

## How single events change travel mode choice – a life span perspective

C. A. Klöckner

*Ruhr-University Bochum, Germany*  
*christian.a.kloeckner@ruhr-uni-bochum.de*

### *Abstract*

This paper reports the results of an explorative study with 91 German participants which was conducted in late 2003 as online-research with people between 19 and 62 years of age. Aim of the study was to test which events in life influence travel mode choice, how they influence it and if the psychology of predicting travel behaviour should focus more on those shifts in people's lives to explain changing preferred travel modes. The study identifies the most important events in the lives of the participating people from a retrospective perspective. Some very important events among others were acquiring a driver's licence, changing school, starting at the university, moving to a new town, starting or losing a job. Furthermore, it is shown that the participants' car choice habits are weaker when they experienced travel mode related life events in the year prior to the study. Finally, three clusters of participants were identified which show different patterns of behaviour in their retrospective description of travel mode choice. This different behaviour is related to different sets of life events.

### *Introduction*

The preference of the car in individual travel mode choice has become one of the most urgent problems of our days. Pollution caused by individual car use is one of the main causes of the world's climate change (e.g. Umweltbundesamt, 2002). Furthermore, the growing number of cars on modern society's streets results in increasing numbers of injuries (e.g. Department of Injuries and Violence Prevention WHO, 2002) and health problems especially for subgroups like children or elderly people (WHO, 2004). Therefore, reducing not only air pollution but the car use itself is a goal that many governments follow (Bundesumweltministerium, 2003). The German Government for example introduced the so called "eco tax" in 2000 to increase the cost of energy consumption and to induce a change of attitudes and behaviour towards environmentally friendly energy use. This shift in policies that was caused or at least supported by the Kyoto protocol which has been signed by 166 countries since its publication in 1992 (United Nations Framework Convention of Climate Change, 2004) has been accompanied by extensive technological research as well as by contributions of social sciences.

Psychology has dealt with the change of heavy car use for many years now. Many theoretical approaches have been used to explain travel mode choice and to suggest starting points for interventions. Two of the most common lines of research are based on the *Theory of Planned Behaviour* (TOPB) by Fishbein and Ajzen (1975) on the one hand and the *Norm-Activation Model* (NAM) by Schwartz (1977) on the other hand. Although very different in their approach both traditions have been successfully applied to the domain of travel mode choice (e.g. Bamberg & Lüdemann, 1996; Hunecke, Blöbaum, Matthies & Höger, 2001). However, both traditions show weaknesses when they have to deal with predicting routine behaviour and with predicting behaviour change. Interventions based on either the TOPB or the NAM have shown only weak effects on various occasions (e.g. Hagstotz, 1997; Matthies, Klöckner, & Preißner, in press). To deal with the first mentioned weakness a growing number of researchers focus on the concept of *habit* to reduce the amount of unexplained residue in variation of behaviour. This paper discusses this approach but argues also that travel mode psychology should focus more on the complete life span of individuals.

### *The influence of habits on travel mode choice*

Starting with the work of Triandis (1977, 1980) habits have been introduced into psychological models to explain the gap between intentions or norms and *actual* behaviour which often is opposite to the *intended* behaviour or the behaviour people feel *morally obliged* to. Triandis argues that intention has an influence only on behaviour that is not routine. The more often a behavioural decision is made the more intentional influence is replaced by behavioural routines. According to him deliberate decisions are therefore replaced by habitual behaviour. This approach was first integrated into the TOPB in the domain of travel mode choice by a research group around Aarts and Verplanken (e.g. Verplanken, Aarts, van Knippenberg & van Knippenberg, 1994). They were able to show that habits explain a large amount of variation in travel mode behaviour. Furthermore, they demonstrate that strong car choice

habits reduce fundamentally the search for travel mode related information (Aarts, Verplanken & van Knippenberg, 1997). Recently it has been shown that habits also moderate the relation between personal norms and behaviour in the NAM (Klößner, Matthies & Hunecke, 2003; Klößner & Matthies, in press). If car choice habits are strong personal norms which are the feeling of moral obligation to act environmentally friendly (Hunecke et al., 2001) are no longer a predictor of travel mode choice.

Habit as a psychological construct is therefore considered to be a “shortcut” between situational cues and behavioural patterns. It is assumed that if certain behaviour is carried out many times under always the same circumstances it becomes over-learned which means the relation between the situational cues and the behaviour is no longer mediated by deliberate decision making but is directly linked by associating the situational cues with automated behavioural patterns (see Klößner & Matthies, in press). Behavioural scripts (see Abelson, 1981) take over control instead of intentions or personal norms.

This concept has important implications for interventions aiming to change travel mode choice. If the targeted behaviour is likely to be routine behaviour (e.g. the trip to work) interventions relating to intentions (e.g. giving information to change relevant beliefs) or norms (e.g. commitment) will most likely have no effect on behaviour even if they are able to change the intentions or norms. Before this change is implemented into actual behaviour the influence of habit has to be broken, or like Louis and Sutton (1991) put it: cognitive gears have to be switched from habitual behaviour to active thinking. Dahlstrand and Biel (1997) argue that one of the most important steps to introduce pro-environmental behaviour is to “unfreeze” old anti-environmental behaviour by breaking old habits. Matthies et al. (in press) were able to show that a combination of breaking habits first by a free ticket and then targeting the personal norm by a commitment to use public transportation has a long term effect on behaviour whereas each intervention technique alone only has short term effects.

