Routines and their breaking – an agent-based analysis of leisure time mobility

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Abstract

In this paper a multi-method approach for analyzing leisure time mobility is suggested. In our conceptual foundation we synthesize approaches from behaviourally oriented psychology and economics by referring to the framework of Ajzen, a Maslowian theory of needs and a bounded rational way to pick up and transform information according to the basic tenets of Carnegie school (Simon/March) giving special emphasis to the role of routines. This conceptual foundation is the background for the architecture of an agent-based simulation model. This simulation model is used to specify the conditions and effects of routine breaking. Finally the empirical component of our approach is sketched: according to the underlying behavioural orientation we figured out lists of constructs related to the most important behavioural components of the agents. These constructs are brought together in quantitative as well as qualitative questionnaires. The resulting data are statistically evaluated by using descriptive methods.

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I. Introduction: multi-method approach to agent-based analysis in the DYNAMIKON research project

Taking an “agent-based” perspective in the research on consumption processes in general and on leisure time activities especially faces some intricacies: the phenomena under investigation are

- (i) multidisciplinary in nature in that they cannot be assigned to one scientific discipline alone,
- (ii) dynamic and composed of heterogeneous entities because the involved human beings have different abilities to change their actions (as well as minds) and finally
- (iii) not easily to grasp because direct observations beyond statistical data are necessary.

Tackling the issue of multidisciplinary nature necessitates a conceptual reflection of the research approach in which the main insights of the most important behavioural approaches are linked. Hence, in our conceptual model we synthesize approaches from behaviourally oriented psychology and economics by referring to the framework of Ajzen, a Maslowian theory of needs and a bounded rational way to pick up and transform information according to the basic tenets of Carnegie school (Simon/March). The theory of planned behaviour (TPB) was founded by Ajzen and Fishbein (Fishbein and Ajzen 1975) and was enriched and detailed mainly by Ajzen over the past years (Ajzen 1988; Ajzen 2005). We adopt their basic idea, that action is influenced by three main driving factors: attitudes towards the behaviour, subjective norms, and perceived behavioural control, by which Ajzen addresses subjective beliefs about an agent’s ability to act like he/she wants.\(^1\) Furthermore we assume that attitudes towards the behaviour are strongly influenced by needs and the degree of their satisfaction. Here we borrow ideas of Maslow, who stated that there are classes of basic needs and that they are ordered in a hierarchical manner (Maslow 1954; Alderfer 1972; Maslow 2005). Contrary to traditional economic textbook thinking we agree with the concept of bounded rationality of Simon, by which he addresses especially the limits of knowledge and of knowledge processing of agents (Simon 1955; Simon 1957; Kahnemann 2002 for an overview of modern concepts of bounded rationality). Following these lines of thought we set up a rich but not too complex cognitive architecture allowing for (positive as well as negative) feedbacks from the agent’s performance to its cognitive resources. The dynamic and heterogeneous nature of the activities and entities under investigation requires a new modeling method. The method we chose for picking up these features is the multi-agent model. Using such a method in analyzing consumption issues as well as applying it to travel mode dynamics is rather new.

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\(^1\) A more detailed explanation of these concepts and their use in our framework is given below.
An incentive for such an application has been given by the endeavor to combine a meaningful modeling of cognitive processes on the individual level with interaction effects due to imitation and social norms. A first attempt to integrate these aspects in an agent-based computer model was made by Jager (2000). Studies about fashions as well as changing preferences (Janssen/Jager 2001), market shares of brands (Ben Said et al. 2002) and food scares (Saggau 2005) are following up in this strand of modeling consumption processes. The first attempt to apply such a modeling concept to (leisure) travel mode behaviour was made by Briegel (2006). Only recently corresponding approaches have been suggested in the research of activity-travel behaviour (Han, Q. et al. 2008). In this framework agents can be represented by (parts of) computer programs reflecting their abilities to act and cognize at the same time. In this computer model agents are represented as a set of interrelated rules on different levels. The computer entities representing agents are autonomous in that they select the rules according to their internal state variables and not due to external pressure. This is a source for making agents heterogeneous in terms of observable actions, internal state variables and activated rules. Furthermore there are different ways in which the actions of agents are coordinated. Both autonomy and heterogeneity are essential features of the multi-agent model we use for generating the simultaneous activities of a multitude of agents in a given time span. By this we respect the above mentioned dynamic nature of the phenomena under investigation.

