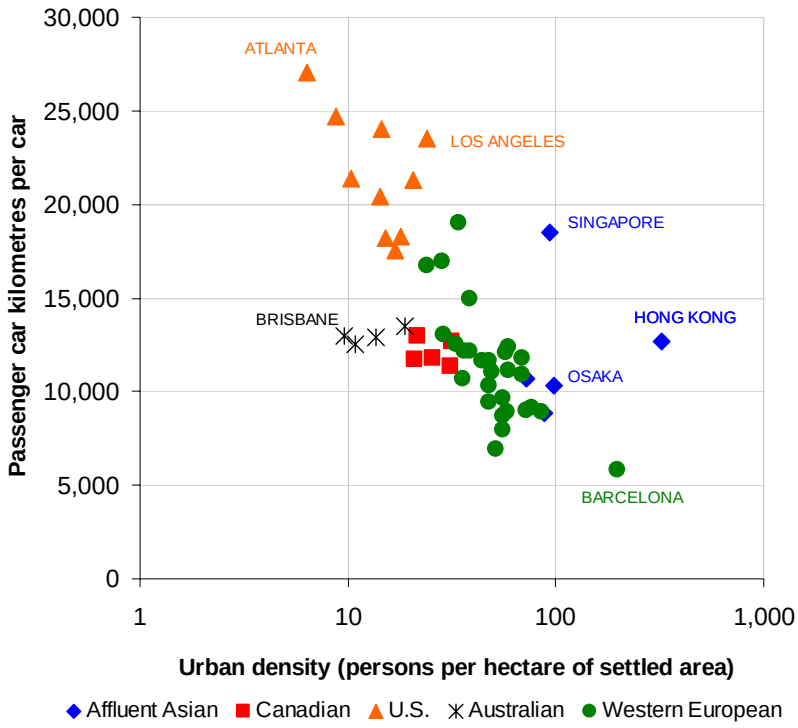
Distance travelled per car also has a strong negative correlation with settlement density, as is illustrated in Figure 13 on the next page.[32] Nevertheless, there are urban regions with similar settlement densities that differ considerably in average distance driven per car. For example, the Los Angeles region has a similar density to that of the five Canadian urban regions, but each Los Angeles car is driven almost twice as far on average. One explanation could be that the Los Angeles region is three or more times larger than any of the Canadian urban regions; thus, people on average have farther to travel. However, this kind of explanation would not apply to the difference between Singapore and Osaka, where cars in the smaller urban region are driven much more. Also, there are instances where similar amounts are driven even though densities differ greatly, as in the case of Hong Kong in comparison with Brisbane and the other Australian urban regions.

Even with these anomalies, which deserve explanation, it appears that **settlement density is a potentially important determinant not only of car ownership but also of the extent to which an owned car is driven**.

Indeed, settlement density may be an important moderating influence on the relationship between car ownership and use, and may account for some of the national differences evident in Figure 8. Higher densities may suppress ownership and may suppress use at a given level of ownership.

The thrust of the foregoing is that perhaps the two key factors in the determination of transport activity are the interrelated matters of car ownership and settlement density. Thus, changes in transport behaviour may well require changes in one or the other or both of these factors, although it is clear that other factors could well play a role. The primary challenge for the present exercise may thus be that of figuring out how soft measures can help reduce car ownership or increase settlement density, or both.

Figure 13. Distance travelled per car in relation to settlement density, 52 affluent urban regions, 1995



Question 4. If increasing settlement density is an appropriate way to address some transport issues, how might soft measures be used to help achieve denser patterns of land use?

3.4. Transport facilities

In order for particular transport activity to occur, there must be opportunity to perform the activity. Even walking has some environmental requirements: a reasonably safe and level path and absence of barriers. Other modes more clearly require appropriate facilities, such as bicycle paths and bus services. In the discussion of car ownership, the case was made that availability of a car strongly contributes to car use. The present section concerns whether such strong determination exists in respect of other means of transport. Does, for example, availability of public transport services increase use of public transport?

The issue as to whether provision of facilities induces particular transport activity has perhaps been most discussed in relation to the phenomenon of induced traffic. Available evidence suggests both that roadway expansion can increase the overall amount of traffic and that reductions in road capacity can reduce it.[33] However, merely adding or subtracting road capacity—for example, in a remote location—will not induce or reduce traffic; an unused road to nowhere will remain an unused road to nowhere; removing it would accordingly have little impact. For traffic to be increased by additions of road capacity, other factors may have to be driving an increase in traffic that lack of road capacity was preventing. Similarly, a capacity reduction may result in reduced traffic only when the reduction constitutes a constraint on traffic. The phenomenon of

induced traffic seems well established, but further analysis of the relevant mechanisms is required.

Equally, adding public transport capacity may not in itself increase use of public transport unless there are other factors impelling an increase that lack of capacity was constraining.[34] Equally too, analysis of the mechanisms whereby public transport capacity can increase use of public transport needs further attention. Similar considerations may apply to walking and cycling.

Thus, a question for the present endeavour could concern the potential roles of soft measures in ensuring that 'other factors' are in place that cause increases in use when opportunity for increased use is or becomes available.

> Question 5. When appropriate facilities are available, what are the best ways to use soft measures to influence mode choice in favour of public transport, walking, and cycling?

CHAPTER 4. OTHER FACTORS IN TRANSPORT BEHAVIOUR

This chapter concerns societal and individual factors in car use and ownership, the relationships between attitudes and behaviour, and what is meant by acceptability. In spite of the topics, this chapter is no more about human behaviour than the previous chapter. Because discussion of the kind of topic addressed in this chapter is often influenced by views held about human behaviour, this matter is discussed first.

4.1. Views about human behaviour

What is it that sustains unsustainable transport behaviour? First it may be useful to consider what sustains any human behaviour.

There are almost as many views about how human behaviour is maintained and how it changes as there are people who hold the views. The views can be organised into five approaches, set out in the appendix to this paper. Each approach likely contains some of the truth. Researchers and others concerned about human behaviour tend to prefer one or sometimes two or even three of the approaches over the others.

The preference in this paper is for the fifth approach: human behaviour is mostly maintained by its consequences, which are mostly found in the milieu (environment) in which the behaviour occurs. This approach is economical, objective, and productive of insights into what maintains behaviour and what makes it change, but there is evident merit in the other approaches. The author's preference is stated at this point to caution readers about the possibility of bias rather than to persuade them of the merits of the fifth approach.

More to the point, **the approach preferred here implies that the best way to change transport behaviour may be to change the milieu or context within which it occurs.** Careful examination of the relationships between the behaviour and its milieu could reveal the critical features of the milieu that sustain the behaviour, and changing these features could change the behaviour. Commuting is above all sustained by the consequence of timely arrival at work or home (or avoidance of the consequences of untimely arrival), but *mode* of commuting could be sustained by a host of consequences that feature cost, privacy, stress, and many others, all interacting with parts of the long chain of behaviour that comprises a journey.

One role of soft measures could be to give additional value to outcomes of desired behaviour. Taking public transport reduces pollution and congestion, but these consequences do not occur in ways that can maintain the behaviour. If colleagues praised using public transport and disapproved of car use, then taking the bus could perhaps be maintained. Viewed in this way, a key challenge becomes that of changing the nature of some of the social chit-chat at the workplace rather than that of persuading people to take public transport.

Another role of soft measures could be to give information about (to signal) the availability of outcomes. Providing information about an improved bus service would come into this category, as would information about the relative costs and comfort of public transport and the time investment required.

The point being made here is that what maintains unsustainable transport behaviour is its consequences, supported by information about these consequences, and perhaps by information about the consequences of alternative behaviour. The most economical approach to changing behaviour involves changing its consequences. Ensuring change may well require the use of hard measures, but soft measures could also have a role.

The focus here is on what it takes to produce the desired behaviour. Changing what people say about the desired behaviour may be a useful step towards getting them to perform the desired behaviour. However, what people say is *not* the desired behaviour and should not be confused with it. The desired behaviour involves transport activity, not talking about transport activity.

> Question 6. How can soft measures be used to give additional value to sustainable transport behaviour?

4.2. Societal factors

'Societal factors' refer here to aspects of society and culture that sustain car ownership and use, ranging from the pervasive influences of 'car culture' to the political practices that support widespread automobilisation.

During Phase 3 of the EST project, such factors were discussed in terms of potential or actual barriers to attainment of EST. The project teams identified several 'societal barriers'. One of these—urban form—has already been covered in the discussion of settlement density in Section 3.3. (Urban form was included as a societal barrier because it fitted more comfortably there than in one of the other two categories of barrier: 'individual barriers' and 'technological barriers'.) Other noted categories of societal barrier included:

- **Political barriers**. These were taken to include the lobbying weight of vested interests and the world outlook of decision-makers, who may be inclined to have strong personal commitments to individual transport. Also significant may be the composition of electorates in democracies, which mostly comprise people who are dependent on their cars to cope with life as they know it.[35]
- **Institutional barriers**. These included the quest for common standards, which may stifle innovation, and perverse subsidies and pricing.
- **Methodological barriers**. Here the focus was on the lack of appropriate performance indicators relevant to sustainable transport, the use of perverse indicators of well-being, and the absence of full-cost accounting procedures.[36]

Extreme characterisations of societal factors can be found in the academic literature. For example, a recent review concluded that the use of cars is deeply embedded in the maintenance of global power structures, as expressed in capital accumulation, economic globalisation, and war-making capacities. National governments, it was said, have served themselves by promoting the 'car economy' in four ways. They have built roads, downgraded public transport and non-motorised transport, subsidised car use, and in some cases colluded with the automotive industry to remove competitor modes of transport to the car.[37]

Discussion of such factors is challenging because of the lack of clear indication as to their effects. Nevertheless, the implied accounts of causation of unsustainable transport activity may have some plausibility and may be useful in developing strategies involving the use of soft measures, such as 'denormalisation' through counter-advertising described in Chapter 5.

What may be of special value is the examination of social and physical circumstances where car ownership and use are not the norm. Such places are found in the central parts of affluent regions, even in North America, where New York City is the most obvious example.[38] The lowest rate of ownership across a large affluent urban region is found in Hong Kong, where there only

55 personal vehicles per 1000 residents.[39] It may be contrasted with the large urban region with the highest rate—Atlanta, Georgia—where there are more than 750 personal vehicles for every 1000 residents. Residential density appears to be the main contributing factor (see Section 3.3, and especially Figure 12). There are no restrictions on car ownership in Hong Kong, although the relative costs of car ownership and use are relatively high (see Figure 10).

North Americans in particular can notice the different transport culture when they arrive in Hong Kong. There are no car rental facilities at the airport, only a wide range of opportunities to use public transport, notably a fast train to the central area that is immediately across from the baggage area.

How are young people in Hong Kong acculturated to forego what seems to be a near-universal demand for car ownership? This kind of question has received too little investigation. One recent study asked undergraduate students in Hong Kong about their car-owning status and intentions. Only one per cent of respondents owned a car; only 15 per cent of their families owned a car; 92 per cent of respondents lived with their families. Only 35 per cent of respondents showed some interest in early purchase of a car (within five years), including 46 per cent of men and 27 per cent of women. The author concluded that if public transport is of a high quality and inexpensive it can suppress car ownership. However, there appears to "quite a substantial latent demand for a car, particular among male students … [therefore] penalties to car ownership may need to be introduced to deter them further."[40]

> Question 7. How can young adults be induced to *not* consider car ownership as an important goal?

4.3. Individual factors

'Individual factors' here refer to factors that contribute to the maintenance of and to changes in the transport behaviour of individuals. The distinction from societal factors is not always clear, especially because in their actual operation societal factors are individual factors and many individual factors have a strong societal influence.

Individual barriers identified in the EST project

In the EST project, several 'individual barriers' to attainment of EST were identified, including widespread car ownership, already discussed in Section 3.1. Other identified individual barriers included:

- **Lack of awareness of the need for change**. The report on the EST project asserted that "for individual behaviour to change … there has to be individual awareness of the need for change."[41] This seems to be common sense, although at least one study has raised doubts about the importance of problem awareness in changing environmentally related behaviour.[42] Problem awareness does seem to be related to the amount people drive and their use of public transport. Car owners who achieve high scores on tests of awareness of problems of car use tended to use their cars less than other car owners and to use public transport more often.[43] But the direction of causality, if any, is not clear. The obvious potential link is that awareness affects transport behaviour. But, it is possible that level of awareness is determined by transport behaviour, i.e., people become aware of transport problems by using public transport more. It is also possible that the association between the two variables is accidental: i.e., neither one causes the other.
- **Cognitive dissonance**. This is a complicating factor in analysis of the importance of problem

awareness. When people learn about the adverse consequences of using their cars, they are as likely to minimise the adverse consequences of this use as they are to use their cars less.[44] This may happen because people grow up in an environment in which consistency between what they do and what they say is prized, and because 'denial' of the adverse consequences may be an easier way of achieving consistency than reducing car use.