However, although habit has become one of the most prominent constructs in present theories of travel mode choice (see for example the number of presentations including habit on the 3<sup>rd</sup> International Conference on Traffic and Transport Psychology 2004; ICTTP, 2004) a discussion has started how habit can be understood as a psychological construct (Verplanken & Aarts, 1999; Klößner et al., 2003; Bamberg, Ajzen & Schmidt, 2003). Although it explains a lot of variation and seems to be a valuable addition to TOPB (see also Ouellette and Wood, 1998) and NAM it is not totally accepted that habit really is a *psychological concept* and not only a *methodological artefact*. The closer the operationalization of habit comes to simply measuring past behaviour the more variation in future behaviour is explained but the less psychological explanation is provided (Klößner et al., 2003). The debate about the usefulness of habit as a psychological concept will therefore be fundamentally influenced by the amount of theoretical progress that is made in making it more than an “empty construct” (Verplanken & Aarts, 1999).

#### *Life events and behavioural change*

Although intervention techniques like free tickets have proven to be effective breaking the influence of strong car choice habits their effects have been small (Matthies et al., in press). On the other hand there are studies showing that “naturally” occurring events like moving to a new town (Rölle, Weber & Bamberg, 2002) or temporal road closure (Fujii, Gärling & Kitamura, 2001) are very effective in unfreezing habits. Therefore, it is surprising that there has been only very little research about the effect of such events on travel mode choice.

Thus, an adaptation of the concept of *life events* from health psychology may help to draw the attention of psychologists to the complete life span of individuals. The life event approach assumes that life is not a steady flow of experiences. Important events such as moving, illness, injury, birth, etc. break the usual routines and force the individual to reorient. Life events are events that are a relevant change in a person’s life which is temporal or longer lasting and a potential threat (Stroebe, Jonas & Hewstone, 2002). The last aspect – the potential threat – is not adapted to travel mode choice because life events that change travel mode choice are not necessarily threatening the individual. However, the important aspect is that life events break routine behaviour and they demand a certain amount of reorientation. Life events in the context of travel mode choice are considered to be events of extraordinary importance that happen in a limited period of time. They are singular (or low frequency) events and interfere with routine behaviour. Therefore, they offer the possibility to switch cognitive gears back to deliberateness. If it is possible to *identify* people who are about to experience a life event that is likely

to change their travel mode choice interventions will be much more effective. Furthermore, instead of treating humankind as one homogenous group and trying to find the perfect model for the whole population this approach focuses on identifying subgroups that experienced a comparable set of events.

However, there is not much research about life events and their relation to travel mode choice yet. Klöckner (2002) investigated the influence of the event of acquiring a driver's licence on young adults and found that not only travel behaviour changed – which is somehow trivial concerning that the young adults were then able to drive – but also the psychological mindset changed before and after the event. Rothe (1993) found that losing the driver's licence can be a psychological critical event to elderly people. Van der Waerden, Timmermanns and Borgers (2003) identified a set of possible influential life events in their study and report how the perceived characteristics of different travel modes change after such an event. Using qualitative interviews Stanbridge, Lyons & Farthing (2004) examined in great detail how the event of relocating residence influenced travel mode habits.

### *A theoretical framework*

The reported first results on the influence of life events on travel mode habits and travel mode behaviour suggest that the occurrence of a life event might be a point that suddenly changes psychological aspects. Figure 1 displays how this change can theoretically be explained. Consider a behaviour that is over-learned (e.g. trip to work). The level of habitualization is high. Therefore, the level of activation – which is the level to which an individual is alert and needs to reorient itself – is low. Everyday the trip is the same, no consideration about the trip to work is needed. Thus, the level of information seeking is low (Aarts et al., 1997). The deliberateness of the decision is also low because habits have taken control of the actions (Triandis, 1977, 1980). Now a life event takes place: for example the work place changes. The over-learned patterns of behaviour fail and the level of activation rises quickly. The individual needs to adjust to the new situation. The first step to gather control again is to seek information about the new circumstances. Thus, the level of information seeking increases shortly after the level of activation. Doing something to control the situation by gathering information the individual's level of activation becomes a bit lower.

As the levels of activation and information seeking are relatively high and the old automated patterns of behaviour failed the level of habitualization decreases. Consciousness and deliberateness are in control of the decision making. For a limited period of time the behaviour should be accessible for interventions or – to speak with Stanbridge et al. (2004) – the window of opportunity is open. However, shortly afterwards the adjustment to the new situation has occurred. The process of (over) learning starts again and – bit by bit – habits become more important in guiding behaviour than deliberate decisions. The window of opportunity slowly closes.

Furthermore, people who experienced a life event are usually already in a situation of change. Maybe their job has changed or their place of residence or their abilities (e.g. caused by a severe illness) or something else. They are already reorganizing their lives and have therefore high levels of deliberateness in domains other than travel mode choice. It seems reasonable that a generalization of this openness to the decision about a travel mode occurs. If an individual is changing important aspects of its life it seems more likely that he/she is also thinking about other aspects of his life. This may be another explanation why life events have an influence on travel mode choice.

### *The present study*

The aim of the present study is to identify events in people's lives that can be considered to be critical for travel mode choice. Are the events that were reported in the study by van der Waerden et al. (2003) representative for a German sample? Following an explorative approach those events should be identified in the variety of possible events that fundamentally and lastingly changed their travel mode behaviour.

Furthermore, the question is addressed if the occurrence of critical life events influences the strength of car choice habits. Is there really a weakening effect of life events on habit strength? If there were important events in the life of the participants relatively shortly before answering the questionnaire their habits should be weaker than the habits of people without experience of at least one important event prior to answering the questionnaire.