Complementary to this conceptual design and modeling approach is our attempt to gain empirical data related to the behavioural components under investigation. Hence, we pick up the conceptual as well as empirical research about routines in the realm of leisure time mobility. Mobility research started to investigate behavioural routines back in the 1990s. Early empirical studies, informed by Ajzen’s Theory of Planned Behaviour (Ajzen, 1991), depicted habit strength as a moderator between behavioural intentions and actual behaviour (e.g., Bamberg, 1996, Verplanken et al., 1998). In parallel, different measures for assessing the habit strength were introduced and the effects routines have on information acquisition were dealt with (e.g., Verplanken et al. 1997). As it comes to leisure time mobility Lanzendorf (2001, 2002, 2003) is among the first to explore the relevance of routines. Besides that, the impact of travel demand management tools was subject of empirical investigations. This research reveals, for instance, that the influence of routines on travel mode choice strongly depends on the kind of intervention and on the actual alterations induced by it (e.g.,

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2 See Gärling and Axhausen (2003) for a brief account of the role of habit in travel behaviour.
3 Verplanken, Myrbakk, and Rudi (2005) provide an overview.
Bamberg, Ajzen and Schmidt 2003, Fuji and Kitamura 2003). According to the behavioural orientation we figured out lists of constructs related to the most important behavioural components of the agents. These constructs are brought together in quantitative as well as qualitative questionnaires. The resulting data are statistically evaluated by using descriptive methods as well as cluster analysis and a structural equation model. This gives us the possibility to differentiate the agents in different types and to get insights about the strength of the causal relationships postulated in the concept and the model as well. Furthermore these empirical insights are used to initialize a population of agents (consisting of different types) in the model and to calibrate the parameters of the latter. Hence at least in the beginning of the time span under consideration there is a similarity between the structure of empirical data and the structure of the model.

II. Conceptual foundation
II.1 Overview
Our conceptual model attempts to explain modes of action as well as choices of alternatives in the domain of leisure time travel behaviour. Especially for empirical purposes, it is useful to apply a precise definition of “leisure time travel behaviour”. Utilising this expression, we assume a choice between four modes of travel: travelling by feet, using a bicycle, using means of public transportation or taking a car, all for the purpose of leisure time activities. Flying as a mode of travel has been excluded. The leisure activities comprise a meeting with friends or relatives, entertainment (for example going to a cinema), a visit of an event (for example a soccer game), doing sports, going on a trip within the limit of three days, a walk and shopping. Moreover, holidays are not in our focus. To assume a clear-cut distinction between these means of travel and leisure activities seems to be stylised, but they are in accordance with the customary categories of other empirical investigation of mobility behaviour.

The following diagram gives an overview of our conceptual model.

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4 The perspective of the DYNAMIKON project is a bit different: It concentrates, at least in its empirical working packages, on the relevance of different modes of action and, in particular, the role of routines. It does not study empirically the behavioural impacts of interventions, e.g., by companies or the government.

5 Due to lack of space this can only be partially documented in this elaboration.
In general, the conceptual model is divided into two parts. The first part contains variables which are mainly given from outside the model (needs, social background and endowment). The second part includes variables which are influenced by feedback loops inside the model (aims, attitudes towards objects and behaviour, subjective norms). These feedback loops are an essential feature of the model because besides modelling cognitive processes, one of our main scientific tasks is modelling the dynamics of behaviour. Therefore, we need to look at factors inside the model which are able to bring about change.

In the following paragraphs we describe our understanding of the variables mentioned in the model above. We start with the variables on top of the figure and go down to the bottom.

**Needs:** Human beings tend to eliminate those physiological and psychological states which are perceived as deficient. These states include hunger or thirst as well as loneliness or boredom. Needs are generally unspecific. Someone can be in need of nourishment but there is a plethora of possibilities to satisfy this need by consuming varieties of food.\(^6\) With regards to leisure time mobility we distinguish five kinds of needs: needs concerning the body like recovery and healthiness, safety need, social needs in the sense of need of contact and need for social relations, need for a social status and need for self-actualisation.

