Moving through nets
An introduction

Author(s):
Axhausen, Kay W.

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Introduction

Moving through nets: An introduction

K.W. Axhausen
Arbeitsbericht Verkehrs- und Raumplanung

Sich in Netzen bewegen: Eine Einleitung

K.W. Axhausen
IVT
ETH
CH – 8093 Zürich

Telefon: +41-1-633 3943
Telefax: +41-1-633 1057
axhausen@ivt.baug.ethz.ch

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Kurzfassung

Dies ist die Einleitung des Buches zur 10th International Conference on Travel Behaviour Research, die im August 2003 vom IVT in Luzern organisiert wurde. Es skizziert einen theoretischen Rahmen für die in der Konferenz präsentierten Arbeiten.

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K.W. Axhausen
IVT
ETH
CH – 8093 Zürich
Telephone: +41-1-633 3943
Telefax: +41-1-633 1057
axhausen@ivt.baug.ethz.ch

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Abstract

This introductory chapter sketches a conceptual framework for the papers presented at the 10th International Conference on Travel Behaviour research, which was organised by the IVT in Lucerne during August 2003.

Keywords

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Preferred citation style

1 A reframing

Travel behaviour research, in particular that informed by the activity-based viewpoint, has expanded our understanding of travellers and their choices enormously. The International Association of Travel Behaviour Research (IATBR) has furthered this process through its now long-standing series of tri-annual conferences (see Table 1 below). Their proceedings and the literature generally document the increasing refinement of our conceptual frameworks and models for the behaviours and choices of travellers on individual days. Taste differences, lifestyles, attitudes and sociodemographics have been added to the description of choice situations, which are driven by the relative, generalized costs of the activities and their associated travel. What is mostly missing in the current analysis is a framing, which would integrate the short- and long-term dynamics of travellers. While the industrialized world will never again see a similarly dramatic shrinking of its time-space system as it did during the last fifty years (see Figure 1 for the Swiss example), other major changes should force travel behaviour analysis to adopt fully dynamic frameworks.

Figure 1 Road travel time-scaled mapping of Switzerland (same scale)

Source: Axhausen and Hurni (2005)

The changes and challenges to the field are both external and internal. The recent difficulties and costs involved in expanding infrastructure capacity have led to increasing reliance on demand management approaches to balance the loads on the networks. Transport telematics,
on-line traffic control, road pricing, revenue management of the airlines, but also employer-based “green travel” come to mind. All of these work because travellers have some flexibility with regard to their timings, above and beyond other possible changes to their schedule such as route, mode or destination. These changed timings are likely to affect other days than just the current one and therefore suggest models which are able to address sequences of days.

The internal logic of the past thirty years of model development points to the microsimulation of all travel in a study area as the appropriate approach for transferring the results of activity-based travel analysis into practise. Microsimulations are inherently dynamic and are therefore able to welcome the external emphasis on behaviour interactions over time. Additionally, the limitations of the current set of variables to explain behaviour have become clear. While the models often have good fits, there remains an unease, especially about trip generation, the stability of behaviour over time, the joint choices of groups and households, the formation of choice sets and finally the selection and formation of choice rules by travellers. From the dynamic perspective, and also against an analysis of the missing variables, two issues (and variable groups) seem obvious: the information assembled by travellers via their biographies, and the information and abilities inherent in their social networks.

Figure 2  The individual in a dynamic social context
Figure 2 above tries to summarize this view of the traveller in a dynamic social context. The personal world of the traveller is perhaps better known as his or her mental map, but that image is limiting, as it emphasizes the geography of the activity space at the expense of other important elements of knowledge: types of activities known, when and with whom to undertake them, and the opening hours of facilities. An alternative term for this knowledge would be activity repertoire, which in turn is weak because it does not refer to the geography of activity participation. Drawing on the knowledge accumulated over the course of a lifetime, the traveller selects projects against the background of his or her current commitments. Longer-term household locations (including workplaces, regularly used shops and other facilities), social networks and the available mobility tools (such as licences, motorized vehicles, public transport season tickets and bicycles) are mentioned in Figure 2. The members of the social network and their personal worlds are both resources and constraints. Their knowledge, their abilities and their material resources can be drawn on within the limits of convention and the strength of the personal relationship, which gives the individual extra leverage in his or her daily life. Their locations, abilities and resources are also limiting, as they have to be considered in decision making. Consider the trivial case of the joint choice of a restaurant if one of the members of the group has particularly strong dislikes, such as an aversion to a cuisine, or is allergic to, say, seafood.

