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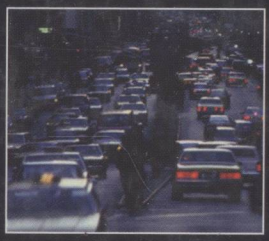
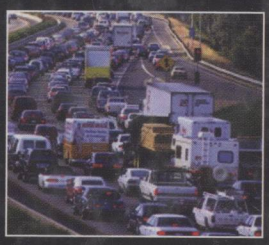
THREATS FROM CAR TRAFFIC TO THE QUALITY OF URBAN LIFE



PROBLEMS, CAUSES, AND SOLUTIONS

EDITED BY
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THREATS FROM CAR TRAFFIC TO THE QUALITY OF URBAN LIFE:
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PREFACE

When thinking about current growth trends in motorized traffic and in particular private car use, there are many reasons to be worried about the future, even the near future. The ever-increasing documentation of negative effects on the environment, most importantly the transport sector's adverse effects on global climate change, is one reason for serious concern. Not enough seems to be done. Some have argued that the political system is non-linear – when the situation becomes *really* severe, politicians will react forcefully. This may or may not be an over-optimistic view.

There must be reasons why the public does not react strongly. The private car is instrumental for many important and desirable activities that people have time to engage in. And they gain even more time from using the car, at least as long as it remains a fast mode of daily travel. However, we know that this is no longer always the case. That people continue to use the car may therefore appear strange. Apparently, other factors account for this: freedom of choice, resistance to change a habit, affective attachment to the car, and the pleasure to drive. A diluted responsibility for undertaking required changes is an additional important factor.

In particular, in urban areas the negative effects of private car use are felt. Noise pollution, air pollution, pedestrian traffic accidents, infringement on land use resulting in the destruction of historic, cultural, and restorative qualities are among the most severe negative threats to the quality of urban life. A primary cause is the immense growth in urban populations, car ownership, and car use.

How can urban-life quality be restored? In any solution private car use must most likely be restrained, although not banished. Is increasing the price a solution? Regulation? Information and education?

We were lucky to manage to recruit scholars as authors of the chapters in this book, who are experts on various aspects of (i) what the threats are from car traffic, (ii) which the determinants of car use are, and (iii) what possible policy measures for curtailing car use can be implemented. This guaranteed a broad coverage of both positive and negative aspects of private car use in urban areas. We hope readers coming from one of the many disciplines represented by the authors of chapters in this book will appreciate this broad coverage. At the same time, we are particularly pleased that all chapters take a behavioural perspective on the problems as well as their solutions. This is needed as a contrast to other perspectives that tend to dominate. After all, it is ordinary people who are both drivers benefiting from the car (excluding the benefits to the car producers) *and* are exposed to the negative effects. We hope that this message will get through to policy makers in the transport sector.

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Tommy Gärling
Linda Steg *October, 2006*

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Threats from Car Traffic to the Quality of Urban Life
Tommy Gärling and Linda Steg (Editors)

1

INTRODUCTION

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ABSTRACT

This introduction briefly overviews the following chapters in the book. The chapters focus on a wide range of behavioural issues related to (i) what the threats are to the urban quality of life from car traffic (and how urban life quality may be defined and measured); (ii) which are the determinants of car use (instrumental, affective/symbolic, or habit) including the possible role played by an ecological orientation; and (iii) how the problems of car use may effectively be reduced through policies forcing or encouraging changes in car use.

BACKGROUND

Motorised traffic is a major contributor to environmental problems at a global scale. In urban areas quality of life is threatened by the steady growth of motorised traffic. Private car use is a major source of these problems. It is widely acknowledged that these problems cannot be effectively controlled by means of new technology aimed at reducing the negative impacts per vehicle. Changes in volumes of car traffic are needed as well (OECD, 1996; Gärling *et al.*, 2002; Steg and Gifford, 2005). Thus, policies must target the demand for car use.