\(^6\) Therefore, we label e.g. the desire of having a dinner in a particular fancy restaurant as a want.
Social background: The following personal characteristics are integrated into the model: age, level of education, employment, profession, social relationship, children, income and sex. The social background is also given by general attitudes. Only two kinds of them are taken into consideration: the attitude towards environmental orientation in behaviour and the attitude towards habits or better, changing habits, since these two attitudes correspond with our main research interests.

Endowment: The category equipment refers to the knowledge base, to the budget in terms of time as well as in terms of money and to different means of travel which particular agents can have at their disposal. Each agent has knowledge about roads, public transport links, but usually this knowledge is not complete or sometimes even wrong. Most important in our context is, however, the fact that his knowledge changes in the course of time. Furthermore, agents are able to forget, have different experiences and are capable of learning. We assume that every agent has a limited amount of money available for the purpose of leisure activities and for spending on means of travel in a particular time period. He or she can save money in one period and spend it during the next time period. Likewise, every agent has a limited time budget for leisure and travel activities. Apparently, not every person owns a car or is capable of riding a bicycle. Thus, we have to look beneath the headline “endowment” and answer particular questions such as how many persons are car owners, how many persons own a bike or have an annual/seasonal ticket for the public transport sector or how many persons have a driving licence and so on.

Aims: We suppose that not every need mentioned above is equally important at a given point in time. Some needs are to some extent satisfied at that moment, other needs are more urgent and exert a greater influence on the decision making process. Such needs which are furthest from a predefined level of satisfaction dominate the decision making process. For example: if an agent did a lot for his personal physical health in the previous time, this need would be far less important for his decision about leisure activities than other needs which are less or not at all satisfied at this moment of time.

Attitudes towards objects and behaviour. With the category attitude towards objects and behaviour, we simply address a positive or negative valuation of behaviour by an agent, in our case towards using particular means of transport. Although our conceptual model has similarities to the approach of Ajzen (e.g. by referring to subjective norms and attitudes) there is a fundamental difference of our approach in that we do not use the concept of subjective expectancy. In the framework of Ajzen, such attitudes are derived from an expectancy-value model: “Attitude toward a behaviour is the degree to which performance of the behaviour is positively or negatively valued. According to the expectancy-
value model, an attitude toward a behaviour is determined by the total set of accessible behavioural beliefs linking the behaviour to various outcomes and other attributes.” [http://www.people.umass.edu/aizen/att.html] Moreover, in the world of Ajzen (1988) there are, beside attitudes and subjective norms, no such extra categories as needs or aims. In our model we draw a distinction between needs and aims on the one hand and attitudes on the other (hand) in order to create a framework which is able to grasp a potential divergence between activities and attitudes of agents.

**Subjective norm.** According to Ajzen, a subjective norm is the perceived social pressure determining whether or not to engage in certain behaviour. Many people are obviously influenced by such pressure. For example, doing what my friend does in a given situation is much simpler than thinking about my own opportunities in that particular situation myself. Additionally, not following my friend’s example could turn out be no easy task and could possibly lead to bad feelings. Whatever the individual rationale behind such a driving force may be, it makes the dynamics of a mobility system conservative.

In contrast, slack and curiosity are two features in our model which can stimulate change. We suppose that slack and curiosity are dependent on the endowment in the sense that the higher the unused amount of money and time an agent has at his disposal in a given time step, the more likely it will be that he tries something new.

One of the most important features of our model is the concept of *feedback-loops* (broken lines in fig. 1).

If an agent falls short of a certain level of satisfaction, very often he or she will have to correct either his/her aims or his/her actions. For example: if an agent experiences an outbreak of violence in public transport, his need for safety will not be met any longer and an incentive to change the means of transport will be activated.

If the action is frequently not in accordance with the agent’s attitudes, there will either have to be a change in attitude or the agent will have to act more in line with the given attitudes at that moment. For example: if someone believes that driving a car is the most convenient way to come from A to B and is now forced by high fuel prizes to use public transport, he will have an incentive to change his attitude towards driving a car.