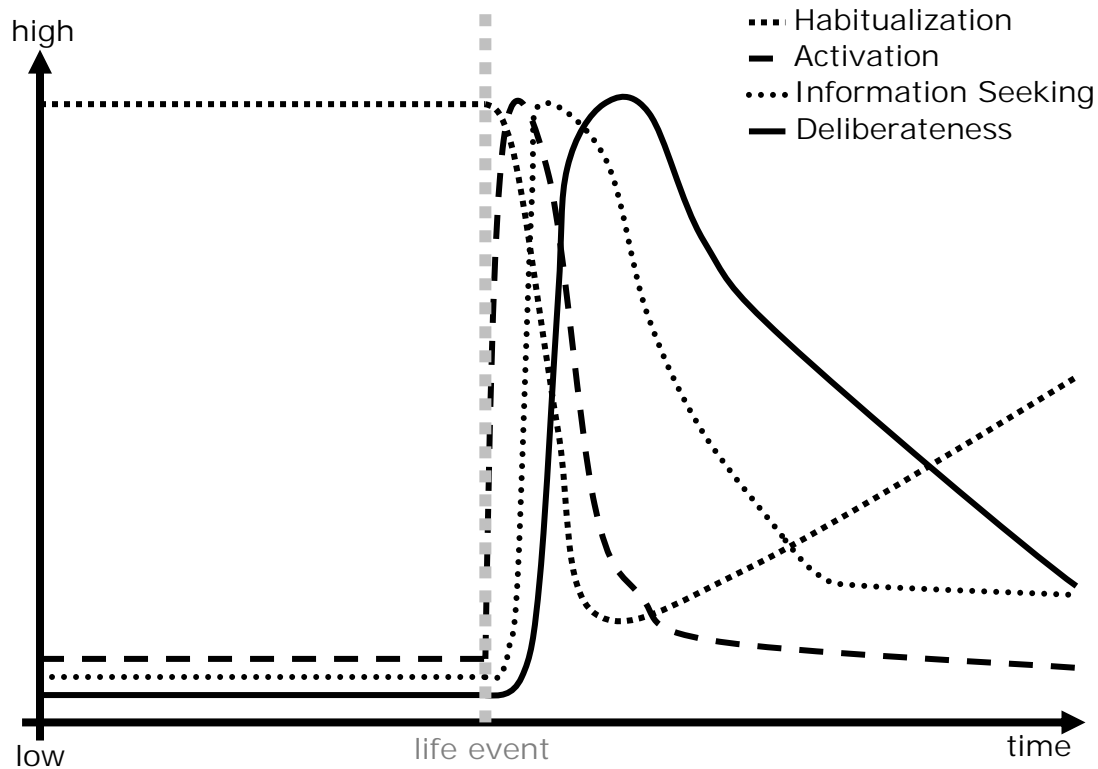


Fig. 1: The influence of a life event on the level of habitualization, activation, information seeking and deliberateness of a well learned behaviour (schematic).

Finally, it is investigated if different patterns of life events go along with different patterns of change in travel mode choice. If life events relate to travel mode choice there should be significant changes in travel mode around life events that are common among members of different subgroups.

#### Method

The study was conducted as online research. Therefore, the questionnaire was designed as a web-form and published on the homepage <http://www.mobilitaetspsychologie.de> in German language. Its deactivated version can still be found at <http://www.mobilitaetspsychologie.de/fragebogen.htm>. Participants for this study were recruited using a snowball system: starting with personal contacts and publishing the link in different newsgroups, mailing lists and on the homepage <http://www.umweltpsychologie.de> the participants were asked to pass the link to other people after they completed the questionnaire. This procedure had the opportunity to reach a large number of people in very short time but has the disadvantage to allow no control about the participating people. There is neither information about the population that was reached by the recruiting process nor about self-selecting processes while passing the link or filling in the questionnaire. Thus, the sample is highly selected and by no means representative for the German population. These limitations were accepted because the question of generalizing the results was not in the focus of this explorative study. Furthermore, doing online research results in additional limitations: Although the access to the internet increased dramatically during the last years in Germany still large proportions of the population have no access to the net. However, even if a person has access to the net the willingness to participate in online research depends on familiarity with the internet, compatibility of the questionnaire with the local computer system and many more aspects (see Batinic, Werner, Gräf und Bandilla, 1999).

91 people participated in the study between November and December 2003. The answers were automatically sent to the author by e-mail without information to identify the participant. 71.4% participated within the first week of the online period. 64.8% of the participants were female, 35.2% were male. The mean age was 33.7 years ( $SD=9.76$ ) reaching from 19 years to 62 years. The level of education is extremely high: 69.8% had a university degree and 25.6% had the highest German school degree ("Abitur" = diploma from German secondary school qualifying for university admission or

matriculation). 48.9% were working fulltime, 17.0% were working part time, 5.7% were self-employed, 20.5% were students, 3.4% were unemployed and 4.6% were doing something else.

At the beginning of the questionnaire the participants were asked to name up to ten life events that changed their travel mode choice with an open ended question. The instruction emphasised that these events could have taken place even in childhood and that the participants should think of large as well as of small events. The named events were categorized by aspects of the content into 76 categories. Retrospectively recording life events implicates methodological problems: especially selective memory can lead to biased results (Dehmel & Wittchen, 1984). This problem was addressed by the instruction and by asking the participants for their age while they experienced the life event. Afterwards the participants were asked to pick three events out of the ten that were most important for them.

Following the open ended question task the participants were presented 18 life events (for a list of the events see table 2) that were considered to be of possible importance by the author. They were asked to say if they already experienced each event and if so how old they were when they experienced it the last time. Then they were asked to judge how much each event influenced their travel mode choice using a 5 point scale reaching from 1="not at all" to 5="very much".