- **Lack of concern for future generations**. Contemporary 'Western' culture may favour immediate over longer term concerns, thereby disposing individual behaviour to be maintained more by immediate outcomes than, for example, by progress towards avoiding climate change. In North America, a contrast is sometimes made with the 'seven generations' approach of aboriginal peoples.[45]

- **Attractiveness of present transport modes**. Here is what was written on this topic in one of the reports on the EST project:

  > "The car-based life can be extraordinarily rewarding. Those who live it travel with comfort, convenience, and privacy unknown in times past even to royalty. Provision of society-wide personal transportation has been a remarkable accomplishment that is for the most part highly appreciated. The evident problems of mass motorisation—notably road congestion, land take, and habitat destruction—can appear trivial in comparison with the apparent benefits. Modern aviation is similarly appreciated; it enables large numbers of people to traverse great distances with ease and comfort that could hardly be imagined even a century ago. Relinquishing what are now regarded as the commonplace benefits of aviation and personal vehicle ownership, however extraordinary they may have once seemed, could be considered to be as unthinkable as dispensing with the written word or other such products of human ingenuity. The only painless way of breaching this barrier may be to provide even better—and sustainable—alternatives. A special challenge in this respect lies in the many functions of the private car, which may be owned as much for its ability to carry shopping, luggage, infants' requirements, sports equipment, and other items as to move people from place to place. Well-managed local freight and delivery services could ensure that these things are transported. But, however excellent such services may be, and however well integrated with good public transport, the combination is unlikely to surpass the private car in overall convenience and general utility."[46]

- **Distaste for collective alternatives**. As with other 'individual barriers', this can reflect a societal disposition, specifically that of favouring individual rather than collective solutions to challenges. It is perhaps exemplified in former UK Prime Minister Margaret Thatcher's often-quoted statement, "There is no society, only individuals and families".[47] In some places there is outright prejudice against collective transport alternatives, as in the North American characterisation of buses as 'loser-cruisers'.[48]

'Psychological' and other factors

The present chapter began by noting that the factors discussed in the previous chapter—car ownership, economics, settlement density—are as to do with human behaviour as those discussed here; i.e., transport behaviour is human behaviour and, in that psychology is the science of such behaviour, all the factors are psychological. Nevertheless, a distinction is sometimes made between 'psychological' and other factors in car ownership and use. One commentator said, for example, "… many people, about 30 per cent, travel not to arrive somewhere, but to escape from where they are. … Almost a third, then, travel for purely psychological reasons".[49] The basic observation here, that travel may have reinforcing attributes separate from those of the objects of travel, may be apt, but characterising one set of factors that maintain transport behaviour as 'psychological' and the others as not may impede useful analysis of the behaviour.

Other ways of grouping determinants of transport behaviour

A different kind of distinction concerns *motives* for car use, which have been described as *instrumentally-reasoned*, on the one hand, or *symbolically-affective*, on the other hand.[50] The former are associated with behaving 'rationally', e.g., using the car because of its "flexibility, independence, availability, speed, reliability, safety, carrying capacity, and comfort". The latter are associated with "deeper" attributes of car use, such as "privacy, status, control, power, independence, and freedom". The authors of this distinction suggested that policy measures based on "instrumentally-reasoned research models" are not very effective, and that car advertising tends to be associated with the symbolically-affective aspects of car use.

A more complex classification of determinants speaks first to *external conditions*, e.g., locations of homes and work places, weather, and road conditions, on the one hand, and *individual characteristics*, which include attitudes, habits, income, and gender, on the other hand.[51] Second, there is a distinction between *volitional* and *non-volitional* determinants, the latter including all external and some internal conditions. Habits, gender, and economic means were noted as non-volitional internal determinants. Third, there are *proximal* and *distal* determinants, with the latter noted as including background characteristics, lifestyles, and values.

Habitual transport behaviour

The paper in which this more complex classification is set out concludes that it is difficult to change people's travel behaviour because it is largely 'habitual', i.e., it is non-volitional or at least not evidently the result of a decision-making process. That paper, like most of the literature on the topic, presents conclusions based on an analysis of responses to a questionnaire, in this case given repeatedly by telephone to a large sample of Danish 'consumers'. Such research can assume that a person's words on the telephone to a stranger and the person's transport behaviour are somehow related, or at least that analysis of the former can provide insights incidents and determinants of the latter.

That paper also assumes that transport behaviour, other than habitual transport behaviour, is the product of a partially autonomous decision-making device or construct located within the traveller. Habitual transport behaviour, however, was said to be the norm. At least one other author has noted the prevalence of habitual transport behaviour—"so that … minds are freed for other tasks".[52]

Another expression of the role of habit has been this: "… when habit is weak, there is a significant link between intention and behaviour. That is, when someone says they will do something they will do it. However, when habit is strong, the power of intention to predict future behaviour becomes diminished."[53] Intention is essentially verbal behaviour that, like all verbal behaviour, is influenced by mostly social outcomes. Transport behaviour is mostly non-verbal behaviour influenced by what may be a different set of outcomes. The two may have more scope for alignment when neither is strongly reinforced. Moreover, alignment (i.e., truthfulness or consistency) itself may be reinforced. To go beyond this and to say that the verbal behaviour is somehow causing the transport behaviour is perhaps to overlook the features of the environment that are actually maintaining the transport behaviour.

Unnecessary constructs

Such classifications and constructs—whether decision-making processes, minds, attitudes or intentions—are unnecessarily complex.[54] Moreover, they may cause researchers who use them to miss the essential features of what is happening. One essential feature could be that behaviour does not change—it is described as habitual—when the consequences of behaviour continue unchanged; but, when the pattern of consequences changes, the behaviour changes to match the

new pattern. Behaviour is expedient, adjusting to match what its surroundings provide, much as the average neck length of a species changes across generations as the height of available vegetation changes. If peers start praising quiet smoothness in a car rather than noisy power, a young owner may change his driving behaviour promptly, and perhaps even his car. His statements about what is responsible for his actions may be mostly irrelevant.

> Question 8. Is some transport behaviour—e.g., non-habitual transport behaviour—more amenable to influence by soft measures?

4.4. Attitudes and behaviour

The individual factor given the most attention is attitude. A commonly used **definition of attitude** in the social psychology literature is this: a tendency to evaluate an entity with some degree of favour or disfavour, ordinarily expressed in cognitive, affective, and behavioural responses.[55] Attitudes are thus essentially expressions of liking or not liking something, where the 'something' (entity) may be a person, a group of people, a concept, a type of food, and much else. The terms 'attitude' and 'intention' are sometimes used interchangeably, although the former should perhaps be reserved for more general statements about behaviour and the latter for statements about specific future behaviour.

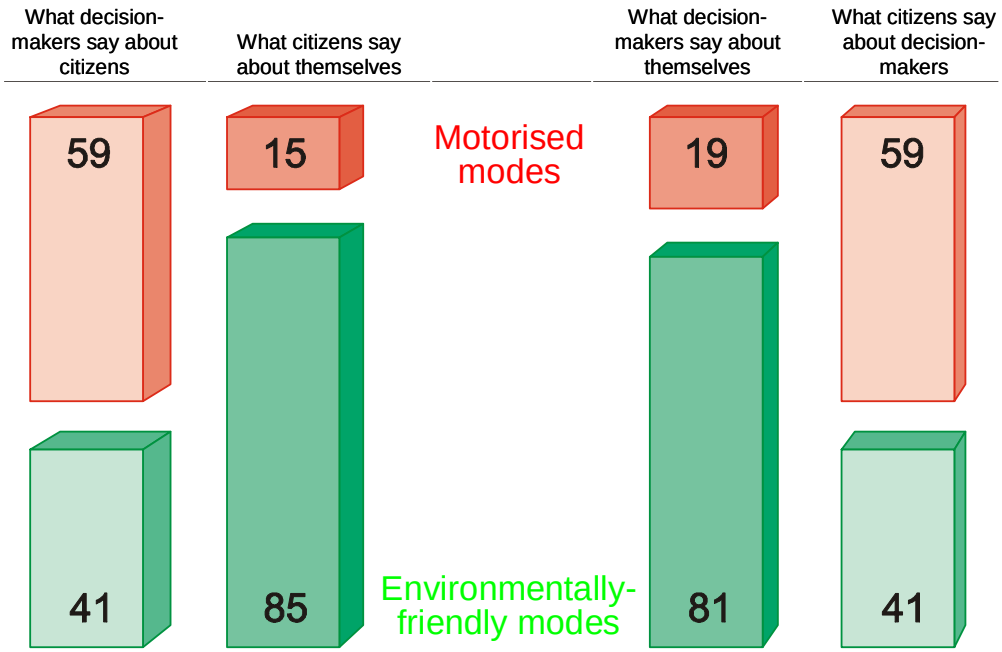
A common view is that changing attitudes is a necessary condition for changing transport behaviour. This could mean that people must say they like using public transport before they actually use it more frequently. A more extreme view is that changing attitudes is a sufficient condition for changing transport behaviour. If you can induce people to say they like using public transport they will use it more.

The research on attitudes and behaviour does not support either position. The most extensive review found that attitudes only sometimes predict behaviour.[56] There is a strong link between attitudes and behaviour only when specific criteria are met: the attitude has to be strongly expressed, specific to particular behaviour, and close in time to the behaviour.[57] Thus, voting intentions on the day before an election are much more likely to predict voting behaviour than attitudes toward public transport are likely to predict public transport use.[58]

A particular caution concerns attitudes that are socially desirable, i.e., expressing them is susceptible to favourable comment. Answers to questions about future behaviour related to socially desirable attitudes tend to overpredict the occurrence of the behaviour. For example, people are more likely to say they will donate to a charity than they are to donate. Similarly, questions related to socially undesirable behaviour lead to underprediction. People say they do not drink and drive, but nevertheless do drive and drive. An interesting complication of these findings is that expressing the prediction seems to change behaviour towards the prediction. Thus, people who are asked about their intention to donate are more likely to say they will donate than to donate, but they are nevertheless more likely to donate than people who are not asked.[59]

Other evidence of the unreliability of verbal behaviour comes from research on the pervasiveness of deception in everyday life. For example, a recent study that used undergraduate students as subjects—as do many such studies—produced results suggesting that lying could be prevalent in everyday conversation, especially when people are trying to appear likable or competent. Men and women were found to lie with similar frequency, but women were more likely to lie to make the person they are speaking to feel good whereas men lied more to make themselves feel good.[60]

Figure 14. Misperceptions of acceptance of environmentally friendly transport modes



In short, what people say is often not reliable and is mostly not a good predictor of what they will do.

In spite of the uncertainty about the importance of attitudes, *perceptions* of attitudes may be an import factor in decision-making about transport. Anticipation of an angry electorate may deter decisions towards attainment of sustainable transport. However, as attitudes may be unreliable so may perceptions of attitudes.

The unreliability of perceptions of others' attitudes is evident from the results of a recent survey conducted across the European Union. Decision-makers and ordinary citizens were asked whether they were more supportive of environmentally friendly transport modes (public transport, walking, bicycling) than regular motorised modes (cars, vans motorcycles), or vice versa, and also what the other group thought. Figure 14 shows that each group was strongly supportive of environmentally friendly transport modes but thought the other group was not.

> Question 9. What causes decision-makers to underestimate public support for environmental friendly transport modes, and how could soft measures be used to correct such underestimates?

4.5. Acceptability

According to the EST project teams, a key issue is the *acceptability* of hard measures, or the *acceptance* of them by travellers and providers of freight services. *Acceptable* and *unacceptable* are hard to construe in behavioural terms. The key feature of unacceptability may be that the measure is ignored or resisted. Normally, such rule-breaking and protest are kept at low levels by adverse consequences, and perhaps too by lack a prospect of positive consequences. Actual

levels depend on numerous factors, including media interest, political structure, and overall conflict level. In times of war and other emergencies, stronger measures can be applied with less protest and rule-breaking. The penalties for non-conformity may be higher, but so also may be the rewards for conforming.

There could be two kinds of practical reason for securing acceptance of hard measures before they are applied. One is that popular acceptance of the measures could mean that they are more likely to be introduced, i.e., politicians are more likely to act if they see their proposed decisions as popular. The other is that accepted measures are less likely to be resisted and may thus be more effective in producing results.

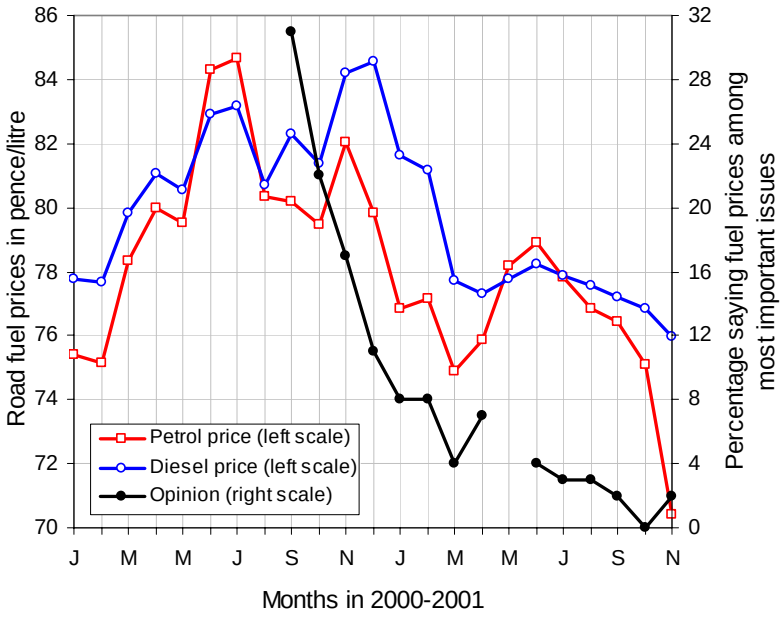
However, some measures may be considered necessary for progress towards sustainability even though they could never be popular. If their unpopularity prevents their introduction, there will no progress. Experience of the measure may be best route to acceptance of the measure.

An example could be the introduction of road pricing in Oslo, Norway (the Oslo Toll Ring). This was introduced in 1990 when about 65 per cent of residents opposed it (70 per cent in the previous year). By 1997, opposition had lessened; just over 50 per cent opposed the road pricing scheme.[61] More recently the level of opposition to the scheme has increased.