To effectively reduce the problems resulting from motorised traffic, the nature of these problems must be understood. Moreover, knowledge is needed regarding which behaviours contribute to these problems; which factors affect such behaviours; and how the relevant behaviours (and underlying determinants) may be changed to reduce the problems. Given the nature of these problems and the many different factors affecting travel behaviour, and more specifically, car use, a multidisciplinary perspective is warranted to address the urgent issues.

Private car use is a major source of threat to urban quality of life. Therefore, this volume focuses on private car use. In the past decades, scholars from different disciplines have conducted numerous relevant studies on problems resulting from car use, factors influencing the level of car use, and ways to reduce car use to manage these problems. These studies have typically been conducted from a unidisciplinary perspective. Insights from such unidisciplinary studies need to be combined and integrated to understand the complexity of the problems of car use and possible solutions for it.

AIMS

This book aims to provide a comprehensive overview of research on problems resulting from car use, factors influencing car use, and effective strategies to manage these problems by reducing the level of car use. These issues are discussed from a behavioural science perspective this book integrates insights from different disciplines. The book consists of three sections, in which the following three main questions are being addressed: (i) What are the threats to the urban quality of life from car traffic; (ii) Which are the determinants of car use; and (iii) How can the problems of car use effectively be reduced via behavioural changes of individual car users?

OVERVIEW OF CHAPTERS

The first part of the volume is devoted to problems resulting from car use. A detailed description is given regarding negative impacts, such as air pollution, traffic noise, destruction of natural areas and aesthetic qualities, and congestion. In Chapter 2, Van Wee reviews environmental effects of urban traffic and related health effects. He discusses emission of toxic and harmful substances related to climate change, acidification, and air pollution (e.g., CO_2, NO_x, CO), as well as the so-called livability effects related to running and parked vehicles. Furthermore, possible ways of reducing these negative environmental effects are discussed. In Chapter 3, Gifford and Steg discuss quality-of-life effects of (reductions in) car use. They argue that sustainable transportation implies finding a balance between collective qualities and individual quality of life. Approaches to measuring quality of life are discussed, as well as implications for informing policy.

Adverse effects of traffic noise are discussed in Chapter 4 by Miedema, who describes various effects of noise annoyance focussing on reduced attention, increased arousal, and affective reactions, such as fear. A distinction is made between instantaneous and chronic effects, and their relationships with impacts on health are discussed. Furthermore, Miedema discusses acoustic and non-acoustic factors that influence (effects of) noise annoyance. In Chapter 5, Allen and Golledge review research on car drivers' navigation

related to spatial structure. They demonstrate how cognitive structures of spatial knowledge and physical structures of the built environment organise and constrain travellers' spatial behaviour. Furthermore, they discuss implications of these influences for motorised traffic in urban areas, with an emphasis on causes and potential remedial actions. Chapter 6 by Hartig focuses on positive and negative effects of car traffic on opportunities for restoration. He argues that, on the one hand, motorised traffic inhibits restoration, for instance, because of loss of green space and depreciation of restorative quality of housing with the construction of new road infrastructure. On the other hand, motorised traffic may serve restoration objectives, by enabling people to travel to recreational settings of greater restorative quality or by allowing a restorative interlude between daily demands.

In Chapter 7, Domergue and Quinet describe external costs of traffic and transport. They list effects that can be evaluated and effects that can be monetarised. Next, they elaborate on methods to evaluate and monetarise impacts of car traffic, which enable decision-makers to make optimal trade-offs between environmental protection and other social objectives. They demonstrate how these methods may be used to provide input to decision-making processes.

The second part of the volume focuses on factors influencing mode choice, and more specifically, choice of private car. Historical trends in car ownership and use as well as possible future developments are described. Next, societal and individual factors affecting car use are discussed. In particular, the chapters elaborate on relevant individual factors. In Chapter 8, Vilhelmson illustrates that socio-spatial organisation of society has stimulated high levels of mobility, and an increased car dependency. He explores the development, structure, and distribution of various car-dependent urban activities. Moreover, he refers to individual as well as external factors that stimulate car dependency, and in particular the time-space organisation of society.