The car habit strength was measured using a short five item version of the *Response Frequency Measure* introduced by Verplanken et al. (1994). The participants were presented five different situations (e.g. "visiting a friend in a neighbouring city" or "shopping daily needs") and asked to name the first travel mode that came to their mind as quickly as possible. Because the described situations did not provide the participants with additional information it is assumed that they had to rely on their travel mode schemes to associate a travel mode. The car habit strength is inferred from the number of situations in which the participants named "car".

Finally, the participants were asked to roughly estimate the percentage of car use during certain periods of their lives starting with the age of 3 years. Therefore, they were asked to estimate the percentage of car use in each phase of their lives (3-5 years, 5-7 years, 8-10 years, 11-14 years, 15-17 years, 18-21 years, 22-26 years, 27-30 years, 31-40 years, 41-55 years, 56-64 years, more than 64 years) on a 11 point scale reaching from 0% to 100% in 10% steps. The participants were instructed to count also trips when they were transported by car.

## Results

Table 1 shows the most frequently named life events. They were "moving to a new town", "starting studies/apprenticeship", "acquiring a driver's license", "change to secondary school", and "buying the first car". In slightly different order these were also the most important events.

Table 2 displays the 18 presented events sorted by the estimated influence on travel mode choice (column 4). Some of these events were experienced by 100% of the sample, others only by small proportions (see column 1). Nobody in the sample has experienced his/her retirement. Many of the events occur at more or less the same point in the lives of the participants (see column 3). Only severe illnesses, separation from partner, unemployment, and traffic accidents happen at very different ages. Many of these 18 events were already included among the frequently named events in the open ended question (table 1). Especially the most influential events are among the frequently named events.

To test if the temporal coincidence of life events influences the strength of car habits two analyses of variance were computed. First, it was checked if participants who experienced at least one life event in the year prior to the study had a weaker habit than participants who had not experienced at least one event. The difference in habit strength between the group with life events ( $n=24$ ;  $M=1.0$ ;  $SD=1.1$ ) and the group without events ( $n=66$ ;  $M=1.6$ ;  $SD=1.3$ ) is statistically significant (ANOVA:  $F=4.1$ ;  $df=1$ ;  $p<.05$ ;  $\epsilon^2=.05$ ).

Tab. 1: The most frequently named life events (open ended question) and the most important among those events.

event	total	important
Moving to a new town	60.7%	26.1%
Starting studies/apprenticeship	55.1%	31.8%
Acquiring driver's licence	53.9%	37.5%
Change to secondary school	28.1%	12.5%
Buying a car	27.0%	13.6%
Starting occupation	22.5%	12.5%
Changing between secondary schools	14.6%	4.5%
Change of job	13.5%	9.1%
Car bought by partner/parents/etc.	13.5%	3.4%
Learning to cycle	12.4%	8.0%
School enrolment	11.2%	2.3%

Tab. 2: Influence of 18 possible life events on travel mode choice, rate of experience and mean age of experiencing the events.

	experience	age		influence	
		M	SD	M	SD
Buying first car	72.2%	22.7	5.93	4.1	1.30
Driver's licence	97.8%	19.1	3.18	3.7	1.37
Starting studies/apprenticeship	98.9%	19.5	1.23	3.7	1.38
Change within secondary school	41.2%	14.5	3.28	3.4	1.63
Change to secondary school	100.0%	11.0	1.94	3.4	1.71
Starting occupation	86.5%	24.5	3.92	3.1	1.66
Military/civilian service	24.7%	19.5	1.47	2.8	1.56
Autonomy/self employment	20.2%	27.4	6.11	2.5	1.71
Change of job	48.9%	33.4	6.27	2.5	1.73
Moving to a new town	95.5%	29.2	6.93	2.5	1.69
Birth of first child	24.7%	29.3	5.96	2.0	1.60
Severe illness	5.7%	31.6	10.90	2.0	1.41
Separation from partner	39.3%	28.4	9.81	1.9	1.35
Unemployment	28.4%	31.5	8.48	1.8	1.36
Moving in with the partner	55.1%	27.0	5.36	1.7	1.24
School enrolment	100.0%	6.1	0.51	1.7	1.23
Traffic accident	42.7%	25.0	7.85	1.6	1.23
Retirement	0.0%	-	-	-	-

In a second step it was checked, if the group of people who experienced at least one *important* event in the year prior to the study had weaker habits than the group experienced no events or only non-important events. Important events were only events that were judged 3 or more on the importance rating. Again the difference in habit strength between the group with at least one important event ( $n=13$ ;  $M=0.7$ ;  $SD=0.9$ ) and the group without important events ( $n=77$ ;  $M=1.5$ ;  $SD=1.3$ ) is statistically significant (ANOVA:  $F=4.8$ ;  $df=1$ ;  $p<.05$ ;  $\epsilon^2=.05$ ).

To identify different subgroups in the sample with homogenous developmental patterns of travel mode behaviour a series cluster centre analyses was computed based on the retrospectively reported travel mode choice in different periods of life. Only the periods between 3-5 years and 22-26 years were included in the analysis so that the sample was not reduced too much because of missing values in the higher age periods for the young participants. Nevertheless, the sample was reduced to  $n=85$  by using these periods. A three cluster solution was chosen because of very small cluster sizes if more than three clusters were included. Figure 2-4 display the percentage of car use and important life events in the life span of 3-35 years in the three resulting clusters.