Also instructive is the way in which concern about high fuel prices in the UK increased dramatically in September 2000 and then fell rapidly. Protests against the high cost of diesel fuel by farmers and lorry drivers in that month blocked roads around refineries and caused 90 per cent of petrol stations to have shortages or run out. The protest was specifically against the high fuel tax regime, among the world's most onerous, even though the 2000 increase in fuel taxes had been the lowest for eight years and the immediate cause of high prices was high crude oil prices. Moreover, farmers—among the most prominent protesters—paid and pay almost no fuel tax for off-road uses and had experienced no increase. As a result of the protests, 33 per cent of respondents to the regular MORI opinion poll said fuel prices were among the most important issues, whereas previously it had not featured in this group (see Figure 15).[62]

Perhaps ironically, the price of petrol—used by most poll respondents—was already declining in September 2000, while the price of diesel fuel—used by most protesters—continued to increase. The government's only response was a small temporary cut in the tax on petrol, introduced in March 2001 when few people reported high fuel prices as being among the most important issues (see Figure 15). The protests resulted in what was described as the governing Labour Party's "most severe opinion poll wobble since 1992", but the

Figure 15. UK fuel prices and public opinion, 2000-2001



Party was re-elected in the June 2001 election with almost no decline in support.[63]

There seems little doubt that high fuel taxes in the UK were and continue to be 'unacceptable', in that consumers would prefer not to pay them. Moreover, it also seems that interruption of vehicle fuel supplies by protesters against high fuel taxes can cause people to say that high fuel taxes area an important issue, at least for a short while. But the important point about what happened in the UK may be that a regime of high fuel taxes, gradually introduced by successive governments over several years, had become accepted to the point that substantial concern about it did not damage the government's popularity, except briefly.

The Oslo Toll Ring and the 2000 fuel price issue in the UK (and elsewhere in Europe) provide some support for the argument that **providing experience of a measure may be the best way to help ensure acceptance of it**. To say that road pricing or high fuel prices became accepted, however, would be misleading. A majority is evidently opposed to the Oslo Toll Ring, and probably to high fuel taxes in the UK.

The issue becomes that of the roles and responsibilities of decision-makers in a democracy. One researcher phrased the issue in this way: "Since the bulk of person transport is made by individuals as private consumers, and since their dual capacity as consumers and voters makes it virtually impossible to effectively force people to change their transport behavior, much more insight is needed into how people can be persuaded to accept more environment-friendly transport solutions."[64]

What is meant here by 'forcing people to change their transport behaviour'? It probably means achieving change by using hard measures, including taxes on unwanted transport behaviour and regulations that prevent unwanted behaviour. When a government uses these measures, what it is in effect doing is changing the consequences of both unwanted and wanted behaviour. Unwanted behaviour incurs higher costs and perhaps other penalties; at the same time, the consequences of wanted behaviour (e.g., public transport) become relatively more favourable. However, use of such measures makes governments unpopular and may arouse overt and even frightening opposition to the measures.

Implementing 'more environment-friendly solutions' may also involve changing the consequences of behaviour, and thus the application of hard measures. The essential difference between 'forcing people to change their behaviour' and persuading them 'to accept more environment-friendly transport solutions' may be that in the latter case there is no overt opposition to the hard measures.

The difference can be compared with rules that require smokers to leave a building to smoke. They are *forced* to leave the building, but they *accept* the rule, meaning they do not protest. Imposition of such a rule 30 years ago would have resulted in protest. What has changed? First, there would be less support for protest now. Second, and perhaps more important, smoking inside the building would have adverse social consequences as well as whatever might be the formal outcome of breaking the no-smoking rule. The no-smoking rule's strongest effect may be its creation of an environment in which building occupants are likely to punish smoking with unfavourable comments.

Why do the building occupants punish smoking? They are mostly non-smokers and find proximity to tobacco smoke to be unpleasant or believe it to be unhealthful, or both. Thirty years ago, objectors to tobacco were fewer, and suffered in silence and without their licence to complain, i.e., the no-smoking rule.

What are the implications for transport? The first could be that quite severe measures can be implemented if the implementation is gradual and if politicians are prepared to wait for any opposition to the measures subside. The second is that the social support may be more important for the effective continuation of the measures rather than for their introduction.

Thus, **the issue becomes not that of ensuring acceptance of measures before they are introduced but of facilitating the process whereby acceptance of a measure increases with experience of it**. In other words, governments should act—prudently, of course—and then seek to ensure that the actions become more accepted.

Question 10. To what extent is acceptance of measures a necessary or sufficient requirement for their effectiveness?
Question 11. How could soft measures be used to increase the acceptance of measures that have been introduced?

CHAPTER 5. ROLES OF ADVERTISING

In what way does advertising a product determine the use of the product? The debate has been fought mostly over tobacco use. The tobacco industry argues that the main purpose and effect of advertising is to maintain brand loyalty and achieve brand switching. Public health agencies argue that tobacco advertising influences the overall consumption of tobacco, in part by helping recruit new smokers.[65] A recent, relatively impartial review suggested that "there is a significant empirical literature that finds little or no effect of tobacco advertising on smoking". However, the report suggested too "that a comprehensive set of tobacco advertising bans can reduce consumption".[66]

Another area of controversy is alcohol use, with the present position being captured well in the following quote,

> "The large volume of research on the advertising of alcohol beverages has produced inconclusive results. There are not sufficient grounds for claiming that advertising either does or does not affect alcohol consumption. … virtually all the research on the impact of advertising suffers from certain key limitations. First, since advertising is only one of many factors that may influence alcohol consumption, even if it did have an impact its influence would likely be small compared with other factors such as price and disposable income. … Second, advertising is usually targeted at particular groups, whereas the research on its effects is not. Thus the impact of advertising on youth or other target groups might fail to appear in the research findings. Finally, research has looked only at the very short-term impacts of advertising. It is possible that the most important consequences of advertising are cumulative effects that could be detected only by using long-term research designs."[67]

As do tobacco manufacturers, manufacturers of alcoholic beverages claim that the main purpose and effect of advertising is to maintain brand loyalty and achieve brand switching. As with tobacco products, there is empirical support for the claim that advertising affects only which beverages are sold not how much alcohol is consumed.[68]

Much less research has been done on advertising's roles in stimulating car ownership and sprawl. Indeed, not one readily available source on these topics could be identified. Had the research been done, a review could well produce conclusions similar to those concerning alcohol use: its overall impact would be found to be small or negligible, its impact on target audiences could be larger, and its long-term effects would be unknown. The research could nevertheless show that advertising can have a strong effect on *which* car models are purchased, or which homes.

Cars are among the most heavily advertised of products. For example, General Motors, the largest manufacturer, became the leading advertiser in the U.S. in 1997, replacing Proctor & Gamble, which has been the leader for many years. In the first half of 2002, General Motors was still the leader, with Ford and DaimlerChrysler in fifth and sixth places.[69] However, as a percentage of sales value, expenditure on automobile advertising ranks relatively low; at less than two per cent it far behind the U.S. leaders in this respect, which are over-the-counter drugs (about 20 per cent) and perfumes and cosmetics (about 15 per cent).[70]

The U.S. accounts for just under half of all advertising expenditures worldwide, about US$200 billion out of a total of about US$418 billion in 1998. Just under half of advertising expenditures in the U.S. involve media advertising (television, radio, newspapers, and magazines); of this, spending by the car manufacturers and dealers comprised about 15 per cent of the total.[71]

Expenditures on car advertising as a proportion of sales volume have risen substantially over the last three decades. For example, advertising in the U.S. by the three major U.S. manufacturers rose from 0.5 to 1.4 per cent of sales over the period 1970-1994. Actual advertising expenditures grew eightfold, while the dollar value of overall sales grew threefold, both in real terms.[72] On the face of it, the large increase in advertising could have driven the increase in sales, but the opposite may have been equally possible; advertising expenditures may be as much a *result* of high overall sales levels as a *cause* of them. Causal relationships, if any, are hard to discern from the available data.

Advertising that might encourage sprawl (e.g., for new homes on 'greenfield' sites) appears to be negligible compared with advertising by the automotive sector.

Even though there is uncertainty as to the extent of the contribution of advertising to car ownership and use, there are suggestions in the literature that counter-advertising could result in reductions in ownership and use. Counter-advertising appears to have had some effectiveness in reducing use of tobacco and alcohol products.[73]

There is controversy in Canada as to whether counter-advertising in respect of tobacco is more effective if it is polite rather than forceful. Interested organizations in Canada claim the government's antismoking advertising is too "lame and tame". They have urged a change in strategy: "drop the preachiness and go into full attack mode against cigarette makers". The government is part way into a five-year, C$190-million media campaign to reduce tobacco-related disease and death. It has been urged to adopt the "tobacco industry denormalisation" strategies of the U.S. states of California, Florida, and Massachusetts.[74] Meanwhile, a tobacco industry executive in Canada has suggested that it may be appropriate to "denormalise" the fast-food, alcohol, gambling, and automotive industries.[75]

According to a Government of Canada document, denormalisation of smoking includes:

- Deglamorizing the use of tobacco products;
- Combatting myths about tobacco products (for example, that light and mild products are safer or can help you quit);
- Drawing attention to the size and impact of tobacco industry advertising budgets, and the nature of their promotional activities.
- Drawing attention to the role of other industries and organizations in supporting the promotion and sale of tobacco.[76]

California, Florida, and Massachusetts have introduced aggressive media campaigns as part of comprehensive programmes designed to reduce the incidence of smoking, particularly among young people. A recent thorough assessment of the effectiveness of these programmes, and those of the states of Arizona and Oregon, concluded that they had produced declines in per-capita cigarette consumption and the prevalence of smoking in adults and youths, and that the anti-smoking media campaigns were the central and most critical components of the programmes.[77]

Thus, there seems more certainty, for smoking at least, that advertising may be more effective in reducing the incidence of targetted behaviour (counter-advertising) than in increasing the incidence (regular advertising). Applied to transport, this could mean that counter-advertising designed to reduce car use could be more effective than regular advertising designed to increase the use of public transport or other modes.

Question 12. How does advertising support unsustainable transport behaviour, and how could it be used to make transport behaviour more sustainable?
Question 13. Are counter-advertising and denormalisation plausible strategies for reducing car ownership and use?

CHAPTER 6. QUICK REVIEW OF SOME RESEARCH ON THE EFFECTIVENESS OF SOFT MEASURES

6.1. Some negative assessments

A new transport journal was launched in 1998, the sixth of a family of journals with the title *Transportation Research*. The new journal has the sub-title *Part F: Psychology and Behavior*. Its opening editorial surveyed the field of traffic psychology and behaviour, including work on public information campaigns. This section began with the word, "Despite their obvious popularity among practitioners, there is very little evidence that public information campaigns are effective."[78]

The kind of information campaigns of primary interest to readers of this journal may be those that reduce the incidence of accidents, improve driving skills in the elderly, and generally increase the amount of car driving. Thus, the rather negative conclusion in the editorial may not apply with such force to sustainability issues, where the challenge is often that of *reducing* the amount of driving. Moreover, the overview highlighted the success of "teaching programmes that … proved very effective in installing safe road crossing behaviour" in young children, raising the hope that such programmes could be developed that would help promote the use of environmentally benevolent forms of transport.

A recent review of the impact of traveller information systems for the UK Department of Transport stress the general lack of evidence of an impact. However, the review also noted "significant measurable impacts" of information services on Ile-de-France motorways, including mode shifts as well as changed routes and departure times. The review noted the inadequacy of stated preference research techniques, arguing for "intervention in real life". Such intervention could involve direct provision of information to selected individuals, with tracking of outcomes. It could also involve building of a prototype information provision system and assessing its impact.[79]

Part of the Government of Canada's Climate Change Process has concerned evaluation of the potential for action resulting from public outreach. The panel concerned with this matter concluded that "a variety of studies have established that enhancing knowledge and creating supportive attitudes often have little or no impact on behaviour. … The failure of information-intensive campaigns to foster behaviour change is due to an underestimation of the difficulty of changing behaviour".[80]

The panel proposed use of a process known as 'community-based social marketing'. It is described here Section 6.3.

6.2. Some more positive assessments

INPHORMM (Information and Publicity Helping the Objective of Reducing Motorised Mobility) was a European Commission-funded project that sought to investigate "how investigating how transport information and publicity campaigns can influence people's awareness, attitudes, and travel behaviour—and encourage cycling, walking, and use of public transport".[81] The work included examination of more than 30 case studies from Europe, the U.S.A., and Australia. Here are some of the results of the review:

- The **primary objective of the campaigns** was to achieve modal shift in favour of alternatives to the car.

- The **second objectives of the campaigns** included environmental, economic, health, social, and community-development objectives as well as improving public relations, creating a better corporate image, and "preparing the public for traffic restraint measures or explaining the introduction of new legislation or measures to encourage a reduction in car use".
- The has been a **trend over time towards more focused campaigns** targeting key settings such as schools, businesses, and defined geographic areas, and even towards individualised campaigns targeting households or individual travellers.
- Another trend has been to **move from a focus on the problems of traffic growth to positive messages** presenting solutions, providing practical advice, and associating reduced car use with enhanced ways of living.
- The **monitoring and evaluation of information and publicity/marketing campaigns is in its infancy**. Nevertheless, there were examples in the case studies of several outcomes of campaigns, including the following:
  - Changes in politicians' views of the need for sustainable transport policies and targets.
  - Introduction of cycling, walking, and integrated transport strategies.
  - Increased acceptance by businesses of their role in promoting alternatives to the car.
  - Increased media coverage and positive reporting of programmes to reduce car use.
  - Increased levels of cycling, walking, and specific public transport services.

The conclusions of the INPHORMM project included the following:

- Public awareness of the problems caused by motorised mobility and the creation of an 'environmentally-friendly transport climate' are prerequisites for widespread sustained behaviour change.
- Complementary coercive measures may also be required.
- Changing cultural norms is a long-term process.

