

Symposium: The Psychology of Sustainable Mobility

Sustainable Traffic Behavior

K. Dziekan¹, T. Gehlert², & T. Gärling³

¹ Berlin Institute of Technology, Integrated Transport Planning, Berlin, Germany

² German Insurer's Accident Research, Traffic Behaviour / Traffic Psychology, Berlin, Germany

³ University of Gothenburg, Department of Psychology, and Karlstad University, The Service and Market Oriented Transport Research Group, Sweden

Chair: Dr. Katrin Dziekan

Introduction

Many efforts to motivate people to use sustainable travel modes have been shown to lead to success. For example, the SrV (national German representative data on urban travel behaviour) shows that for the first time the share of cars in the modal split is decreasing.

This good news brings new challenges to sustainable mobility. It puts traffic safety in the center of attention. Some people are so concerned about traffic safety that it prevents them from using sustainable travel modes. Thus, if one wants to motivate road users to switch to sustainable transport modes, safety must be considered as well. The presentations in this session shed light on different aspects of the relationship between sustainability and traffic safety behavior.

The *first presentation* investigates the underlying motivation of driving behaviour in a field trial using GPS devices. It shows that affective considerations do not only influence travel mode choice but also actual driving behaviour, for example, speeding. There are indications that affective determinants prevent both sustainable and safe driving behaviour.

The *second presentation* investigates attitudes towards road safety in a broader lifestyle context. Using a qualitative approach the results show that participants have multiple road user identities. But, the perception of road safety issues is dominated by one identity at a time, primarily the car user's perspective. Road space is seen as

“competitive” space with sustainable travel modes like walking and cycling more or less intruding on this space. Furthermore, it is regarded as inherently dangerous even by frequent cyclists themselves.

The *third presentation* complements the comparison of road safety attitudes of different travel modes with a quantitative approach. It analyses and compares the psychological background of red-light running for car users, cyclists and pedestrians. The aim is to see whether traffic rules are able to create common expectations about certain traffic behaviour among different road users creating a mutual understanding and avoidance of accidents.

The *fourth presentation* compares the psychological background of different traffic violations for one travel mode. A theoretical model is developed based on the theory of planned behavior. A telephone interview survey was conducted with a total of 1009 German road users. Structural equation modeling was applied to analyse the model structure. Overall, the results support the model structure. They also emphasize the importance of the social environment for complying with traffic rules, especially for speeding and red-light running.

Summarizing the message of the individual presentations, the conclusion of the session is that a joint strategy of travel mode choice and road safety is needed to motivate people to change their travel behaviour.

Presentation 1: Where's the fun in driving? Hedonic determinants of sustainable driving behavior

J. W. Bolderdijk & L. Steg

University of Groningen, Groningen, the Netherlands

Interventions aimed at changing driving behavior (e.g. speed cameras, kilometer charges) are typically built on the assumption that people are concerned about financial outcomes (cf. pricing measures) and are motivated to adhere to norms (cf. awareness campaigns). Empirical research, however, suggests that such interventions have been less effective than anticipated. Our research offers a potential explanation for this. Following goal framing theory (Lindenberg & Steg, 2007), we examined to what extent hedonic, gain and normative considerations are associated with driving behavior. In collaboration with five Dutch car insurance companies, we equipped cars of 150 young drivers with GPS devices. These devices allowed us to monitor driving behavior (mileage, driving speed) during one year.

The data show that hedonic considerations (affect) are strongly associated with driving behavior. Specifically, participants violated the speed limit more often when they evaluated maintaining the speed limit as boring. Moreover, regression analyses suggest that hedonic determinants (affect) were even stronger predictors of logged driving behavior than normative (personal norm) and gain considerations (anticipated financial costs).

These results may help explaining why pricing measures and awareness campaigns have been less successful in changing behavior: financial and normative considerations appear to be less predictive of driving behaviour than hedonic considerations. In order to effectively promote sustainable driving behavior, interventions should therefore target hedonic consideration (e.g., by making sustainable driving behavior fun and convenient, and unsustainable driving behavior inconvenient and aversive).

References

Lindenberg, S. & Steg, L. (2007). Normative, Gain and Hedonic Goal Frames Guiding Environmental Behavior. *Journal of Social Issues*, 63, 117-137.

Presentation 2: Public Attitudes to Road User Safety in the United Kingdom and their Effect on Travel Behaviour

C. Musselwhite, E. Avineri & Y. Susilo

Centre for Transport and Society, University of the West of England, Bristol, United Kingdom

This research aimed to examine public attitudes to road safety within a wider social context of other attitudes, identities, lifestyle and values. This paper will present findings on how road user identity affects accepted level of risk, focusing in on implications for both road user safety and travel behaviour (change) policy and practice.

The study used a qualitative deliberative approach, engaging 228 members of the UK public in focus group discussions around road safety and risk. In four areas across the UK, six groups, with ten participants in each group, were selected to include different road user groups, life-stages and attitudes to risk. Each group met on three occasions and hence participants were engaged in three re-convened workshops. The data was analysed using matrix mapping, a version of thematic analysis that involves assigning categories to the data a-priori whilst leaving scope for additional categories to be formed post-hoc.