Cluster 1 starts with very low car use in childhood which increases in adolescence and rapidly reaches a high until the age of 25 years. Afterwards, there is no significant reduction of car use. Cluster 2 shows the opposite pattern. Starting with a high percentage of car use in childhood the percentage of car is reduced during adolescence – with a small temporal increase around the age of 19 years. Finally, cluster 3 starts as cluster 1 with low percentages of car use but maintains this low car use – again with the small temporal increase around 19 years – until he/she is 25 years old. Then the percentage of car use increases steadily.

Figure 2-4 also show that the different patterns of car use seem to go along with different patterns of life events. Only events were included in the figures that had no large standard deviation in age and that were experienced by at least 35% of the sample. Cluster 1 has many extremely important life events between the age of 18-20 years (acquiring the driver’s licence, starting studies/apprenticeship, and buying a car). Thus, car use changes dramatically. Afterwards, no important events follow and the car use is not changing anymore. Cluster 2 has the same important three events around the age of 19 years, but also considers the start of the job as an important event. Cluster 3 finally considers acquiring a driver’s licence as much less important as cluster 1 and 2. However, cluster 3 shows the coincidence of four life events around the age of 25-26 years: moving in with the partner, birth of the first child, starting the first job, and buying a car. Taken together these events seem to heavily influence the travel mode choice.

Table 3 shows a description of the three resulting clusters. Cluster 2 is noticeable in particular. It has a lower mean age and a higher percentage of women and students than cluster 1 and 3. Furthermore, the average time of living in the current hometown is only half the time of cluster 1 or 3 although this difference is not statistically significant. Cluster 1 has a higher number of cars per household than cluster 2 and 3.

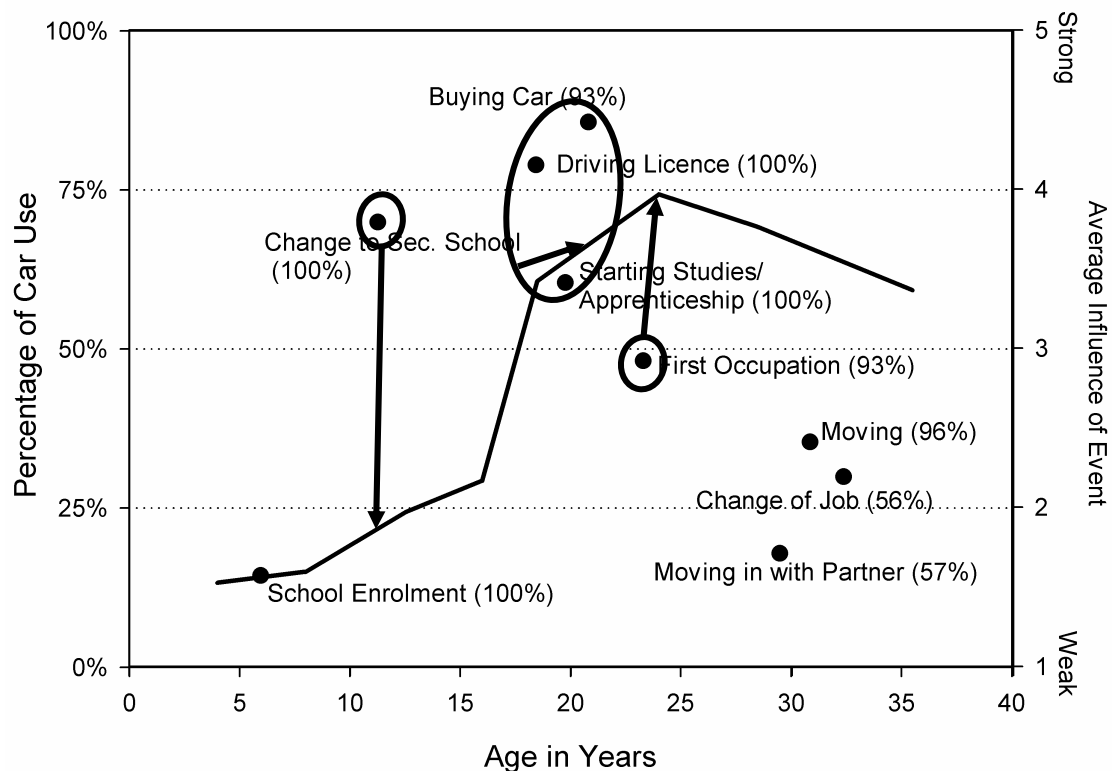


Fig. 2: Development of retrospective car use and life events in cluster 1. The percentage of experience of the life event is displayed in brackets.