Another recent review assessed the impact of the whole range of local transport policy instruments, as applied in the UK, in terms of their impacts on transport supply and demand and on environmental and other factors.[82] A section of the review concerned soft measures. It assessed three types of intervention: (i) company transport plans are packages of measures designed to cause a shift away from car use for the journey to work; (ii) travel awareness plans concern all journeys but may be implemented via the workplace; and (iii) school travel plans concern the journey to school.

The assessment found that quantifying the demand effects of the three types of intervention is difficult. Nevertheless, it was said that there have been positive results from each type, although details of changes in transport behaviour were given only for several company transport plans.

In development of the preferred strategy for enhancement of transport between north west England the West Midlands, the UK Government Office for the West Midlands evaluated the likely impact of several soft measures in early 2002 and concluded the following:

- e-commerce, internet shopping, car clubs, improved interchanges, land use policies, local sourcing and new technology would have negligible short term effects on travel activity;
- school travel plans and promotion of walking and cycling would have small effects;
- teleworking; videoconferencing; company travel plans; public transport fares, marketing ticketing initiatives; and bus quality partnerships would have larger effects;

- all soft measures could have a maximum impact of reducing traffic levels by just over four per cent during peak hours and by just over one per cent over the day, although these may well be over estimates.[83]

The OECD held a workshop in January 2001 with the title “Information and consumer decision-making for sustainable consumption” as part of its Programme on Sustainable Consumption. The workshop concluded the following:

- Information can be a powerful tool for promoting more sustainable household consumption. However, it is often hard to target and its impact is unpredictable and difficult to measure.
- There is little information available on the cost-effectiveness of information-based instruments for helping households reduce their environmental impacts.[84]

The TAPESTRY project—subtitled “Campaign Solutions for Transport—is a major three-year exercise that began in November 2000 and is being conducted under the auspices of the European Commission. Its overall aim is "to increase knowledge and understanding of how to develop effective communication programmes to support sustainable transport policies in Europe". The main product will be the development, conduct, and assessment of “16 travel awareness, communication, education and publicity case study campaigns, based on a combination of best practice and local needs across Europe”.[85]

The second deliverable of the TAPESTRY project was a “State-of-the-Art Review” conducted “to provide a common understanding to all TAPESTRY partners about behavioural and attitudinal concepts, the factors affecting them and the relationships between theory and practice”. The conclusions of the review, other than those concerning monitoring and assessment, are summarised in Table 6 on the next page.[86]

Table 6 is a mixture of summaries of research conclusions and prescriptions for information campaigns. The research basis for many of the statements made is thin at best. Indeed, it is hard to provide solid support for any of the statements.

In respect of the essential matters of monitoring and assessment, the TAPESTRY review concluded that “In the majority of campaigns identified so far, monitoring and assessment activities are missing, or at best inadequate.” The review urged that “Monitoring and assessment need to be built into the project design from its inception, and to be carried out to the highest possible scientific standards.” The review proposed the following guidelines:

- define the objectives of the campaign
- derive more specific and realistic targets
- establish an assessment plan for the campaign, including what will be measured, why, when, and by whom
- define likely impacts from a more extensive list of all potential impacts
- develop indicators to match the list of likely impacts
- identify data sources and collection methods for each of the indicators
- estimate likely impacts (changes)
- consider the use of a control group or region
- collect “before” measurements in intervention area and control if used
- run the campaign and monitor its progress e.g., press coverage, take up of publicity material

Table 6. Summary of conclusions from the TAPESTRY review

On the link between attitudes and behaviour

- The barriers that people perceive when considering changing mode are among the most important predictors of behaviour, therefore, campaigns aiming to change behaviour have to address how these barriers can be overcome.
- Habit is also a very strong determinant in predicting behaviour. Campaigns to change behaviour should therefore also take this into account and look at opportunities for intervention when habits can be easily broken (new home, new job, changes in family circumstances etc.)
- Changing attitudes to car use may not lead to a change in actual car use: if people change their attitude to car use and still drive, it leads to "cognitive dissonance". To avoid this, attitudes to car use are likely to remain positive.
- Simple categorisation of people as "car drivers" or "public transport users" is not an effective way to determine the potential for change in travel behaviour.
- Socio-economic and demographic criteria are not a useful way to predict people's awareness, attitudes and intention to change their travel behaviour.
- Looking at people's attitudes to transport-related measures may be a more useful way to "segment the market", when designing campaigns.

On the process of changing travel behaviour

- Many factors can influence the potential for change. These may be under the direct influence of the person concerned or in the world around them. They can be objective or subjective (perceived). It is important to be aware of these factors when developing campaigns and to try to address the misconceptions that prevent people from making changes towards more sustainable modes.
- People undergo a process of change. Changing behaviour is not possible until they have passed through the preparatory stages of awareness/ arousal and acceptance.
- Encouraging a change in behaviour is not enough to ensure a long-term shift.
- Communication strategies need also to build in support mechanisms for maintaining that change.
- Different stages in the process of change require different sorts of campaign techniques.
- Changing attitudes alone may be a valid outcome of a campaign.

On planning campaigns

- Campaigns are most effective when linked to physical or "hard" measures, e.g., new transport plan, new cycle lanes.
- Ensure that you know about current public opinion prior to planning a campaign—use market research if necessary.
- A step-by-step communications programme is more likely to result in changes in behaviour. Public awareness campaigns should be followed up by more targeted and perhaps individualised campaigns to change attitudes and encourage a shift in behaviour.
- Consider whether you are using just one or combining different communications strategies ("power", "reinforcing", and "persuasive") .

On defining target groups

- Prior research is essential to define target groups effectively.
- Target groups for site based campaigns focus on all those who travel to that site.
- Target car-dependent journeys as opposed to car dependent people.
- Target those who want to change their transport behaviour and expect that they can first.
- For individualised campaigns, focus on those who are interested and motivated to take part.
- Consider targeting people at times of change in their lives, e.g. moving house, job, starting a family etc.

On messages and message givers

- Use arguments on which most people agree.
- Make the desired behaviour special in some way.
- Use positive messages and a non-authoritative tone.
- For site-based campaigns, use messages relevant to the main concerns of that site (e.g., child health and safety for schools or employee health and better "productivity" for companies).
- For individualised campaigns, stress how small changes can make a big overall impact.
- Message should "get Attention, hold Interest, arouse Desire and obtain Action".
- Effective message givers can be respected celebrities, fictional or cartoon characters.
- Messages must be pre-tested with the target audience to ensure effectiveness.
- Consider collaborating with respected voluntary or community organisations.

On incentives

- Incentives should be directly targeted at encouraging the desired behaviour.
- Consider combining incentives with disincentives.
- Ensure that any incentives you put in place are not counteracted by existing policies that favour car use (e.g. company car policies).
- Use promotional material that is mutually reinforcing, e.g., posters with leaflets.
- Pre-test all materials for both format and content with all your target groups.
- Don't give free tickets to existing public transport users!

On partnerships

- Consider other policy areas that are related to your campaign and explore whether these need to be a direct focus or indirectly addressed.
- When planning a campaign, bring together all possible interested parties.
- "Campaigning for a campaign" to gain positive support of all levels of the organisations involved is an important pre-condition for success.
- Strong partnerships make for more effective lobbying.

- collect 'after' measurements in intervention area and control if used
- collate and analyse results.

6.3. Enhanced soft measures

A process known as 'community-based social marketing' was advocated in the course of the Government of Canada's climate change work discussed in Section 6.1. Its core feature is the use of tools for fostering behaviour change. In brief, these are:

- securing ***commitment*** to change behaviour increases the likelihood of change
- providing ***prompts*** helps predisposed people remember to act
- establishing ***norms***—the socially 'right-thing-to-do'—facilitates desired behaviour
- providing ***incentives*** (and disincentives) for desired (and undesired) behaviour
- engaging in good ***communications*** to support the other tools, with these qualities: relevant to audience, vivid, delivered by credible person, clear and specific, memorable, informative as to desired actions, and made through personal contact.

The panel's report included assessment of seven implementations of soft measures in Canada that had an evaluation component (only one concerned transport-related behaviour). The assessments are summarised in Table 7.[87] They were used to support the general approach of the panel that provision of information alone is ineffective, but that provision of information supported by extensive and often face-to-face contact can be effective.[88]

The first application in Table 7 concerned tobacco use. One report cautioned that there are key differences between health-related and transport-related behaviour. "Changing health behaviour brings almost immediate benefits to the individual concerned. This is not the case for transport. More often than not, the benefits of changing travel behaviour will only be visible if many people at once decide to reduce their car use and if the benefits are seen to be greater than the

Table 7. Summary of evaluations of use of soft measures in Canada

Program name	Program goal	Primary method	Measured direct effect
Tobacco Demand Reduction Strategy	Reduce smoking	Wide variety of approaches	None
Seat Belt Education Campaign	Increase seat beat use	Media advertising	None
Federal Energy Conservation Information Campaign	Increase understanding of need for energy conservation; reduce energy use	Media advertising, community programmes, corporate challenges	Increased understanding of need for conservation. Reduced energy use
Ontario Green communities	Reduce energy use in homes	Home visits providing one-on-one advice	Reduced energy use in in homes.
Pro-trucker	Encourage fuel-efficient driving	Training, advertising	Programme participants' fuel use lower
Energuide	Use of more energy-efficient home appliances	Labelling; training	Reduced energy use by appliances
R-2000	Reduce energy use in low-rise dwellings	Education of home-builders, etc.; certification	Reduced in-building energy use

perceived disadvantages of making that change."[89] Nonetheless, the intervention with respect to tobacco use was considered to have been unsuccessful.

Many of the successful interventions listed in Table 7 concern energy use. A comprehensive assessment of 51 interventions concerning energy use in Europe under the European Commission's SAVE II programme resulted in a set of guidelines for securing behaviour change in the direction of energy conservation.[90]

The overriding principles articulated in the guidelines are (i) 'begin at the end', i.e., first define the desired outcome, i.e., which behaviour of which people is to change, (ii) identify what is sustaining present behaviour (predisposing, enabling, reinforcing factors) and what is available to sustain the desired behaviour; (iii) only then design and implement the intervention; and (iv) evaluate what was done, above all its effectiveness.

The assessment of the 51 interventions (12 concerned transport-related behaviour) had resulted in the following conclusions:

- **Behaviour change projects work**; three quarters of the interventions showed significant positive results; however, there was "very significant decay in any behaviour change achieved".
- **Few interventions were rooted in theory or even previous practice**; thus there was no building on knowledge, or contribution to general principles.
- **Market segmentation was rare**; those that did were more successful and cost-effective.
- **Prior diagnosis was rare**; there was little assessment of initial positions, making evaluation of performance difficult, often a consequence of no or late involvement of behaviour change professionals.
- **Behavioural evaluation and assessment rare**; almost four fifths of the projects had some form of evaluation, but fewer than half noted what change in *behaviour* had occurred (as opposed, say, to change in energy-saving items purchased).
- **Most projects did not lead to further activity**; two thirds were one-off, stand-alone actions.
- **There was little transfer of learning among projects**; this was the result of weak evaluation, lack of prior desk research, and absence of networking.

The guidelines also addressed the question of cost-effectiveness of interventions, to be assessed in terms of impact, the product of reach and effect. An example of such an analysis is provided

Table 8. Illustrative monetary costs and benefits of interventions designed to reduce energy use in 600,000 households

Intervention	**Reach** (how many affected)	**Effect** (how much change in those affected)	**Impact** (product of reach and effect)	**Cost of intervention per person** (in €)	**Total cost of intervention** (in 1000 €)	**3-year saving in energy costs** (in 1000 €)	**Net outcome** (saving less total cost, in 1000 €)
No intervention	33%	3%	1%	0.00	0	3,564	3,564
Mass media campaign	80%	4%	3%	0.50	240	7,956	7,716
Self-help guide	80%	10%	8%	6.50	3,120	25,236	22,116
Tailored information	80%	20%	16%	18.00	8,640	54,036	45,396
Individual advice	50%	28%	14%	182.00	54,600	46,836	-7,764

in Table 8.[91] The analysis suggests that the largest effect is achieved by interventions involving tailored information, e.g., via the Internet. However, the largest proportionate return on the amount invested is from intervention by a mass media campaign, e.g., use of folders or posters. An investment of 240,000 € produces a return of 7,716,000 €, i.e., more than 32 times the investment.

The application of a technique known as individualised marketing in Perth, Australia, has been reported as reversing the decline in walking, cycling, and public transport use, and curbing the growth in automobile use. Individualised marketing has been described as "informing people of their travel choices and encouraging self help. It is not about telling people which trips to change or what modes to use. The design of the technique allows the information and dialogue to be related to each individual's or household's unique situation. The information provided tailors the information, especially about public transport, to each person's unique situation. This is opposite to a system wide approach to providing public transport information, which is also essential".[92]

Question 14. To what extent are soft measures effective in changing transport behaviour?
Question 15. Can soft measures be used to facilitate the effects of 'hard' measures designed to make transport behaviour more sustainable?
Question 16. How can soft measures best be used to achieve sustainable transportation?

CHAPTER 7. CONCLUSIONS CONCERNING THE USE OF SOFT MEASURES

The basic conclusion concerning soft measures is that it is hard to be conclusive about their effects. It's hard to conclude that soft measures have had much of an effect on transport-related behaviour by themselves. It's also hard to conclude that soft measures have contributed much towards the effectiveness of hard measures.

Assertions that for transport behaviour to change there must be prior changes in attitude, development of problem awareness, and intention to change seem plausible, but they are not well supported in practice. Favourable attitudes may be as much shaped by experience of changed behaviour as by statements designed to change the behaviour.