Such a dynamic view of the individual requires a division of the modelled processes into short-term and long(er)-term ones. One possibility for such a division is suggested in Figure 3 and Figure 4. The understanding sketched here does not require an equilibrium concept, but assumes a willingness on the part of the individual to improve his or her situation incrementally. While behaviourally appealing, such an approach might still need equilibrating mechanisms to produce consistent results in application timeframes.

The central process for the short term (Figure 3) is the formulation of schedules, such as the complete description of a day (number, type and sequence of activities, their durations and locations, modes and routes, finally group size and composition for travel and activities). It is assumed here that the scheduler draws from an activity calendar which lists the activities or, more generally, activity types that the traveller has to accomplish due to project engagements, commitments, physiological needs or desires. This list reflects the activity repertoire of the person, which can be expanded through interaction with others and the environment. As people generally aim to improve and possibly even optimize their schedules, they will draw on their mental maps to reduce the effort and uncertainties of the day. We know that travellers, as a rule, do not fully book their days, but leave slots for the unexpected and the unplanned. In a simulation framework it might be necessary for the sake of computational
convenience to impose the assumption that the current day has been fully allocated by some arbitrary point of time in the previous night.

Figure 3  Modelling the individual’s day-to-day dynamics

The execution of the schedule requires interacting with others in the networks and in activity opportunity places such as shops, cinemas or other persons’ homes. In some cases the resulting congestion or the failure of an activity opportunity to deliver the expected service or good forces travellers to adjust and to reschedule. At the end of the day, travellers will have updated their knowledge about the elements in their activity repertoires and mental maps. They may have developed new solutions to the fulfilment of their needs by trying new routes, modes or locations, by drawing on new information, by expanding their expectation space or by accepting solutions proposed by others on the basis of their knowledge. The expectation space is a third view of the personal world. It is the set of heuristics which people develop about the environment, and their generalizations about the organization of space. Examples are the heuristics of how and where to find a gasoline station in an otherwise unknown part of town or expectations about the store composition of a local shopping mall.

Longer-term processes, which structure the shorter-term ones, revolve around the projects which a traveller formulates to translate his or her life goals and his or her understanding of him- or herself into reality. In any one period these projects need to be sequenced to provide a
reasonable load and prioritization. This planning requires negotiation with others, as many projects will depend on synchronization with, input of, presence of or permission of others. Again, the interaction with still others in the markets and networks during execution will require adjustments and changes, including the abandonment of certain projects or project elements. The experience will update and expand the individual’s personal world, but also shape the set of life goals pursued in the next time interval.

Figure 4   Modelling the individual’s longer-term dynamics

The impact on travel behaviour modelling of such a reframing of the task would be profound. It would move the centre of attention away from the idea of equilibrium and towards concepts such as innovation, solution generation, life goals and commitments to people and ideas. These concepts are not unknown to activity-based travel behaviour analysis, but they would need to be moved centre-stage.
2 Acknowledgements

This book documents the reviewed keynote papers of the 10\textsuperscript{th} International Conference on Travel Behaviour Research in Lucerne, August 2003. It gives an excellent, state-of-the-art overview of the key concerns of the travel behaviour research community. The authors of the papers were free to achieve this goal by presenting reviews or by challenging through a focus on new and innovative aspects of the area. The titles of the papers and the names of the authors speak for themselves, so I will forgo the usual capsule summaries of a book introduction.

Such an event and the associated book is the product of many hands, which I have the pleasure and duty to acknowledge.

Dr. Robert Schlich was the main local organizer who made sure that the event during the hottest week in living memory worked smoothly in an only partially air-conditioned building. The building, which was ideally suited for our purposes, had generously been made available by the Schweizerische Hotelfachschule of Lucerne. Dr. Robert Schlich was able to draw on his colleagues at the Institute for Transport Planning and Systems, ETH Zürich, who set up the projectors, fixed laptop problems and undertook all the further less exciting but necessary tasks of such a conference (Sigrun Beige, Saikumar Chalasani, Phillip Fröhlich, Jeremy Hackney, Arnd König, Stefan Sandmeier, Stefan Schönfelder, Martin Tschopp and Milenko Vrtic).

The local organizing committee provided important and generous input during the three-year preparation of the conference: Dr. Michel Bierlaire, EPF Lausanne; Prof. Rico Maggi, USI, Lugano and Prof. Kai Nagel, then ETH Zürich. The committee was again supported by Dr. Robert Schlich during this phase. In the same spirit, we were able to draw on the advice and help of the members of the scientific committee of the conference and of the members of the IATBR board, who unfortunately are too numerous to list here.

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3 Literature


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