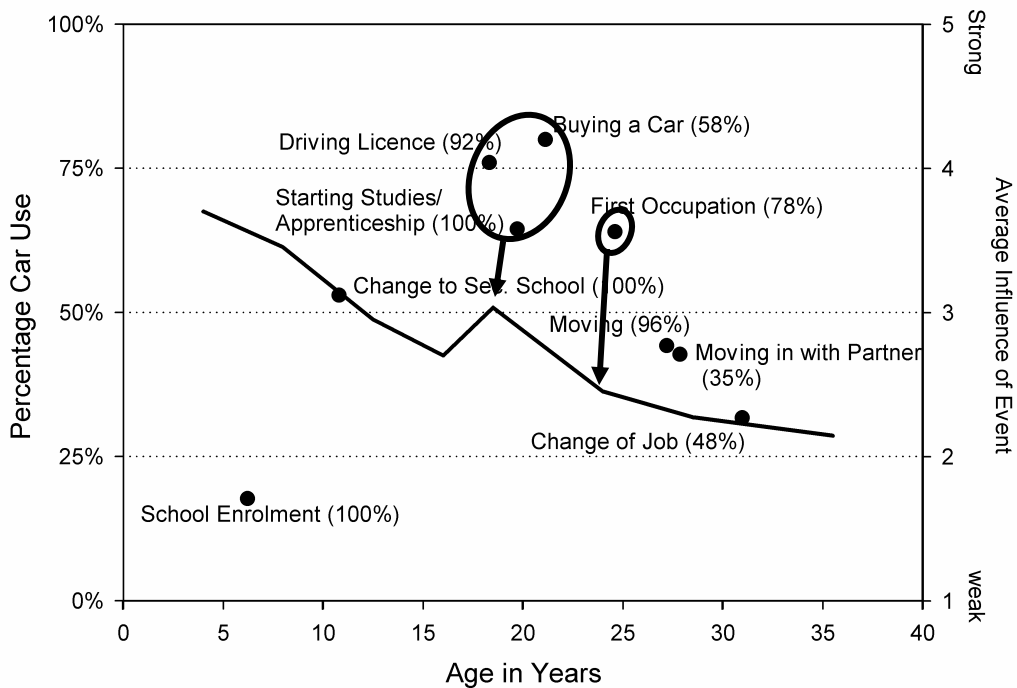


Fig. 3: Development of retrospective car use and life events in cluster 2. The percentage of experience of the life event is displayed in brackets.

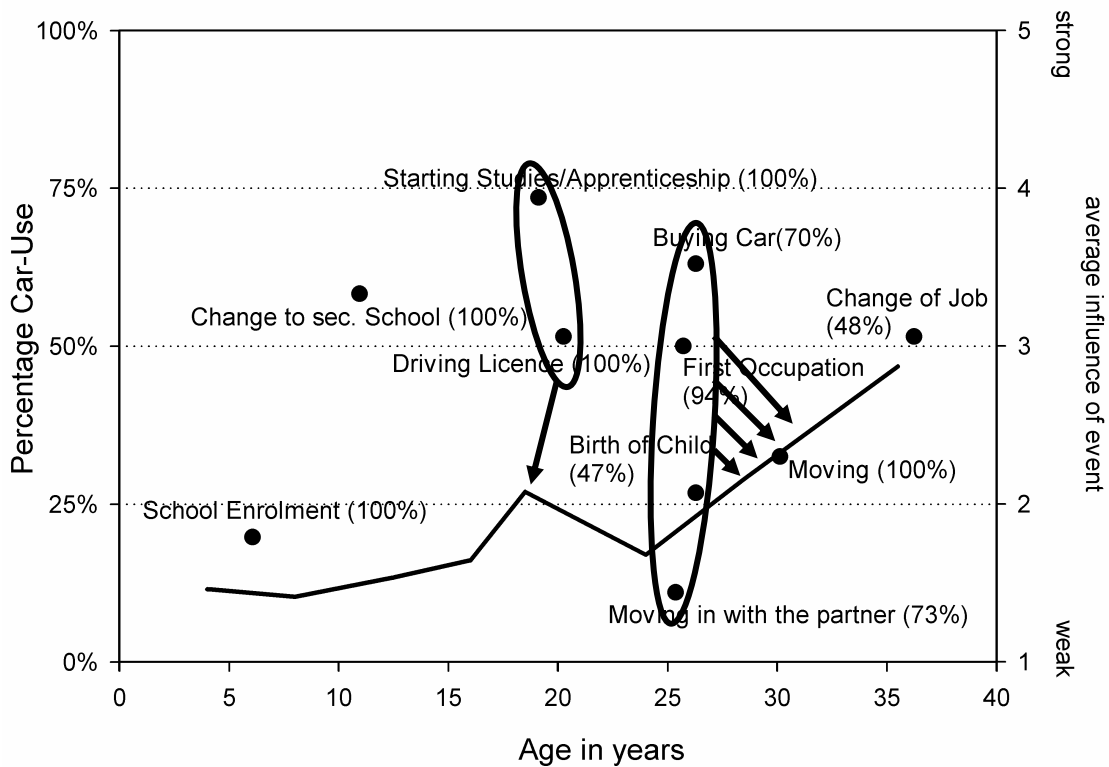


Fig. 4: Development of retrospective car use and life events in cluster 3. The percentage of experience of the life event is displayed in brackets.



Tab. 3: Description of the clusters. Displayed are percentages or mean scores (standard deviations in brackets).

	cluster 1	cluster 2	cluster 3
<i>n</i>	28	24	33
Mean age (years)	34.1 (9.2)	30.0 (6.3) <sup>1</sup>	37.9 (10.7) <sup>1</sup>
Percentage female	59.3%	70.8%	59.4%
Percentage fulltime workers	51.9%	37.5%	59.4%
Percentage students	11.1%	37.5%	9.4%
People per household	2.1 (1.2)	2.2 (1.5)	2.1 (1.0)
Cars per household	1.2 (0.7) <sup>2</sup>	0.7 (0.6) <sup>2</sup>	0.9 (0.6)
Car-choice-habit	1.9 (1.3)	1.1 (1.2)	1.3 (1.3)
Average time of living in the current hometown (years)	10.6 (11.9)	5.3 (6.2)	11.3 (14.4)

<sup>1</sup> = the difference between cluster 1 and 2 is statistically significant in a Post-Hoc-Test following the Scheffe-  
Procedur (mean difference: -7.88; p=.008).

<sup>2</sup> = the difference between cluster 1 and 3 is statistically significant in a Post-Hoc-Test following the Scheffe-  
Procedur (mean difference: 0.51; p=.017).