Hard measures may change behaviour because they change the consequences of behaviour. Soft measures could have the ability to change the consequences of behaviour—by adding positive or negative value to outcomes of the behaviour—but they do not seem to have been used in this way. The effectiveness of hard measures is consistent with the view that the key determinants of transport behaviour are in the milieu in which it occurs rather than within the travellers whose behaviour is to be changed.

Some techniques involving soft measures do seem to have been effective. Counter-advertising—as opposed to regular advertising—may be effective in reducing the incidence of unwanted behaviour. What are described here as 'soft measures plus' may be effective in increasing wanted behaviour. Soft measures plus include community-based social marketing, tailored information, individualised marketing, and other intensive processes that seek to engage individuals in face-to-face or individualised settings.

A major exercise concerning the effectiveness of soft measures in transport behaviour is under way in Europe. The TAPESTRY project is to be completed at the end of 2003. It could resolve several of the uncertainties that have been identified here.

One matter that may not be resolved by the TAPESTRY project is the way in which decisions are made with respect to sustainable transport. Politicians and other decision-makers prefer to implement measures that are accepted. This is understandable both because it is more consistent with democratic principles and because enacting acceptable measures is more consistent with re-election and continued office.

Most of the measures required for attainment of sustainable transport may never become accepted before implementation and perhaps not after implementation. They may nevertheless be essential for the continued functioning of society. The issue may thus become that of providing decision-makers with a sufficient degree of comfort that their unacceptable actions will not have adverse political consequences. How this can be done requires further attention.

In the meantime, it may be reasonable to venture the position that preoccupation with soft measures may impede rather than facilitate progress towards use of the hard measures required for attainment of environmentally sustainable transport.

> Question 17. Is interest in soft measures a way of avoiding unpalatable use of hard measures?

CHAPTER 8. A STEP BEYOND SOFT MEASURES: ENVIRONMENTAL SUPPORTS FOR DESIRED TRANSPORT BEHAVIOUR

The opening words of this paper characterised soft measures for changing transport behaviour as measures other than the use of taxes (or incentives), the use of regulations, and the provision of infrastructure or transport supply. Soft measures are "non-coercive and relatively low in cost". This chapter helps frame the limits of soft measures by describing an approach to the management of transport behaviour that is also mostly non-coercive and relatively low in cost but involves regulations and in some cases the provision of infrastructure or transport supply.

The approach is to guide the planning of urban regions with the principle that in every part of the region—or in as many parts as may be practicable—it should be as advantageous to live without a car as with a car. Put another way, a goal of land-use and other urban planning should be that car ownership is behaviour of the minority rather than the majority. The principle has been dubbed the EANO principle, i.e., Equal Advantage for Non-Ownership.[93]

At an experts' meeting on "Sustainable Consumption and Individual Travel Behaviour" held at OECD Headquarters in January 1997, "support for [a version of this principle] was so strong that three quarters of meeting participants chose it as the most significant policy recommendation to emerge from the two days of discussion".[94]

The EANO principle is rooted in the considerations set out here in Section 3.1, which illustrated the importance of car ownership as a determinant of car use. It is also rooted in what was discussed in Section 4.2, where it was noted that circumstances are such that car ownership is minority behaviour in parts or all of several affluent urban regions, even parts of urban regions in North America. The basic idea is that urban environments exist where residents are more likely to not own a car as to own a car—in other language, they choose not to own a car—and thus other places can be created or re-created to produce the same result.

In practice, application of the EANO principle is hardly different from much of what is regarded as good town planning practice: e.g., compact pedestrian-oriented development, mixing of uses, readily accessible public transport, etc.[95] But, there is one key difference. Application of the EANO principle would require assessing each location and asking whether, on balance, living there without a car would be at least as advantageous as living there with a car. The 'proof', of course, would be that a majority of households are carless, but at the planning stage this can only be anticipated.

Some of the amenities and services that support living without a car are these:

- schools, stores, and recreational and cultural facilities within a walk, a bicycle ride or a short public transport journey.
- safe and enticing routes along which to walk or ride a bicycle.
- good public transport, which in lower-density areas could include demand-driven service to the door or to nearby pick-up and set-down points.
- ready access to places of employment and to the services that support home-based employment.
- car-sharing services for longer or special trips.
- delivery services for the carriage of purchased goods and for other purposes.
- excellent information about all of the above.

However, availability of these amenities and services, together with the relatively high cost of car ownership (see Figure 11), may not be sufficient to offset the inherent attractions of the car (see the long quote in Section 4.3 on Page 147) and thus to tip the balance against majority car ownership. Something may be required to offset the car's enormous convenience.

In high-density areas this 'something' is often the difficulty or cost—or both—of nearby parking. Thus, one way of discouraging car ownership may be to design neighbourhoods so that parking spaces are not near homes, so that they are at least as far as the distance to the nearest public transport stop.[96]

The regulations and enforcement of them that would support such a design requirement, particularly in lower-density areas, are beyond the strict definition of soft measures. They go beyond provision of information, persuasion, changing attitudes, and so on, as may some of the measures listed above, e.g., provision of "safe and enticing routes along which to walk or ride a bicycle". The requirement nevertheless exemplifies a key message of this paper: that transport behaviour is determined by its milieu and that the way to change transport behaviour is to change the milieu in which it occurs.

> Question 18. How can soft measures best contribute to the creation of human environments in which car ownership and use are not the norm?

CHAPTER 9. DRAFT WORKSHOP RECOMMENDATIONS

The following recommendations have been developed through dialogue among workshop panellists (who individually may or may not agree with the result of the dialogue). The recommendations are proposed here for possible adoption at the workshop, with or without amendments that may be considered appropriate by workshop participants.

1. Use soft measures to publicise a vision of EST and promote the benefits of EST, and to disseminate information about best practices towards EST.

2. Set national targets concerning transport behaviour that are consistent with the vision, e.g., 20-per-cent reductions by 2012 in the number of person-kilometres travelled by car, and in the number of tonne-kilometres moved by road. Set early milestones that are easy to achieve.

3. Ensure that these reductions are accompanied by increases in access to the objects of mobility by providing more public transport and opportunities for walking and bicycling, ensuring that origins are closer to destinations, substituting teleservices for transport, increasing local production or reducing material consumption, or by use of two or more of these strategies.

4. To achieve the foregoing, work with soft and hard measures to ensure that car use and movement of freight by road are less appealing than their alternatives. Employ every available means: counter-advertising, interventions in schools, etc. Focus especially on people whose life circumstances are changing. Coordinate all of these efforts.

5. Using soft and hard measures, construct environments in which there are evident gains *to individuals* who behave in ways consistent with progress towards EST.

6. Use soft measures to support the effectiveness of hard measures. Select target groups carefully—with opinion leaders and decision makers as prime targets—and fashion strategies accordingly. Use soft measures to provide comfort that support for sustainability is widespread.

7. Note that soft measures can be as effective as hard measures. Apply them gradually and patiently, aiming for small, cumulative changes.

8. Facilitate transfer of knowledge about sustainable transport across disciplines, particularly from disciplines at the fringe of transport studies, including social scientists.

9. Evaluate, evaluate, evaluate, and publish the results widely. Ensure that there is good understanding of the effectiveness of particular soft and hard measures in relation to the circumstances in which they are applied. Make use of this good understanding in designing strategies to change behaviour.

10. Prepare policy statements and design organisational structures to implement the foregoing in effective ways.

APPENDIX: FIVE APPROACHES TO EXPLAINING HUMAN BEHAVIOUR

Interior constructs

Everyday explanations of behaviour and those of many researchers invoke 'mind' or another interior construct as a cause of behaviour. Sophisticated versions of this model speak of an interior decision-maker that makes choices that result in behaviour. However, the notion of 'mind' may not be far away. Consider the following,

> "A decision is only an intention or commitment to behave. Reflecting that preferences may be inconsistent over time, the decision maker sometimes changes his mind and chooses not to carry out the behaviour. Under what circumstances does this occur? In other words, when it is possible to predict people's behaviour from their stated choices? … A frequently repeated behaviour (such as commuting by automobile) is not necessarily preceded by deliberate decisions. Such behaviours performed automatically"[97]

What can be imagined here is something inside the person that chooses a course of action from among many and then chooses whether or not to implement the course of action. Implementation involves causing the person to behave in a certain way.

Knowledge about what the interior construct is doing comes from asking the person questions. The responses—the 'stated choices' in the above quotation—are believed to reflect the condition of the interior construct. They can be compared with the 'revealed choices' that are the actual behaviour of the person.

There are at least two problems with this 'interior construct' approach. One is that the problem of explaining behaviour of the person becomes the possibly more difficult problem of explaining the behaviour of the interior construct, and we may be no farther ahead. The other problem with the interior construct approach is independent information about the condition of the interior construct comes only from another kind of behaviour of the person, i.e., verbal behaviour, known to be notoriously unreliable.[98]

Another kind of interior construct is consciousness, an attribute of humans and perhaps other species and some computers. Like mind, it is somehow inside the body. Consciousness may be a cause of behaviour or a correlate of behaviour, or it may even be a special kind of behaviour. As a cause of behaviour it seems particularly elusive. It is observable in others only by inference and often exhibits only a loose connection to behaviour of interest.

Brain activity

A recent OECD report included the following: "Techniques such as functional neuro-imaging, including both functional Magnetic Resonance Imaging (fMRI) and Positron Emission Tomography (PET), together with Transcranial Magnetic Stimulation (TMS) and Near Infrared Spectroscopy (NIRS), are enabling scientists to understand more clearly the workings of the brain and the nature of mind".[99]

Brain is undoubtedly something to do with behaviour; just as a ball's molecular structure is something to do with how the ball moves when it is hit. However, the interesting determinants of a ball's trajectory are usually outside the ball, and certainly no explanation of how a ball moves could ignore external factors such as the force of the strike and direction of the wind. Similarly, there is no doubt that brain is involved in behaviour, but the interesting determinants may lie elsewhere.

A difference between brain and mind is that parts of the brain can be stimulated and depressed, and even removed, and behaviour changes. There is no such equivalent for mind. We can see a person's brain, even when it is functioning, but not a mind. It is certainly of interest to map the brain and to understand the neural correlates of behaviour. But there seems little chance that the organizing principles of behaviour will be revealed in this way, just as molecular biology contributes little to our understanding of evolution. (Molecular biology helps us understand how members of a species vary, but not the actual process of natural selection, i.e., the favouring by a particular environment of one variant rather than another.)

A neurologist wrote recently, "At the start of the new millennium, it is apparent that one question towers above all others in the life sciences: How does the set of processes we call mind emerge from the activity of the organ we call brain? … Recently the question has preoccupied both the experts and others who wonder about the origin of the mind, specifically the conscious mind."[100]

Such a focus on brain may miss an essential feature of consciousness: its interactions and even dependence on the world outside the person. Much of what we characterise as consciousness appears to be sub-vocal verbal behaviour, which we know to be intimately tied to the milieu of like-language speakers and to the framework of consequences of behaviour known as culture. In other words, consciousness—like most human phenomena—may be a product of the exquisitely complex interactions people have with their environments from the moment they are born, and even before.

Heredity

Somewhat separate from the appeals to mind and brain as explanations of human behaviour have been appeals to heredity. A recent polemic against full-scale environmental determinism of behaviour suggested that genetic factors can be at the root of quite specific behaviour. Examples given were both members of a pair of identical twins reared apart "who liked to keep elastic bands around their wrists and pretend to sneeze in crowded elevators". The author's conclusion was more restrained: overall, 40-50 per cent of the variation in human behaviour can be attributed to genes and 50-60 per cent to environment.[101]

The key issues are not *whether* heredity plays a role in determining behaviour—it would be astonishing if it did not—but *how* it plays a role. There seem to be three kinds of contribution of heredity. One is what might be called 'hard-wired' responses to specific stimuli, sometimes called instinctive responses. These responses usually have a tight link to survival, as in the case of the pigeon that flees from the silhouette of a hawk.

The second kind of contribution is the endowment of an effective adaptive mechanism that provides for the repetition or other strengthening of behaviour that produces specific outcomes.

The third kind of contribution of heredity to human behaviour is that it determines which outcomes have the ability strengthen behaviour. The core set of outcomes meet physiological requirements, including reproduction, but a part of the 'effective adaptive mechanism' confers this ability on relatively neutral events (e.g., money can strengthen behaviour that secures it).

The fourth kind of contribution is that heredity determines what can and what cannot be done. For example, an important reason why chimpanzees do not speak may be their lack of an appropriate tongue and larynx. Whether a human speaks, however, depends not only on having an adequate body, including an adequate brain, but also on having vocalisations selected and fashioned by an adequate social environment.

Antecedent external causes

The other two views about behaviour look to outside causes. One type of outside cause consists of things that happen *before* the behaviour being explained. Advertising is said to cause the purchase of cars and perhaps even the high-speed driving of them. Suburbia is said to cause car-dependence. The challenge here is explaining why car advertising should cause purchase of cars rather than earplugs and suburbia should cause dependence on cars rather than on bicycles.

As noted in connection with the previous view, tight links between environmental stimuli and responses can be 'hard-wide' during evolution. Compared with other species, humans seem to have less of this 'hard-wiring'.

Consequences of behaviour

The fifth view about behaviour is that it is maintained by its consequences, more precisely the history of its consequences. The close analogy with evolution has already been noted. A species evolves to fit a particular environment. Behaviour changes to fit a particular environment. If the environment is constant, species and behaviour can equally remain fixed. If the environment changes, species and behaviour change to fit the new circumstances. For behaviour, the critical changes are its consequences.[102] If commuting by car becomes tiresome, expensive, time-consuming or socially unacceptable, this behaviour could decline. Whether would be replaced by other behaviour, e.g., commuting by bus, could depend on what is possible and on what would be the consequences of commuting by bus.