If the action does not correspond to the subjective norms of the actor, there will either be an incentive to choose another action or the social cohesion of the peer group comes loose. For example: If the whole circle of friends normally uses a car and has a very positive attitude towards using a car, but one member of this circle is the only one who has to travel by public transport because he cannot afford a car, there will probably be some feeling of dissonance.
Every action consumes money as well as time, so that the budgets mentioned above have to be adapted after each action which in return may have an influence on slack and curiosity.

II.2 Role of routines
We denote goal-oriented behaviour as action. However, it should be emphasized that agents are not necessarily aware of their goals and intention(s) at the moment of action. According to empirical results of mobility research, agents have often been acting on the basis of routines. (Gärling and Axhausen 2003) Routines are simple heuristics which connect particular characteristics of situations with particular actions. The decision being made there may be interpreted in the sense that a feature x of a situation – for example a short distance - stimulates an action a – for example walking. The genesis of a routine like this is probably a result of a former evaluation of different actions in the light of their consequences. Having once been established, a routine does not need this cognitive effort of evaluating possible outcomes any more.

We assume that agents normally choose their mode of action with the smallest cognitive effort (Beckenbach 2004) possible. Therefore, routines can be seen as the “default modus” of action. Routines are discarded if the result of such a routine is not in accordance with the aims and attitudes of the agent performing this routine. Subsequently, there will be a switch to another mode of action; i.e. a kind of deliberate choice of actions by evaluating their consequences. In contrast to traditional economic thinking, we assume that the agents in our model act on the basis of their bounded subjective knowledge (instead of objective unbounded knowledge). Therefore an agent’s knowledge is restricted and sometimes even wrong. Furthermore, the agents in our model have a limited memory, causing them to forget certain issues after a while and allowing them to learn something new. Our model’s third mode of action represents a special case of learning which we have labelled imitation or adoption, i.e. the observation and adaptation of new opportunities of action. An agent is able to study other agents and imitate those of their actions which appear successful to him. In general, he or she will choose that third mode of action if all the other modes do not deliver satisfactory results referring to the actor’s needs and are not in line with his attitudes.
III. Modeling

III.1 Routine behaviour in a multi-agent framework

In the research about routines (and habits) there seems to be a consensus that their most important feature is that they are activated without any deliberate cognitive effort (Gärling 1992). Although routines and habits in that sense are a well-known research topic in economics, sociology and psychology they are rarely integrated in a model. If this is done they are often dealt with as the only mode of action.\textsuperscript{7} In such a frame work the dynamics of routines in terms of their generation as well as their overcoming cannot be analyzed. To include such a dynamic analysis necessitates to take also other modes of action into consideration. The background for using a multi-agent frame work for such an analysis is the assumption that there are general features for these different modes of action which are the same for all agents; at the same time it is postulated that these features have a agent-specific attributes being a source of heterogeneity between agents (or groups of agents).

The basic ‘grammar’ of routine is composed of two components: an “if”-condition reflecting perceived situational conditions the agent is familiar with, and a “then”-part of pursuing well-known activities. In the considered leisure time context the conditional part of the routines is related to well known leisure activities, locations, distances and und monetary feasibility; the consequential part of the rule comprises the activation of a travel mode.

Due to the multitude of conditional parts it is possible that in a given situation several routines are competing for being activated.\textsuperscript{8} The activation of a routine depends \textit{firstly} on their specificity and \textit{secondly} on their strength. The specificity of a routine is the higher, the more conditional parts are ‘true’; the strength of the routine depends on their past appropriateness in terms of goal attainment.\textsuperscript{9} In any case priority is given to the more specific routine; the strength is the selection criterion for routines with the same level of specificity.

The total set of routines the agent can dispose of is changing over time. Given that the agent has a limited memory capacity, routines which are activated only once within this memory horizon are deleted whereas activities which are activated twice (or more often) within this memory horizon become part of the disposable set of the routines.

As has been mentioned earlier activating and pursuing routines is considered as a specific mode of action different from deliberate choice as well as from adopting new upcoming ways to act. According to our conceptual design we apply the tools for analyzing bounded

\textsuperscript{7} Exceptions are Jager 2000 and Briegel 2006.

\textsuperscript{8} These rules are either similar or even identical in their conditional parts but might have different consequential parts.