### Discussion

This study shows clearly that people can relate to the idea that important events in their lives change their travel mode choice. The six most frequently named events in the open ended question were “moving to a new town”, “starting studies or apprenticeship”, “acquiring a driver’s licence”, “change to secondary school”, “buying a new car” and “starting occupation”. When being asked which of these events were the most important the participants say that the acquisition of a driver’s licence was most important for their travel mode choice followed by the start of studies or apprenticeship and moving to another town. These results match almost perfectly with those of van der Waerden et al. (2003). They also identified “getting the driver’s licence” as the most important event followed by “change of the work situation”, “getting a car”, “moving”, “starting to work” and “change of school location”. What do all these events have in common so that they have the power to change peoples travel mode behaviour? Two different types of events can be differentiated: Type one changes the set of possible alternative travel modes (“getting a driver’s licence”, “buying a car”). Travel modes that were impossible to use before are now part of the possible alternatives. However, acquiring a driver’s licence or getting the first car means more to many young people than just having another alternative. At least in German society acquiring a driver’s licence can be understood as a rite of becoming adult (see Schönhammer, 1999). Klöckner (2002) shows that getting a driver’s licence and maybe the first car does not lead to more perceived behavioural control as might be expected but to less control. Young people that have a driver’s licence feel forced to use it. Type two of situations goes along with fundamental changes of the living situation (“moving to a new town”, “starting studies or apprenticeship”, “change to secondary school”, and “starting occupation”). Not only the ways which have to be travelled change but almost the complete life of the person. New social relations are established. A reorientation is evident. Further research should focus on detecting the psychological side effects of such a change. Is there really more to such a change than simply a different situational setting?

The second conclusion that can be drawn from this study is that life events indeed seem to weaken car choice habits. Even such a rough measure as “having at least one life event in the last year or not” can differentiate between weaker and stronger habits. People who are more stable in their living situation seem to have established stronger habits. Again, further research should focus on the exact mechanisms of weakening habits and strengthening deliberateness. Is the proposed framework in an earlier section of this paper really valid? Is there a higher level of activation, information seeking and deliberate decision making shortly after a life event? Do different events have different influences on the psychological mindset? How are other psychological variables like “intention”, “personal norms” or especially “social norms” influenced by life events? More research in the line of Stanbridge et al. (2004) or Wundke and Ampt (2004) is needed that follows people through the process of experiencing life events such as relocation and records the changes in their psyche.

Finally, although the quality of this explorative data suggests a very careful interpretation the results of the cluster analysis show that it seems possible to detect subgroups in the population that experience different sets of life events and react in different ways to that events. However, not only the

experienced life events are different but also their perceived importance. What some people consider a very important event (e.g. cluster 1 “driver’s licence”) is only of medium importance for another group (cluster 3). This suggests not only to identify life events but also to investigate how *important* these events are from the subjective view of each person. The clusters themselves should not be overestimated because of the limited quality of the data but should be taken as an example of how the life event approach might explain different behaviour patterns in different subgroups.

As a conclusion it can be stated that life events offer a new perspective on the developing travel mode choice over the life span. Life seems to be non-linear. There are periods of stability and habits as well as periods of rapid change and deliberate decision making. Especially from an interventionist’s perspective it is important to identify these periods of change and to tailor interventions to meet the “window of opportunity”. Psychological modelling should much more focus on the complete life span. Young people might react totally different than established people around 35 years who are again totally different from elderly people. Furthermore different subgroups can react totally different to the same life event. This explorative study suggests the perspective of life events should be analysed further. More details are needed about how exactly life events influence the complete psychological mindset and the situational setting.

### References

- Aarts, H., Verplanken, B., & van Knippenberg, A. (1997). Habit and information use in travel mode choices. *Acta Psychologica*, 96, 1-14.
- Abelson, R.P. (1981). Psychological status of the script concept. *American Psychologist*, 36, 715-729.
- Bamberg, S., Ajzen, I & Schmidt, P. (2003). Choice of Travel Mode in the Theory of Planned Behavior: The Roles of Past Behavior, Habit, and Reasoned Action. *Basic and Applied Social Psychology*, 25, 175-187.
- Bamberg, S. & Lüdemann, C. (1996). Eine Überprüfung der Theorie des geplanten Verhaltens in zwei Wahlsituationen mit dichotomen Handlungsalternativen. Rad vs. PKW und Container vs. Hausmüll. [Testing the theory of planned behaviour in two situations of dichotomous choice. Bicycle vs. Car and Recycling vs. no Recycling]. *Zeitschrift für Sozialpsychologie*, 27, 32-46.
- Batinic, B., Werner, A., Gräf, L., & Bandilla, W. (1999). *Online-Research – Methoden, Anwendungen und Ergebnisse [Online Research – Methods, Applications and Results]*. Göttingen: Hogrefe.
- Bundesumweltministerium (2003). *Mobility for all*. Retrieved September 20, 2004 from <http://www.bmu.de/en/1024/js/mobility/generalinformation>
- Dahlstrand, U., & Biel, A. (1997). Pro-environmental habits: Propensity levels in behavioral change. *Journal of Applied Social Psychology*, 27, 588-601.
- Dehmel, S. & Wittchen, H.-U. (1984). Anmerkungen zur retrospektiven Erfassung von Lebensereignissen und Lebensbedingungen bei Verlaufsuntersuchungen – Bewertung und Vergessen. [Remarks on retrospective recording of life events in research – judging and forgetting]. *Zeitschrift für klinische Psychologie: Forschung und Praxis*, 13, 88-110.
- Department of Injuries and Violence Prevention WHO (2002). The Injury Chart Book – a Graphical Overview of the Global Burden of Injuries. Retrieved September 20, 2004 from <http://whqlibdoc.who.int/publications/924156220X.pdf>
- Fishbein, M. & Ajzen, I. (1975). *Belief, Attitude, Intention and Behavior. An Introduction to Theory and Research*. Reading: Addison-Wesley.
- Fujii, S., Gärling, T., & Kitamura, R. (2001). Changes in Drivers' Perceptions and Use of Public Transport During a Freeway Closure: Effects of Temporary Structural Change on Cooperation in a Real-Life Social Dilemma. *Environment and Behavior*, 33, 796-808.
- Louis, M. R., & Sutton, R. I. (1991). Switching cognitive gears, from habits of mind to active thinking. *Human Relations*, 44, 55-76.
- Hagstotz, W. (1997). „Es war ein guter Anfang!“ Ergebnisse einer empirischen Fallstudie zum Ozonversuch im Großraum Heilbronn. [„It was a good start!“ Results of an empirical case study of the Ozon intervention on Heilbronn]. In E. Giese (Hrsg.) *Verkehr ohne (W)Ende? Psychologische und sozialwissenschaftliche Beiträge* (S. 285-296). Tübingen: DGVT-Verlag.
- Hunecke, M., Blöbaum, A., Matthies, E., & Höger, R. (2001). Responsibility and environment: Ecological norm orientation and external factors in the domain of travel mode choice behavior. *Environment and Behavior*, 33, 830-852.
- ICTTP (2004). *3<sup>rd</sup> International Conference on Traffic & Transport Psychology – Abstract Book*. Nottingham.
- Klöckner, C.A. & Matthies, E. (in press). How Habits Interfere With Norm Directed Behaviour - a Normative Decision-Making Model for Travel Mode Choice. *Journal of Environmental Psychology*.
- Klöckner, C. A., Matthies, E., & Hunecke, M. (2003). Problems of Operationalizing Habits and Integrating Habits in Normative Decision-Making Models. *Journal of Applied Social Psychology*, 33, 396-417.
- Klöckner, C. A. (2002). Altersabhängigkeit der Mobilitätsstile. [Age Dependency of Mobility behaviour patterns] In M. Hunecke, C.J. Tully, & D. Bäumer (Hrsg.), *Mobilität von Jugendlichen* (S. 130-139). Opladen: Leske & Budrich.