The point is not to explain commuting in such a simplistic manner but to suggest that **the most important determining features of transport-related behaviour lie in the circumstances of the behaviour**. Consideration of what may be going on inside the heads of commuters could be a distraction.

The criticisms of such radical behaviourism are basically of two kinds. One is that interior events such as are called mind and consciousness appear to be universal human experiences with connections to how humans behave. Full descriptions of human behaviour may well include accounts of these phenomena, but scientific parsimony requires that we first go as far as with the simplest of explanations.[103]

The second criticism is that human behaviour is complex and requires a much more sophisticated approach than mere regard for its consequences, and perhaps for events that have been associated with the consequences. Again, it is possible to appeal to natural selection, a simple process that more-or-less explains the diversity of life and much else.

Natural selection is still resisted as a sufficient explanation of human existence.[104] Even more, behavioural variation and the selection by environmental consequences of particular variants is resisted as a sufficient explanation of human behaviour. The reasoning is similar in both cases. Humans are too complex to be explained by such simple processes. There has to be something else: perhaps God's Guiding Hand, in the case of the evolution of the human species and Mind in the case of human behaviour.

The inclination here is to rely on such a simple process to account for transport activity. People do what they do because doing it has had favourable consequences. Circumstances change. Behaviour varies, and in the changed circumstances new behaviour may be favoured.

Soft measures can help both to help generate new behaviour and to help ensure that it is favoured and therefore prevails.

END NOTES

[1] This broader interpretation of soft measures, to include taxes and regulations, is that of the Asia Development Bank. See
http://www.adb.org/vehicle-emissions/General/Transport-tdm.asp. Accessed 25 September, 2002.

[2] The use of the term soft measures here is identical to that of the head of Berlin's Senate Department for Urban Transport. See Kalendar U, *Creating a public private partnership for the multi-modal traveller information centre in Berlin*. Presentation at the annual conference of Polis (European Cities and Regions Networking for New Transport Solutions), Rome, November 2001, available at the first URL below. The use of soft measures has been equated to the increasingly popular process in Europe of 'mobility management', also described as "getting the best out of transport hardware" (see the second URL below).
http://www.polis-online.org/docs/rome2001/t29s3kalendar.doc. Accessed 25 September, 2002.
http://mo.st/public/mm.html. Accessed 25 September, 2002.

[3] Figure 1 was part of a presentation by Ernst-Ulrich von Weizsäcker at the OECD International Conference held in Vienna, Austria, 4-6 October, 2000, entitled *est! Futures, Strategies, and Best Practices*. The report on the conference is available at
http://www.olis.oecd.org/olis/2001doc.nsf/LinkTo/env-epoc-wpnep-t(2001)8-final. Accessed 29 September, 2002.

[4] The two surveys were conducted as part of the Urban Travel and Sustainable Development programme of the European conference of Ministers of Transport (ECMT) and the OECD. According to a presentation on the survey by Jack Short, ECMT Secretary-General, at a conference organized by the Union Internationale des Transports Publics held in Lodz, Poland, in October 2002, during the 1990s, daily car trips per person increased by 11.3% in the surveyed cities while daily walking and public transport trips fell by 9.3% and 9.4%, for an overall increase in trips by 1.4%. See the URL below.
http://www1.oecd.org/cem/online/speeches/JSlodz02.pdf. Accessed 28 October, 2002.

[5] The term sustainable development was popularized in 1987 by the World Commission on Environment and Development. It was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" on Page 41 of World Commission on Environment and Development (Brundtland Commission), *Our Common Future*. Oxford University Press, U.K., 1987.

[6] Another definition has been developed by the Toronto-based Centre for Sustainable Transportation (see the first URL below). A slightly amended version of the Centre's definition was adopted as a working definition of sustainable transport by the ministers of transport and communications of the 15 European Union (EU) countries at their meeting in Luxembourg in April 2001 (see the second URL below), as follows:

> "A sustainable transport system [is] defined as one that: (i) allows the basic access and development needs of individuals, companies and societies to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations; (ii) is affordable, operates fairly and efficiently, offers choice of transport mode, and supports a competitive economy, as well as balanced regional development; (iii) limits emissions and waste within the planet's ability to absorb them, uses renewable resources at or below their rates of generation, and, uses non-renewable resources at or below the rates of development of renewable substitutes while minimising the impact on the use of land and the generation of noise."

http://www.cstctd.org. Accessed September 12, 2002.
http://www.health.fgov.be/WHI3/krant/krantarch2001/kranttekstmei1/010509m05eu.htm. Accessed September 12, 2002.

[7] For example, soft measures may contribute to the need for improved logistics in freight transport to reduce energy consumption and environmental impacts has been emphasized on both sides of the Atlantic. See McKinnon AC, Logistics and the environment, in Hensher D, Button K (eds.) *Handbook of Transport and the Environment*, Elsevier, Amsterdam (forthcoming, 2003). See also Vanek FM, Morlok EK, Improving the energy efficiency of freight in the United States through commodity-based analysis: justification and implementation. *Transportation Research Part D*, 5, 11-29 (2000).

[8] Figure 2 was part of a presentation by Magnus Swahn of GreenCargo (a Swedish rail company) at the OECD Conference held in Eskilstuna, Sweden, 25-26 October, 2001, entitled *Environmentally Sustainable Transport: Is Rail on Track?*

[9] For information about the OECD's EST project, see the numerous reports available at the URL below. http://www.oecd.org/env/ccst/est. Accessed 11 September, 2002.

[10] Table 2 is from the report on Phase 3 of the EST project, *Scenarios for Environmentally Sustainable Transport: Volume 1, Synthesis Report.* Organisation for Economic Cooperation and Development, Paris, 1999. It is available at the URL in Note 9.

[11] Figure 4 is from the source detailed in Note 10. The estimates in Figure 4 represent all sources of environmental impact; however, transport is usually the major or a major impact.

[12] See, for example, Topp HH, Traffic 2042—mosaic of a vision. *Transport Policy*, 9 , 1-7 (2002). See also some alternatives in the commentaries on this paper: Wachs M, A different kind of vision: a comment on Harmut Topp's "Traffic 2042—a mosaic of a vision". *Transport Policy*, 9, 9-10 (2002); and Kenworthy J, Traffic 2042—a more global perspective. *Transport Policy*, 9, 11-15 (2002).

[13] Figure 5 and the percentage changes given in the text are based on projections made during the EST project in respect of the nine participating countries: Austria, Canada, France, Germany, Italy, The Netherlands, Norway, Sweden, and Switzerland.

[14] Figure 6 is from the source detailed in Note 10.

[15] For example, transport in the UK was described as unsustainable in the UK Government's 1998 White Paper, *A New Deal for Transport: Better for Everyone*. Department of Environment, Transport and the Regions, available at the URL below. For a discussion of the White Paper, see Goodwin P, Transformation of transport policy in Great Britain. *Transportation Research Part A*, 33, 655-669 (1999) http://www.dft.gov.uk/itwp/paper/. Accessed 11 September 2002.

[16] Figure 7 is from the IWW-INFRAS report *External costs of Transport* prepared for the International Union of Railways (March 2002). A summary of the report is available at the URL below. Note that the external costs of transport-related air pollution may have been greatly underestimated in the IWW-INFRAS report. According to an article published at about the same time (Künzil N et al., Public-health impact of outdoor and traffic-related air pollution: a European assessment. *The Lancet*, 356, 795-801, September 2, 2000), air pollution by motorised traffic accounts for about 20,000 deaths a year in Austria, France, and Switzerland. This is more than twice the number of fatalities from road accidents (*Trends in the Transport Sector 1979-2000*, European Conference of Ministers of Transport, Paris, 2002).
http://infras.domainserver.ch/htdocs/downloads/z-620e.pdf. Accessed 28 October, 2002.

[17] For sources on freight transport, see Note 7.

[18] Figure 8 is from a presentation made by Lee Schipper of the International Energy Agency to a workshop on *Fuel Taxation* held by Transport Canada, Ottawa, March 4-5, 1999.

[19] The causation of use by ownership seems the most plausible account of the remarkable constancy of the relationship. However, the assumption that ownership causes use may be unjustified. Use—determined by other factors—could cause the amount ownership required to support the use given the circumstances of the country. Alternatively, there could be no causal link between use and ownership. Whatever the causal link, if any, the constancy of the relationship between ownership and use deserves more investigation.

[20] An example of advocacy of car ownership without use is the 18th report of the UK Royal Commission on Environmental Pollution, *Transport and the Environment*. HMSO, London, UK, 1994. The UK government has been said to echo this advocacy in that it believes "car ownership is good and car use is bad—or at least to be discouraged" (Adams J, Letter to the editor of *The Times*, 3 July, 1998). One researcher has provided a rationale for ownership without use: "owning a car *per se* leads to few environmental problems: A gas guzzler sitting in a garage pollutes and congests less than an efficient car driven several hours per day." (Schipper L, Determinants of automobile use and energy consumption in OECD countries. In *Annual Review of Energy and Environment*, 20, 325-386 (1995).)

[21] It should be noted that there are contrary views and assessments. For example, the UK Institute for Fiscal Studies estimated that a abolition of the annual car licence fee (a tax on ownership) with a compensatory increase in fuel taxes would reduce car use by eight per cent in one year. This estimate is

cited in Bolton P, Seely A, Hough J, *Road fuel prices and taxation*, Research Paper 01/52, House of Commons Library, London, UK (May 2001), available at the URL below. The same source notes political support in the UK for taxing use rather than ownership, especially to enable people living in rural areas to own a car.
http://www.parliament.uk/commons/lib/research/rp2001/rp01-052.pdf. Accessed August 24, 2002.

[22] For a recent review of the determinants of passenger mobility that gives priority to economic factors as determinants of car ownership, see Breugem RMH, can Vuuren DP, van Wee B, *Comparison of global passenger transport models and available literature*. RIVM report No. 461502025, RIVM, Bilthoven, The Netherlands (2002), available at
http://www.rivm.nl/bibliotheek/rapporten/461502025.pdf. Accessed September 12, 2002.

[23] Figure 9 is from Schipper L, Marie-Lilliu C, Lewis-Davis G, *Rapid motorization in the largest countries in Asia: Implication for oil, carbon dioxide, and transportation*. International Energy Agency (1998), available at
http://www.iea.org/pubs/free/articles/schipper/rapmot.htm. Accessed September 13, 2002.

[24] Figure 10 is based on data in Kenworthy J, Laube F, *The Millennium Cities Database for Sustainable Transport*, Union Internationale des transports publics (UITP), Brussels, Belgium, 2001 (CD-ROM). Of the 60 affluent urban regions represented in the *Database* (i.e., with regional GDP greater than US$10,000 per capita in 1995), only 52 were used here, the other eight having insufficient data or a population of less than 500,000. Correlation coefficients based on 52 pairs of values are considered significant at the 5% and 1% levels if their absolute value (i.e., without its sign) is respectively greater than 0.27 and 0.36 (Quenouille MH, *Rapid Statistical Calculations*, London, UK: Griffin, 1959).

[25] The correlation between car ownership rate and relative cost per trip is -0.29, i.e., there is a significant but not particularly strong negative correlation between the two variables (see Note 24 for the significance of the correlation coefficient).

[26] See Hymans S, *Consumer durable spending: explanation and prediction.* Brookings Papers on Economic Activity, No. 2, 1970.

[27] The survey was conducted by J.D. Power and Associates and is entitled “The 2002 Escaped Shopper and Owner Loyalty Study”. A partial report is available at
http://www.jdpa.com/studies_jdpower/pressrelease.asp?StudyID=651&CatID=1. Accessed 12 September, 2002.

[28] See Glaister S, Graham D, *The effect of fuel prices on motorists*. Automobile Association, London, UK (September 2000), available at
http://195.167.162.28/policyviews/pdf/effect_fuel_prices.pdf. Accessed 17 September 17, 2002.

[29] Figure 11 is taken from Gilbert R, *Sustainable mobility in the city*. Presentation to URBAN 21, Global Conference on the Urban Future, Berlin, Germany, July 2000, available with detailed sources at:
http://www.cstctd.org/CSTadobefiles/sustainablemobility.pdf. Accessed 16 September 2002.

[30] The data on which Figure 12 is based are from the source detailed in Note 24. The correlation between car ownership rate and urban density is -0.64, i.e., there is a strong negative correlation between these two variables (see Note 24 for the significance of the correlation coefficient).

[31] Mention should be made of work suggesting that attitudes about urban life may be a more important factor than residential density in determining travel behaviour. It is Kitamura R, Mokhtarian PL, Laidet L, A micro-analysis of land use and travel in five neighbourhoods in the San Francisco Bay Area. *Transportation*, 24, 125-158 (1997). The authors concluded that “land use policies promoting higher densities and mixtures may not alter travel demand materially unless residents’ attitudes are also changed”. A problem in interpreting this study is the lack of specific information about settlement densities and possible misclassification. One of the three areas described as “high” density (Pleasant Hill) appeared to have more in common with the two areas described as “low” density (Concord, San Jose).

[32] The data on which Figure 13 is based are from the source detailed in Note 24. The correlation between car ownership rate and urban density is -0.40, i.e., there is a strong negative correlation between these two variables (see Note 24 for the significance of the correlation coefficient).

[33] For evidence concerning induced traffic, see Noland RB, Lem LL, A review of the evidence for induced travel and changes in transportation and environmental policy in the US and the UK, *Transpor-*

tation Research Part D, 7, 1-26 (2002); also Fulton LM, et al, A statistical analysis of induced travel effects in the U.S. mid-Atlantic Region, *Journal of Transportation and Statistics*, vol. 3(1), 2000, pp. 1-14. For a somewhat contrary conclusion, see Mokhtarian PL, Samaniego FJ, Shumway RH, Willits NH, Revisiting the notion of induced traffic through a matched pairs study, *Transportation*, 29, 193-220 (2002). For evidence that *reducing* highway capacity does not increase congestion, see Cairns S, Hass-Klau C, Goodwin P, *Traffic impact of highway capacity reductions: assessment of the evidence*. (Report for the UK Department of the Environment, Transport and the Regions), Landor Publishing, London (UK), 1998.