\textsuperscript{9} The algorithm for updating these strengths is based on reinforcement learning suggested by Arthur 1993.
rationality to the different goal dimensions of behavior \((z_i)\) incorporated in our framework (i.e., satisfaction of needs, attaining behavioural consonance, sticking to conformity and pursuing curiosity). Hence, for each of these goal dimensions a lower and an upper level of aspiration \((A_o,i\) and \(A_u,i\) resp.) is distinguished. The routinized mode of action is activated by an agent if the degree of goal attainment is considered as being perfectly satisfying in terms of all goal dimensions. In formal terms this means: \(z_i \geq A_o,i\) for all \(i\). If this condition is not met, the other modes of actions come into play. Fig. 2 depicts the corresponding realm of routine activities and the conditions for the other modes of actions for two selected goal dimensions.\(^{10}\)

**Fig. 2:** Realms of different modes of action for two goal dimensions. The value of goal attainment is the higher, the farther it is away from the origin.

**III.2 Breaking routines**

Given this modeling layout abandoning a routine can occur under several circumstances: (i) Even if the conditional parts remain identical or similar a routine \(r_1\) can be substituted by a routine \(r_2\) (with a consequential part different from \(r_1\)) if there is a competition of a multitude of routines due to the stochastic nature of the selection process between these routines. If the payoff in terms of overall goal attainment of \(r_2\) is superior to \(r_1\) a path-dependent lock-in in favor of \(r_2\) may take place. An accidental switch from car to bike for reaching a place of

\(^{10}\) The graph manifests that we assume a limitational relation between the different goal dimensions. The comparability between the different goals is allowed for only in an indirect manner by using the concept of aspiration level. If there are fewer and more comparable goal dimensions assuming substitutability seems to be more plausible in this framework (cf. Beckenbach 2004)
leisure activity may strengthen the selection probability of this alternative due to unexpected positive experiences.

(ii) The main driver in the model for breaking routines is its lack of performance in terms of one, several or all goal dimensions. If this includes the failure to meet the upper or even the lower level of aspiration the agent will ‘switch’ to another mode of action and the evoked set of alternatives taken into consideration will normally be enlarged. This implies a higher cognitive effort to be provided by the agent.

(iii) In this context curiosity is of special importance. It is dealt with in the model as dynamical trait which is negatively correlated to routines. The higher the frequency of routine activity of an agent in a given time span the higher the increase of curiosity (i.e. the desire for change) the lower c.p. the propensity to pursue the given routine in the future.

III.3 Preliminary simulation results
Generally the long run average level of the share of routinized behavior is only slightly affected by the distance between the different levels of aspiration ($A_{u,i}$ and $A_{o,i}$). Changing this distance has a long run effect only on the shares of choice and adoption (cf. fig. 2). A more mid-range effect of varying the distance between the aspiration levels is that a cyclical relationship between the routine mode and the choice mode of action becomes the more obvious the lower this distance is (cf. fig. 3 below). In any case the inverse relationship between the frequency of routine and choice indicates that routines must be learned from the set of alternatives the agent is considering deliberately.
One important driver for the time-dependent level of routine behaviour seems to be the curiosity satisfaction. If the latter is high (i.e. the strength of curiosity itself is low) one important incentive to switch from routine behaviour to another mode of action is blocked (cf. fig. 4 and section III.2 above).

Another interesting result is the effect of a slightly differentiated increase of cost for car use and for using public transport facilities. Fig. 5 shows, that there is firstly a lasting effect on the modal split (increase of the shares for walking and biking). Secondly, the shares of the modes of action are only temporarily influenced by this financial impact. Within a time span of about 25 time steps the share of routines is first decreasing and than increasing back to its previous level (vice versa for the choice mode). Hence, it can be concluded that at the individual level more routine breaking is taking place under these conditions during a limited time span opening a ‘window of opportunity’ for further regulations.
Fig. 4: Strength of curiosity and satisfied curiosity over time for a mid-range distance between the two aspiration levels.

Fig. 5: Modal split (above) and shares for different modes of action over time for higher costs of car use (increase with factor 4) and public transport (increase with factor 3) in t=200.
IV. Empirical research

IV.1 The empirical approach of DYNAMIKON

The empirical design of the DYNAMIKON project pursues three objectives:

- to generate empirical evidence for the relevance and conceptualisation of the theoretical constructs, in particular with regard to the three distinct action modes (single/multiple routine, deliberate choice, adoption/innovation),

- to obtain data that may validate the architecture of the multi-agent-modelling and that may provide reality-based inputs for the multi-agent-based simulation of leisure time travelling behaviour,

- to identify target groups particularly prone to switch to a more sustainable mobility behaviour.