In Chapter 9, Axhausen reviews the macroscopic dynamics of the travel and communication market. Based on this, he proposes dynamic frameworks for travel behaviour, and elaborates a research agenda for travel behaviour and mobility tool ownership. Chapter 10 by Stradling looks at how car ownership, car use, and prospects for modal shifts from car to more sustainable modes vary across different segments of a population. Stradling develops a theoretical overview of factors influencing travel and transport choices, distinguishing car dependent places, trips, and persons. He demonstrates the prevalence of different types and levels of car-dependence, and the prospects for modal shifts for groups differing in car dependency. Based on this, policy suggestions are given for how to reduce car dependency.

The subsequent chapters focus on individual factors affecting car use. The instrumental values of car use as well as its social and affective values are discussed. In Chapter 11, Jakobsson focuses on instrumental reasons for car use. She highlights the role of external

factors as well as internal motives for private car use. The argument is made that many people fail to carry out intentions to reduce car use, because instrumental motives are in conflict with the intended change in behaviour, and she concludes that people must be presented with good (instrumental) reasons to reduce their car use, as well as the possibility to form a conscious plan for how to overcome various barriers to do so. Affective and symbolic values of car use are discussed by Gatersleben in Chapter 12. She reviews studies demonstrating the significance of non-instrumental aspects indicating that cars have more than instrumental value. Gatersleben concludes that in informing travel demand management (TDM), it is necessary to know more about what drives people to use their car rather than more sustainable modes of transport.

Habits and routines also play a large role. Chapter 13 by Fujii and Gärling focuses on the development and impact of car use habits. They argue that habitual car users often fail to reduce their car use, even when they intend to do so. Their chapter answers questions like, how car-use habits are developed, how habits affect travel choice, and how car-use habits may be broken. Moreover, they evaluate various methods for measuring car-use habits.

Chapter 14 by Matthies and Blöbaum describes relationships between ecological norm orientations and car use. They demonstrate that norms to cut back on driving in order to protect the environment are particularly distinctive in some western European countries, such as Germany, Switzerland, Sweden, and The Netherlands. However, these norms do often not result in actual reductions in car use. After a review of studies that have examined relationships between ecological norms and behaviour, Matthies and Blöbaum propose the conditions under which ecological norms may influence mode choices.

The third part of the volume describes ways to reduce the problems caused by car use through behavioural changes. The effectiveness, political feasibility, and acceptability of various strategies of behavioural change are critically discussed. In Chapter 15, Loukopoulos provides a classification of TDMstrategies detailing their important properties. He demonstrates that TDM measures have a much broader aim than they originally had, that is, they are no longer aimed at reducing car use only, but are aimed at reducing negative impacts related to car use as well. Next, Loukopoulos discusses several attributes or dimensions of TDM strategies, and indicates how these dimensions may affect policy effectiveness, acceptability, and feasibility.

The following chapters provide an in-depth discussion of four general TDM strategies: urban planning, prohibition, transport pricing, and marketing. These strategies differ in how they trigger behaviour change (Steg, 2003). The first three strategies are aimed at changing social conditions and structures that inhibit car use or facilitate the use of sustainable modes of transport. Urban planning is aimed at facilitating or inhibiting

certain types of travel behaviour by changing physical structures and infrastructure. Prohibition is based on enforcing behaviour changes via laws, regulations, and standards adopted by the government. Transport pricing makes car use less attractive by increasing prices of car use, or by making the use of sustainable modes of transport relatively cheaper, thereby increasing their relative attractiveness. In contrast, the fourth strategy, social marketing, is aimed at promoting the use of sustainable transport modes by influencing people's perceptions, beliefs, attitudes, values, and norms.