[34] For example, analysis of the particular success in the 1980s of the Houston and San Diego public transport systems compared with the rest of the in the U.S. pointed not only to "large service increases" but also to fare reductions and growth in employment and population. See Kan J, Liu Z, Secrets of success: assessing the large increases in transit ridership achieved by Houston and San Diego transit providers, *Transportation Research, Part A*, 33(7/8), 601-625 (1999).

[35] The consumer politics of car use is discussed further in Thøgerson J, *Structural and psychological determinants of the use of public transport*. Presentation at a colloquium organized by the Copenhagen-based Centre for Transport Research on environment and health Impacts and Policy (TRIP), Hørsholm, Denmark, November 2001, available at
www.akf.dk/trip/publications/papers/jt_public_tr.doc. Accessed September 18, 2002.

[36] For information about Phase 3 of the EST project, including the identification of societal and individual barriers to attainment of EST, see the URL in Note 9.

[37] Paterson M, Car culture and global environmental politics. *Review of International Studies*, 26, 253-270 (2000).

[38] For example, in 2000 more than half of the three million households in New York City did not own a car. In the most densely populated borough, Manhattan, where median household incomes are above both the New York City and the national averages, only 23% of households owned a car. For car ownership rates see the first URL below. For household incomes, see the second and third URLs below.
http://www.rightofway.org/research/5borocars2000.htm. Accessed October 25, 2002.
http://www.newsday.com/news/ny-census-nycincome.htmlstory. Accessed October 25, 2002.
http://www.whitehouse.gov/fsbr/income.html. Accessed October 25, 2002.

[39] For a recent review of transport in Hong Kong, and how it could be made even more sustainable, see Gilbert R, *Electrifying Hong Kong: Making transport sustainable*, Civic Exchange, Hong Kong, February 2002, available at the first URL below. See also Barron W, Ng SK, Loh C, Gilbert R, *Sustainable transport in Hong Kong: Directions and Opportunities*. Civic Exchange, Hong Kong, and Asia-Pacific Foundation, June 2002, available at the second URL below.
http://www.civic-exchange.org/publications/2002/Hong%20Kong%20paper%205.pdf. Accessed November 6, 2002.
http://www.civic-exchange.org/03publication/ST_HK_book.pdf. Accessed November 6, 2002.

[40] The study of Hong Kong students is Cullinane S, The relation between car ownership and public transport provision: a case study of Hong Kong. *Transport Policy*, 9, 29-39 (2002). In his introduction to the paper, the author suggests that stated intentions to use improved public transport and actual use differ because "the type of improvements envisaged [by survey respondents] are of a much greater magnitude than those actually put in place (such as isolated park and ride schemes)". He noted that large increase in patronage have occurred when *the whole system* has been improved. High quality service as in Hong Kong is above "a threshold level at which is becomes more viable not to have a car". On the matter of youth culture, another recent article, written from a UK perspective, suggested that sociology generally "has barely noticed the car, which is somewhat surprising given its impact on social life". It is Carrabine E, Longhurst B, Consuming the car: anticipation, use and meaning in contemporary youth culture. *The Sociological Review*, 50(2), 181-196 (2002).

[41] The quote is from Section 4.1 of the report on Phase 3 of the EST project (see the URL in Note 9).

[42] Staats HJ, Wit AP, Midden CYH, Communicating the greenhouse effect to the public: Evaluation of a mass media campaign from a social dilemma perspective. *Journal of Environmental Management*, 45, 189-203 (1996).

[43] Steg L, Sievers I, Cultural theory and individual perceptions of environmental risks. *Environment and Behavior*, 32(2), 250-269 (2000).

[44] Tertoolen, G, van Kreveld, D, Verstraten B, Psychological resistance against attempts to reduce private car use. *Transportation Research - A*, 32(3), 171-181 (1998).

[45] The approach of many of Canada's First Nations peoples is reflected in the title of the five-volume final report of the federal Royal Commission on Aboriginal Peoples, *For Seven Generations*. Depository Services Program, Canadian Government Publishing, CD-ROM (1997). The report's title appears to come from the Kaianerekowa—or Great Law of Peace—of the Haudenosaunee (Iroquois) Confederacy, as noted in Volume 2 of the report (Chapter 3, Section 1.2), which included the following: "The lawmakers, in weighing any decision, must cast their minds seven generations ahead, to consider its effects on the coming faces. The lawmakers must consider the effects of each decision on the natural world."
http://www.tc.gc.ca/envaffairs/english/SDStrategy/final%20SD%20Strategy%20-%20eng.pdf . Accessed August 26, 2002.

[46] The quote is from Chapter 4 of the report on Phase 3 of the EST project, available at the source detailed in Note 9.

[47] Margaret Thatcher's statement is quoted in Gamarnikow E, Green AG, The Third Way and social Capital: Education Action Zones and a new agenda for education, parents and community? *International Studies in Sociology of Education*, 9(1), 3-22 (1999).

[48] These are the opening words of a recent column in a U.S. newspaper: "Roaring Brook Road, normally a quiet country thoroughfare in Westchester County, becomes a frustratingly long line of cars, minivans and SUVs on school mornings, as hundreds of cars snake down a steep hill on their way to the local high school, which has barely 1,000 students. The bright yellow school buses, meanwhile, arrive practically empty, carrying mostly ninth-graders. No older student would be caught dead in the 'loser cruiser'. Anyone who wants to understand America's urgent energy challenge should watch this morning ritual, repeated in hundreds of suburban and rural communities across the country. With only limited public transportation, scarce sidewalks, few bike lanes, and 'uncool' school buses, it's all about cars. (Harris DA, Waste not, depend not. *New York Times* (3 March, 2002), available at
http://www.ajc.org/InTheMedia/OpinionsDetail.asp?did=202&pid=1130. Accessed 20 September 2002.

[49] The statement was reported to be that of Frederic Vester of the Munich-based Studiengruppe für Biologie und Umwelt GmbH (Study Group for Biology and Environment Ltd.), reported in Guntram U, Systems thinking and the environment: An interview with Frederic Vester. *The MacKinsey Quarterly*, 2, 153-169 (1993).

[50] Steg L, Vlek C, Slotegraaf G, Instrumental-reasoned and symbolic-affective motives for using a motor car. *Transportation Research Part F*, 4, 141-169 (2001).

[51] This classification is from the source detailed in Note 35.

[52] Gärling T, Fujii S, Boe O, Empirical tests of a model of determinants of script-based driving choice. *Transportation Research Part F*. 4, 89-102 (2001).

[53] The quote is from *Deliverable 2: State-of-the-Art Review* (Version 2). TAPESTRY project, European Commission (November 2001), available at the URL below. It is in reference to an account of the following report: Verplanken B, Aarts H, van Knippenberg A, Moonen A, Habit versus planned behaviour: A field experiment. *British Journal of Social Psychology*, 37, 111-128 (1998).
http://www.eu-tapestry.org/p_dwl/tap_d2.pdf. Accessed September 29, 2002.

[54] They violate what is known as the Principle of Parsimony, articulated most famously by mediaeval philosopher William of Ockam, who wrote (in Latin) that "entities should not be multiplied beyond necessity". This advice to slice out constructs became known as Ockam's razor. See
http://www.britannica.com/eb/article?eu=58133. Accessed 19 September, 2002.

[55] The definition of attitude is from Eagly AF, Chaiken S, *The psychology of attitudes*. Harcourt Brace Jovanovich, Fort Worth, Texas (1993).

[56] The review of the effect of attitudes is Krause SJ, Attitudes and the prediction of behaviour: A meta-analysis of the empirical literature. *Personality and Social Psychology Bulletin*, 21, 58-75 (1995).

[57] Mention should also be made of a more positive view of the link between attitudes and behaviour associated with the 'theory of planned behaviour' developed by Icek Ajzen. "According to the theory, the primary antecedent of any behavior … is the intention to perform the behavior in question. The intention, in turn, is a joint function of three factors: attitude toward the behavior, which is the degree of positive or negative evaluation associated with performing it; subjective norm, or the perceived social pressure to perform the behavior; and perceived behavioral control, which refers to the perceived ease or difficulty of performing the behavior." The quote is from Ajzen I, Brown TC, Rosenthal LH, Information Bias in Contingent Valuation: Effects of Personal Relevance, Quality of Information, and Motivational Orientation. *Journal of Environmental Economics and Management*, 30, 43-57 (1996). The theory of planned behaviour grew of the 'theory of reasoned action' also associated with the name of Icek Ajzen. The problem with such theories may be that they invoke what is being explained, and thus have little explanatory or predictive value.

[58] Pre-election voter-intention polls can be remarkably accurate. Polls reporting a few days before the September 2002 election of members of the German lower house of parliament (Bundestag) anticipated the actual votes for the two larger parties within a few percentage points, and the votes for the smaller parties within about 20 per cent. (For the pre-election poll results, see Erlanger S, Germans vote in tight election in which Bush, Hitler and Israel became key issues. *New York Times*, 22 September, 2002.)

[59] These points are discussed and examined in Fitzsimons GJ, Williams P, Asking questions can change choice behavior: Does it do so automatically or effortfully? *Journal of Experimental Psychology: Applied*, 6(3), 195-206 (2000).

[60] The study of lying is Feldman RS, Forrest JA, Happ BR, Self-presentation and verbal deception: do self-presenters lie more? *Basic and Applied Social Psychology*, 24(2), 163-170 (2002). See also, DePaulo BM, Kashy DA, Kirkendol SE, Wyer, M, Epstein JA, Lying in every day life. *Journal of Personality and Social Psychology*, 70(5), 979-995 (1996). This study also found everyday social interaction to involve much lying, with more self-centred lies being told to men and more other-oriented lies being told to women.

[61] For a description of the Oslo experience, see Tretvik T, *Urban road pricing in Norway: Public acceptability and travel behaviour*. Presentation at a conference entitled "Acceptability of pricing strategies" held in Dresden, Germany by MC ICAM (May 2002), available at the first URL below.
http://www.mcicam.net. Accessed 20 September, 2002.
http://data.vatt.fi/afford/reports/deliverable-2c.pdf. Accessed 20 September, 2002.

[62] The fuel price data in Figure 15 are from the first URL below; the opinion poll results are from MORI's Web site at the second URL below
http://www.dti.gov.uk/energy/inform/energy_prices/2002/august02/table_411.xls. Accessed 27 October, 2002.
http://www.mori.com. Accessed 27 October, 2002.

[63] Information about the protests and the election, and the 'poll wobble' quote, are from the BBC Web site at the first URL below, supplemented by information from the on-line archives of the *Guardian* newspaper at the second URL below.
http://news.bbc.co.uk. Accessed 27 October, 2002.
http://www.guardian.co.uk. Accessed 27 October, 2002.

[64] The quote is from the source detailed in Note 35.

[65] For the views of one health agency on the purposes and effect of tobacco advertising, see U.S. Department of Health and Human Services. *Reducing Tobacco Use: A Report of the Surgeon General.* Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health (2000), available at
http://www.cdc.gov/tobacco/sgr/sgr_2000/FullReport.pdf. Accessed 14 September, 2002.

[66] Saffer H, Tobacco advertising and promotion. In (Jha P, Chaloupka F eds.) *Tobacco Control in Developing Countries*, World Bank, Washington DC, pp. 215-236 (2000), available at
http://www1.worldbank.org/tobacco/tcdc.asp. Accessed September 14, 2002.

[67] The quote is from Page 26 of Eliany M, Rush B, *How effective are alcohol and other drug prevention and treatment programs? A review of evaluation studies*. Health and Welfare Canada, Ottawa (1992).

[68] See for example, Gius MP, Using panel data to determine the effect of advertising on brand-level distilled spirits. *Journal of Studies on Alcohol*, 57, 73-76 (1996).

[69] For advertising expenditures, see the article "Advertising" in *Encyclopedia Britannica*, available (for a fee) at the first URL below. See also *Ad Expenditures Drop Only 0.2 Percent in First Half of 2002*, CMR Data and Analysis (26 August, 2002), at the second URL.
http://www.britannica.com/eb/article?eu=136245. Accessed 15 September, 2002.
http://www.cmr.com/news/2002/082602.html. Accessed 15 September, 2002.

[70] Bittlingmayer G, Advertising. In *The Concise Encyclopedia of Economics*, available at:
http://www.econlib.org/library/Enc/Advertising.html. Accessed 15 September, 2002.

[71] The advertising data in this paragraph are for 1998 or 1999 and are from CMR Data and Analysis (29 March, 2000) at
http://www.cmr.com/news/2000/032900_2.htlm. Accessed September 15, 2002.

[72] Advertising and sales data are from Greuner MR, Kamerschen DR, Klein PG, The competitive effects of advertising in the US automobile industry, 1970-1994. *International Journal of the Economics of Business*, 7(3) 245-261 (2000).

[73] For counter-advertising against tobacco use, see *The Use of Counter-Advertising As a Tobacco Use Deterrent*, The Advocacy Institute, Washington DC, at the first URL below. For counter-advertising against alcohol use, see Saffer H, Alcohol advertising and youth. *Journal of Studies on Alcohol*, Supplement No. 14, 173-181 (2002), available at the second URL below. For examples of counter-advertising that is not product-specific see the third URL below.
http://www.advocacy.org/publications/mtc/counterads.htm. Accessed 16 September, 2002.
http://www.collegedrinkingprevention.gov/reports/Journal/173-Saffer.pdf. Accessed 16 September, 2002.
http://adbusters.org/uncommercials/. Accessed 28 September, 2002.