Accordingly, the empirical design encompasses three major activities:

- A representative telephone survey among a random sample of 1,000 people from the Kassel region, evenly spread among Kassel city, Kassel’s commuter belt, and a rural area in Northern Hesse. The questionnaire covered leisure time activities, the means of transport used, and selected aspects of the conceptual model, such as action modes, attitudes, and needs. The survey was conducted in December 2007. The average interview time was 25 minutes.

- To prepare the representative survey explorative face-to-face interviews were conducted with eleven people from Berlin. Interviews were structured along an interview guideline and took, on average, one hour of time. This qualitative survey provided hints as to the practical relevance of the different action modes and the importance of life events, such as birth of a child, relocation, or retirement, for the individual modal split.

- As a follow-up to the representative survey carried out in the Kassel region another 29 people from the same three areas (city, suburb, rural area) were interviewed. The questions addressed aspects that have not sufficiently been covered by the telephone survey. Important topics of the approximately one-hour interviews were peoples’ decisions on travelling destinations, the role of social relations for choosing the means of transport, peoples’ levels of aspiration with respect to the satisfaction of needs and social conformity, and also the relevance of the curiosity construct.
This empirical setting yielded plenty of evidence for the main research question of the DYNAMIKON project, namely the role of behavioural routines and routine breaks (see below). At the same time, however, the empirical approach proved itself insufficiently suited to fully reveal the complex decision-making processes of the individuals. This was especially evident in case of non-routinised behaviour, such as deliberate choice and curiosity-driven behaviour and also with regard to the individual relevance of constructs such as level of target achievement, attitudinal consonance, level of social conformity, and level of aspiration. Neither the item-based telephone survey nor the qualitative interviews could fully grasp all important parameters, such as the set of criteria relevant to decision-making, the decision-making process itself, or the minimum requirements with respect to the needs fulfilled by the different means of transport. To achieve more robust and detailed data on these constructs by using psychological interview and testing methods is a remaining research task.

Due to time and budgetary reasons long-term panel surveys and travel diaries could not be employed in the DYNAMIKON project. Hence, the generated data reflect the dynamic nature of the decision-making processes related to leisure time travelling behaviour only to a limited extent. Furthermore, information on activities and modal splits contained in the data might be slightly inaccurate since it relies on peoples’ spontaneous self-disclosure and not on independent measurement. Moreover, since data on travelling distances was collected solely in the second series of qualitative interviews the information on this item cannot be regarded representative.

IV.2 Selected empirical findings of DYNAMIKON on mobility routines

In the following we present selected empirical findings concentrating on routines and routine breaks in travel mode choices during leisure time. Other topics of the empirical findings, e.g., with respect to needs and attitudes and with regard to possible target groups for more sustainable travelling choices, are discussed elsewhere, as is the role of the empirical observations for the validation of the conceptual framework and the multi-agent-modelling.

The explorative interviews

Habitualized behaviour in the choice of the means of transport for leisure time activities has been explored by the response frequency measure (RFM) (Verplanken, Myrbakk, and Rudi, 2005, p. 236f.). The interviewees were asked which means of travelling, i.e., car, public

11 The evaluation of the final qualitative interviews is not finished yet. Thus, the results shown are confined to the precursory explorative interviews and the representative survey.
transport, bike, and on foot, they would choose for certain leisure time activities. By asking them to respond as quick as possible a limited cognitive effort, which is one characteristic of routinized decision-making, was provoked. According to the RFM, the routine strength can then be measured by the relative share of the most often mentioned transport means over all activities.

All interviewees had one means of transport mentioned most often. However, its relative significance, in the above mentioned terms, varies from almost 80 to about 40 %. Among those respondents where this percentage is below 50 % the majority uses the entire spectrum of possible travel modes. One can conclude from this observation that

- the routine strength linked with the major means of transport is fairly high in case of some respondents, and pretty low in case of others,
- weak routines come along with the use of a wide spectrum of different means of travelling,
- individuals have multiple routines in the choice of their means of transport, i.e. the evoked set contains more than one alternative.