In Chapter 16 Newman and Kenworthy illustrate how urban transport is shaped by the physical structure and infrastructure of a city. Based on this, they suggest how physical planning may change travel behaviour. Newman and Kenworthy argue that sustainable transport options should in particular be competitive with cars with respect to speed, and they propose various planning measures that may help achieve this aim. In Chapter 17, Gärling and Loukopoulos focus on prohibition of car traffic. They discuss why voluntary measures are not effective in reducing car use, and why coercive measures need to be implemented. They demonstrate that coercive measures may have negative side effects. Furthermore, Gärling and Loukopoulos describe the circumstances under which coercive measures may or may not be acceptable to the public and to the policy-makers, respectively.

Chapters 18 and 19 focus on transport pricing strategies. Transport pricing strategies have been extensively studied by many scholars. They are believed to be effective in reducing car use. However, transport pricing is not easily implemented because of lack of public and political support. In Chapter 18, Ubbels and Verhoef provide an overview of the economic theory of transport pricing. They distinguish several transport pricing objectives, of which economic efficiency should take precedence, according to economics. They demonstrate that efficient prices can often not be set in existing markets. Therefore, regulators have to resort to so-called "second-best" pricing, that is optimal prices, given the prevalent constraints, which are more difficult to define and implement than are the "first-best" prices (i.e., efficient prices under ideal circumstances). Steg and Schuitema provide a psychological perspective on transport pricing in Chapter 19. They discuss various factors influencing the effectiveness and acceptability of transport pricing from a theoretical perspective, and provide empirical evidence for their propositions. The role of individual as well as policy characteristics is discussed. Steg and Schuitema also analyse the relationship between effectiveness and acceptability.

In Chapter 20, Thøgersen discusses social marketing strategies aimed at promoting the use of non-motorised modes of transportation. He provides a concise definition of social marketing in this context, and reviews its effectiveness based on practical experiences as well as research. From this, Thøgersen outlines policy recommendations and makes suggestions for further research to better understand under which conditions social marketing may be effective.

Chapter 21 illuminates the value of driver support systems in cars to reduce the problems caused by car traffic. In this chapter, Brookhuis and De Waard distinguish driver support systems that operate in advisory, semi-automatic or automatic mode, and illustrate that these may have different effects for traffic safety and the environment. They discuss possible desired and adverse effects of driver support systems on traffic safety, efficiency, and the environment. Moreover, Brookhuis and De Waard outline issues related to acceptability of driver support systems.

A general overview of the effectiveness of transport policies is provided in Chapter 22 by Goodwin, who reviews a vast body of empirical evidence with a bearing on what policies are likely to be effective in reducing car travel. Prospective research results as well as actual effects of policy initiatives are critically discussed. Goodwin concludes that, given the political will and a suitably consistent policy support to reduce unintended effects, it is not very difficult to adopt measures that reduce car use from 10% to 30%.

The different perspectives on problems resulting from car use, their causes and possible solutions are integrated in the concluding chapter by Vlek (Chapter 23). Vlek discusses 12 key issues for research and policy-making to effectively manage the problems of car use. He argues that management of these problems requires (i) diagnosis of the problems resulting from car use and behavioural factors underlying these problems; (ii) policy-decision making about which behaviour changes are needed to reduce the relevant problems; (iii) implementation of practical intervention strategies that are effective, acceptable, and feasible; and (iv) evaluation of effectiveness of these strategies. For each of these phases, specific focal issues are elaborated. Vlek argues that freedom in markets (i.e., freedom to travel) must be pitted against required governmental control and direction in order to protect human well-being and environmental quality. He emphasises the importance of a multidisciplinary research, and stresses that effective solutions of the problems caused by car use will be reached only when a coherent mix of policy measures that address the main factors underlying the growth of car use is implemented.

Overall, the volume provides a comprehensive overview of the problems resulting from car use, the causes of these problems, and effective and acceptable ways to manage the problems through behavioural changes.

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