[74] The quotes and information in this paragraph are from two articles in the *Globe & Mail* (Toronto) on 19 August, 2002. One was an article by André Picard entitled "Antismoking campaign 'ineffective'". The other was an open letter to the federal Minister of Health signed by 14 organizations, including the Canadian Medical Association.

[75] The tobacco industry executive is John Wildgust, director of corporate affairs for Montreal-based JTI-Macdonald Corporation, in Bashing big tobacco's a nasty habit. *Globe & Mail* (Toronto), 17 September, 2002.

[76] These points are taken from Appendix C of *New Directions for Tobacco Control in Canada—A National Strategy*. Health Canada, Ottawa (1999), available at:
http://www.hc-sc.gc.ca/hecs-sesc/tobacco/policy/new_directions/appendix_c.html. Accessed 17 September 2002.

[77] Siegel M, The effectiveness of state-level tobacco control interventions: A review of program implementation and behavioral outcomes. *Annual Review of Public Health*, 23, 45-71 (2002), at
http://publhealth.annualreviews.org/cgi/reprint/23/1/45.pdf. Accessed 17 September, 2002.

[78] Groeger JA, Rothengatter JA, Traffic psychology and behaviour. *Transportation Research Part F*, 1, 1-9 (1998).

[79] See *Traveller Information Systems Research: A Review and Recommendations for Transport Direct*. Department of Transport, UK Government (September 2001), available at:
http://www.local-transport.dft.gov.uk/travinfo/index.htm. Accessed September 24, 2002.

[80] The quotes are from *Public Outreach on Climate Change: Foundation Paper*. Public Education and Outreach Issue Table. National Climate Change Secretariat, Government of Canada (October 1998), at
http://www.nccp.ca/NCCP/pdf/public_found.pdf. Accessed 24 September, 2002.

[81] The quote and other information about INPHORMM is from the final summary report on the project available at
http://www.cordis.lu/transport/src/inphormmrep.htm. Accessed 25 September, 2002.

[82] The review is Grant-Muller S (ed.), *Assessing the Impact of Local Transport Policy Options*, Working Paper 549, Institute for Transport Studies, University of Leeds, UK (April 2000), available at http://www.its.leeds.ac.uk/projects/detr/advice16.pdf. Accessed September 25, 2002.

[83] The work on the West Midlands to north west England corridor is summarized at http://www.m6corridor.com/Reports/MIDMAN%20pn2%2024jan.pdf. Accessed 25 September, 2002.

[84] See *Report of the OECD workshop on Information and Consumer Decision-making for Sustainable Consumption*. Document ENV/EPOC/WPNEP(2001)16/FINAL, environment Directorate, Organisation for Economic Cooperation and Development, Paris, March 2002.

[85] The quotes are from the TAPESTRY Web site, at http://www.eu-TAPESTRY.org/p_aim1.shtml. Accessed 29 September, 2002.

[86] The TAPESTRY review is available at the first URL below. It is also detailed in Note 53. The review has two annexes, available at the second and third URLs. Annex A is a review of recent relevant EU research projects. Annex B overviews activities within EU member countries. The quote is from Page 2 of the review. Table 6 is based on Section 2.6 of the review.
http://www.eu-tapestry.org/p_dwl/tap_d2.pdf. Accessed 29 September, 2002.
http://www.eu-tapestry.org/p_dwl/tap_d2_a.pdf. Accessed 29 September, 2002.
http://www.eu-tapestry.org/p_dwl/tap_d2_b.pdf. Accessed 29 September, 2002.

[87] Table 7 is based on Table4.1 of the source detailed in Note 80.

[88] Community-based social marketing has become a focus of part of the Government of Canada's climate change work. For example, the applications concerning transportation to the Public Education and Outreach programme of the Climate Change Action Fund are expected to have a community based social marketing approach, as specified in the URL below. The term 'social marketing' appears to have been used first in the following paper: Kolter P, Zaltman G, Social marketing: an approach to planned social change. *Journal of Marketing*, 35, 3-12 (1971).
http://climatechange.gc.ca/english/actions/action_fund/AppGuide_CGP.shtml. Accessed October 29, 2002.

[89] The quote is from the TAPESTRY report detailed in Notes 53 and86. It is in reference to Fergusson M, Davis, Skinner I, *Delivering changes in travel behaviour*. Institute for European Environmental Policy, London UK (1999).

[90] The energy conservation guidelines are in Greer H et al, *The guide to change energy-related behaviour*. Æneas Technical Publishers, Best, The Netherlands (2000).

[91] Note that the assumptions underlying the numbers in Table 8 are the same as those in Table 5.1 of the document detailed in Note 90, but the numbers are different. The numbers have been recalculated. Note particularly that the 'no-intervention result' has been subtracted from the '3-year saving in energy costs' for the four interventions, as this amount cannot be legitimately regarded as a saving resulting from the interventions.

[92] Information about the technique of individualized marketing is at the first URL below. Data on the application of individualized marketing are at the second URL.
http://www.travelsmart.transport.wa.gov.au/pdfs/present_infra.pdf. Accessed September 25, 2002.
http://www.vicfit.com.au/walk/DocLib/Pub/DocLibDownload.asp?lngDocLibID=9&Filename=BruceJamesPaper.pdf. Accessed 25 September 2002.

[93] The EANO principle is discussed more fully in Gilbert R, Reducing automobile use in urban areas by reducing automobile ownership: the EANO principle. In Andan O, Faivre D'Arcier B, Lee-Gosselin M (eds.), *L'Avenir des Déplacements en Ville: The Future of Urban Travel*. Laboratoire d'Economie des Transports, Lyon, France. Vol. 2, pp. 31-47. It was also discussed in a keynote presentation made at URBAN 21, Global Conference on the Urban Future, the proceedings of which are at the first URL below. The full paper is at the second URL below.
http://www.urban21.de. Accessed 28 October, 2002.
http://www.cstctd.org/CSTadobefiles/sustainablemobility.pdf. Accessed 28 October, 2002.

[94] The quote is from the official report on the experts' meeting, which can be found at the URL below.
http://www.olis.oecd.org/olis/1997doc.nsf/LinkTo/ocde-gd(97)144. Accessed 28 October, 2002.

[95] These features can be found, for example, in *Transit-Supportive Land Use Planning Guidelines*, prepared by Toronto's IBI Group and published in 1992 by the Ministries of Municipal Affairs and Transportation of Canada's Province of Ontario, and available at the URL below.
http://www.mah.gov.on.ca/business/transuppguid/transuppguid-e.pdf. Accessed 28 October, 2002.

[96] This is the design feature proposed by Hermann Knoflacher, Technical University of Vienna, at an OECD-ECMT workshop entitled *Land-use Planning for Sustainable Urban Transport*, Linz, Austria, September 1998. For an available version of a similar paper, see the URL below.
http://www.kouvola.fi/domino/webbi/sis.nsf/ab3345b59555029442256a93002cb836/09371d200f0e31f942256adf002cd482/$FILE/abstractKnoflacher.doc. Accessed 27 October, 2002

[97] Gärling T, Behavioural assumptions overlooked in travel-choice modelling. In Ortúzar J de D et al. (eds.) *Travel Behaviour Research: Updating the State of Play*. Elsevier: Oxford, UK, pp. 3-18 (1998)

[98] See the source detailed in Note 60.

[99] The quote is from Page 27 of *Understanding the brain: Towards a new learning science*, Organisation for Economic Cooperation and Development, Paris (2002). 'Mind' is not in the glossary of this document, although it is part of the definition of the following terms: "**Cognition.** Operation of the mind which includes all aspects of perceiving, thinking, learning, and remembering. **Cognitive neuroscience.** Study and development of mind and brain research aimed at investigating the psychological, computational, and neuroscientific bases of cognition. **Cognitive science.** Study of the mind. An interdisciplinary science that draws upon many fields including neuroscience, psychology, philosophy, computer science, artificial intelligence, and linguistics. The purpose of cognitive science is to develop models that help explain human cognition – perception, thinking, and learning. **Cognitive vitality.** Refers to the active strength or force of mind throughout the life-span."

[100] Damasio AR, How the brain creates the mind. In *The Hidden Mind*, special edition of *Scientific American*, 2002.

[101] The polemic against environmental determinism is Pinker S, *The Blank Slate: The Modern Denial of Human Nature*, Viking, New York (2002). The quote is from Page 73. The estimates of the contributions to variation in human behaviour are on Page 380-381.

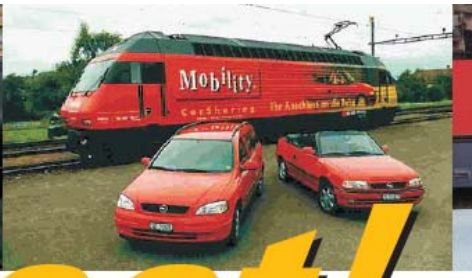
[102] For an elaboration of the analogy between evolution and behaviour see, for example, Gilbert RM, Variation and selection of behavior. In Gilbert RM, Millenson JR (eds.), *Reinforcement: Behavioral Analyses*, Academic press, New York, pp. 263-276 (1972). For a topical discussion of 'Universal Darwinism' see Wynne CDL, Universal Plotkinism: A review of Henry Plotkin's *Darwin Machines and the Nature of Knowledge*. *Journal of the Experimental Analysis of Behavior*, 76, 351-361 (2001).

[103] Neurophysiology may be helping identify the covert behaviour that comprises thinking and even 'mind'. See especially Nicolelis MAL, Actions from thoughts. *Nature*, 409, 403-407 (2001).

[104] For information about creationism, see the first URL below. For a contrary view, see Steering Committee on Science and Creationism, *Science and Creationism: A View from the National Academy of Sciences, Second Edition*. National Academy of Sciences, Washington DC (1999), available at the second URL below.
http://www.creationism.org. Accessed September 11, 2002.
http://www.nap.edu/books/0309064066/html. Accessed 11 September, 2002.

APPENDIX 2

WORKSHOP PROGRAM


est!

PROGRAMME

OECD-UBA Workshop on

COMMUNICATING ENVIRONMENTALLY SUSTAINABLE TRANSPORT – THE ROLE OF SOFT MEASURES IN ACHIEVING EST

Berlin, 5-6 December, 2002

5 December, 2002

Session 1. 09:30-10:30 **Soft Measures for EST? – What will be required for EST?**

This session will introduce the workshop, set out its context and purposes, explain what is meant by soft measures and by EST, summarise the issues paper prepared for the workshop, and describe in a general way how use of soft measures could help secure attainment of EST.

Chair: Reinhard **Kaiser**, Federal Ministry of Environment, Berlin

Axel **Friedrich**, Federal Environmental Agency, Berlin

Peter **Wiederkehr**, OECD Environment Directorate, Paris

Richard **Gilbert,** Centre for Sustainable Transportation, Toronto

Session 2. 11:00-12:30 **Present transport behaviour and what maintains it**

This session will show how present transport is unsustainable and project the consequences of continuing with present trends. It will discuss what contributes to present trends, including individual and societal factors, and the barriers to change.

Moderator: John **Adams**, University College London

Herbert **Kemming**, ILS, Dortmund

Ellen **Matthies**, University of Bochum

Charles **Vlek**, University of Groningen

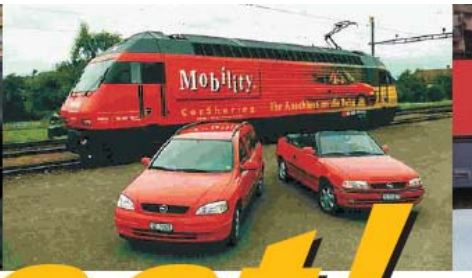
Session 3. 14:00-15:30 **Roles of soft measures in changing transport and other behaviour**

This session will overview research on the effectiveness of soft measures in transport and other sectors. The importance of associated factors such as acceptance and attitude change will be highlighted. Consideration will be given to relevant cultural and other differences (e.g., OECD vs. non-OECD countries).

Moderator: Udo **Becker**, University of Technology, Dresden

John **Whitelegg**, John Moores University, Liverpool

Tony **Weggemans**, AYIT Consultancy, Tilburg


est!

Hermann **Knoflacher**, University of Technology, Vienna

Session 4. 16:00-18:00 **How soft measures could be used to achieve EST**

This session will focus on identifying the best roles for soft measures in making progress towards EST, both alone and in combination with hard measures, both in securing understanding of the need for EST; and in changing behaviour towards EST. The session will end with a review of the day's proceedings.

Moderator: Martin **Kroon**, Ministry of Environment, The Hague

Peter **Jones**, University of Westminster, London

Jens **Schade**, University of Technology, Dresden

Anders **Berndtsson**, National Road Administration, Stockholm

6 December, 2002

Session 5. 9:30-11:00 **Special focus on the media, advertising, and marketing**

This session will examine how present trends are sustained by marketing practices, advertising, and representations in the media, and how these could all be used to help achieve progress towards EST.

Moderator: Axel **Friedrich**, Federal Environmental Agency, Berlin

Werner **Brög**, SOCIALDATA, Munich

Michael **Houben**, WDR-Köln

Claudia **Schury**, Climate Alliance, Frankfurt

Session 6. 11:30-13:00 **Developing advice for policymakers on the use of soft measures**

This session will develop recommendations directed towards changing awareness of policymakers about the need for EST and helping policymakers work towards attainment of EST. The recommendations will concern information provision and education at all levels, the use of media and advertising, and the use of other techniques involving soft measures alone and in combination with hard measures.

Moderator: Robert **Thaler**, Federal Ministry of Environment, Vienna

David **Banister**, University College London

Joerg **Beckman**, European Federation for Transport & Environment, Brussels

Werner **Reh**, BUND, Berlin

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