At the example of a more regular leisure time activity (daily; once or twice per week) and a less regular activity (once or twice per month; less often) interviewees were asked whether they choose the appropriate means of transport deliberatively or automatically. The answers reveal for both types of activities that transport choices are preponderantly taken in an automatic fashion and that situational factors, such as weather conditions or state of health, can guide the choice of alternative means of transports in case of multiple routines.

Being asked whether other means of transport have been more important in the past or whether other means might be chosen in the near future respondents showed that a change in the major means of transport seldom occurs and if so, this break of mobility routine is often closely related to certain biographical events. For instance, one interviewee changed from public transport to bicycle due to relocation. Others based the planned purchase of a private vehicle upon reaching the age of consent and acquiring a driving licence.

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12 The leisure time activities asked for were ‘trip to the countryside’, ‘visiting a friend’, ‘going for a walk’, ‘visiting parents or relatives’, ‘going shopping’, ‘drinking or dining out’, ‘concert or other cultural activity’, ‘going in for sports’, ‘walking around downtown’, ‘going to the movies’, and ‘taking the dog out’.
The representative survey

The observations made in the explorative interviews as to decision-making routines and the relevance of life events for routine breaks are, by and large, proven and further differentiated by the findings of the telephone survey. In all considered spatial areas, the majority of respondents characterises their travel choices for leisure time activities as routinized processes. For instance, 77 % of all respondents agree with the statement “If I plan to go for a leisure time activity, the means of transport I use for this is already decided upon”.¹³

The habitualized decisions on travelling choices do not only relate to the activity under consideration, but also to the fact whether the activity is executed alone or with family or friends: The total agreement of 79 % to the item “Which means of transport I use for a certain activity depends on whether I go on my own or with my family or with my friends” is similarly high as the previous one – no matter where the respondent lives, in the city, in the suburbs, or in a rural area.

Automatic choices are backed-up by a high contentment with the means of transport used for leisure time activities. The share of people being “very satisfied” and “satisfied” is 88 %. This figure scores so high that in all three areas only a minority of people – between 38 and 46 % – were ready to consider a change to another means of transport in case they had bad experiences with the present one.

In the context of leisure time mobility behaviour deliberate choice is encountered less often and requires strong external triggers to be activated. This is revealed by the questions dealing with past changes in the favourite means of transport. Only small groups of respondents displayed such kind of experience, caused mainly by certain life events or by alterations in transport supplies and prices:

- One third of the respondents from Kassel city had changed their means of transport, most often due to moving or to starting a family. In the suburbs and the rural area this percentage accounts for only one fifth of the respondents.

- A change in prices was more often a cause for shifts in modal splits in Kassel (30 %) and in the rural area (28 %) than it was in the commuter’s belt (24 %). The most important changes mentioned were increases in the costs of public transport and of private vehicles. In Kassel city, the latter was mentioned less often than the first. In the

¹³ The extent of agreement corresponds with the relative share of people that „fully agree“ and „largely agree“.
rural area, it was the other way round. People from the suburb mentioned both kinds of cost stimuli equally often.

- Only 15% of the sample ascribes a shift in modal split to a change in transport supplies. Most often these changes were novelties in public transport.

Hence, one can conclude from this brief overview that habitual behaviour is highly relevant in leisure time mobility and that strong external stimuli are necessary to break the existing routines and provide a window of opportunity for behavioural change.

V. Conclusions

Conceptual reflections as well as empirical research make the overwhelming importance of routines in leisure time traffic evident. Taking the high share of car use in the modal split the breaking of routines then is a challenge for the sustainability issue.

What is less evident is the decision environment the routines are a part of. How other modes of action come into play and - to phrase in economic jargon - how the ‘scarce’ cognitive resources are ‘allocated’ among these different modes of action remain empirically unanswered questions. Hence, there is a need for deepening the empirical as well as the conceptual research on these behavioural topics. At least the domain of leisure time travel reveals that dichotomizing low level impulse-driven activities on one side and high level deliberate activities on the other side is a too simplistic frame work for explaining the dynamics of routines.
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