- Matthies, E., Klöckner, C.A. & Preißner, C. (in press). Applying a Modified Moral Decision Making Model to Change Habitual Car Use – How can Commitment be Effective? *Applied Psychology*.
- Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, 124, 54-74.
- Rölle, D., Weber, C., Bamberg, S. (2002). Vom Auto zum Autobus. Der Umzug als Einstieg zum Umstieg. [From car to bus. Moving as a start to change travel modes]. *Gaia*, 11, 134-138.
- Rothe, J.P. (1993). Nicht mehr Auto zu fahren – ein kritisches Lebensereignis. [No more car driving – a critical life event]. *Zeitschrift für Verkehrssicherheit*, 39, 12-16.
- Schönhammer, R. (1999). Auto, Geschlecht und Sex. [Car, gender and sex]. In C. J. Tully (Hrsg.). *Erziehung zur Mobilität. Jugendliche in der automobilen Gesellschaft*. Campus: Frankfurt a.M..
- Schwartz, S. H. (1977). Normative influences on altruism. In L. Berkowitz (ed.) *Advances in Experimental Social Psychology* (vol. 10). New York: Academic Press.
- Stanbridge, K., Lyons, G. & Farthing, S. (2004, September). *Travel behaviour and residential relocation*. Presentation at the 3<sup>rd</sup> International Conference on Traffic & Transport Psychology, Nottingham, GB.
- Stroebe, W., Jonas, K., & Hewstone, M. (2002). *Sozialpsychologie – eine Einführung*. [Social Psychology – an introduction]. Springer. Berlin.
- Triandis, H. C. (1977). *Interpersonal Behavior*. Monterey, California: Brooks/Cole.
- Triandis, H. C. (1980). Values, attitudes, and interpersonal behavior. In M.M. Page (ed.) *Beliefs, Attitudes, and Values. Nebraska Symposium on Motivation 1979*. Lincoln: University of Nebraska Press.
- Umweltbundesamt (2002). *Umweltdaten Deutschland 2002*. [Environmental data for Germany 2002]. Retrieved March 1, 2004 from <http://www.umweltbundesamt.de/udd/udd2002.pdf>
- United Nations Framework Convention of Climate Change (2004). *Status of Ratification*. Retrieved September 20, 2004 from <http://unfccc.int/resource/conv/ratlist.pdf>
- Van der Waerden, P., Timmermanns, H., Borgers, A. (2003, August). *The influence of key events and critical incidents on transport mode choice switching behaviour: A descriptive analyses*. Paper presented at the 10<sup>th</sup> International Conference on Travel Behaviour Research, Lucerne, CH.
- Verplanken, B., Aarts, H., van Knippenberg, A., & van Knippenberg, C. (1994). Attitude versus general habit: Antecedents of travel mode choice. *Journal of Applied Social Behavior*, 24, 285-300.
- Verplanken, B., & Aarts, H. (1999). Habit, attitude, and planned behavior: Is habit an empty construct or an interesting case of goal-directed automaticity? *European Review of Social Psychology*, 10, 101-134.
- WHO (2004). *Health Aspects of Air Pollution – Answers to Follow up Questions from CAFE*. Retrieved September 20, 2004 from <http://www.euro.who.int/document/E82790.pdf>
- Wundke, J.S. & Ampt, E. S. (2004, September). *Can you influence people to travel less when they are moving house? Facilitating behaviour change at the point of location change*. Poster presented at the 3<sup>rd</sup> International Conference on Traffic & Transport Psychology, Nottingham, GB.

### Keywords

travel mode choice, life events, online-research, habit