Participants largely viewed themselves as drivers and engaged in behaviour that suggests they have dominant rights of way over other users. This is enhanced by social norms and re-enhanced by other road user identities, for example cyclists and motorcyclists who view themselves as vulnerable.

Despite participants having multiple road user identities – from driver, to pedestrian, to cyclist and so on – their view of the road was generally limited to one identity at a time. This detachment between identities has implications for the acceptance of different policy interventions. The primary view of

roads was from the perception of the car driver and hence saw road user safety largely in terms of aiding the driver to have a safe passage of movement. Participants viewed the road space as “competitive space” along with a ‘survival of the fittest’ mindset”. Pedestrians and cyclists, in particular, were seen to be encroaching on this space. There is a need for the public to be more aware of and empathetic towards other road users, and also help to re-establish norms that are guided by individual judgement, conventions and protocols, rather than a reliance on rights of way and laws. Investigating concepts of shared space may help achieve this.

The driver as the dominant road user identity is reinforced by and also reinforces (often negative) social norms within the group. In speeding, for instance, it is viewed that many drivers speed which offers a justification for such behaviour. In addition, the effect of passengers on driving behaviour and peers on pedestrian and cycling behaviour is crucial, showing that people deliberately alter their behaviour to suit or impress others.

Overwhelmingly, there seems to be a consensus that drivers see themselves as competent and safe road users and others as more risky and dangerous. Hence, support for interventions is largely accepted as necessary for “other” road users rather than for themselves. Frequent motorcyclists and cyclists inadvertently reinforce the concept that they are dangerous, but over stating their ability to master a perceived dangerous activity. This means drivers view accidents with cyclists and motorcyclists with a certain level of inevitable.

Overall, the research highlights the importance of taking into account road user, especially driver, identity, road culture and risk taking when designing interventions. As well as traditional approaches, social marketing, new technologies and the novel design of space should play a role in thinking through the 3Es (Education, Enforcement and Engineering) over the coming years. There is also a need for attitudes towards modes of transport to be considered in light of road user safety and a joining up of

strategy is needed between travel behaviour (change) and road safety in order to focus on getting people to consider alternatives to the car.

Presentation 3: A comparison of what motivates car drivers, cyclists and pedestrians to violate traffic rules

T. Gehlert

German Insurer’s Accident Research, Traffic Behaviour / Traffic Psychology, Berlin, Germany

As attempts to shift road users to more sustainable travel modes such as cycling or walking tend to be successful the safe interaction between the different road user groups demand attention. Road users need to anticipate each other’s behavior to identify and avoid critical situations. Traffic rules provide standardized information about road user behavior in a given situation. Thus, they create common expectations among all road users. Violating these expectations resp. traffic rules makes critical situations or even accidents more likely (e.g. Parker, West, Stradling & Manstead, 1995).

The aim of this study is to compare the psychological background of car drivers, cyclists and pedestrian’s traffic violations. Red light running has been chosen as example since it applies to all three road user groups. The study uses the Theory of Planned Behavior as theoretical framework. The TPB approach has already successfully applied to explain the psychological background of car driver’s traffic violations (e.g. Rößger, Schade, Schlag & Gehlert, 2011).

The study is based on data from the German traffic climate panel. This panel regularly monitors public attitudes towards road safety and self-reported traffic behavior. The data stems from the 2010 panel wave. The overall panel sample consists of 1.600 subjects and is representative for household characteristics and travel mode choice in Germany. Red light running was measured for car drivers, cyclists and pedestrians. A traffic situation was described that created a

dilemma for participants between complying with the red light and accepting inconveniences or violating the red light. Car drivers had to choose between braking sharply at an amber traffic light and driving through. Cyclists had to choose between stopping at an amber traffic light even though the intersection appeared to be free or to cycle through. Pedestrians had to choose between stopping at a red light and missing the bus or going through. Based on the theory of planned behavior attitudes, behavioral and normative beliefs towards red light running, the intention and self-reported red light running were measured. 250 frequent car drivers answered the car driving scenario, 239 frequent cyclists answered the cycling scenario and 617 frequent pedestrians answered the pedestrian scenario.

The descriptive results reveal common characteristics of red light running between the three road user groups as well as differences between car drivers, cyclists and pedestrians. The results are further elaborated using multiple regression analyses. The presentation will describe and compare the psychological background of red light running for car drivers, cyclist and pedestrians. If there are distinct psychological backgrounds does it contradict the purpose of traffic rules to create common expectations among road users? And what does that mean for the design and implementation of countermeasures? The presentation will discuss these questions and the consequences for safe and sustainable transport in metropolitan areas.

References

- Parker, D., West, R., Stradling, S. G. & Manstead, A. S. R. (1995). Behavioural characteristics and involvement in different types of traffic accidents. *Accident Analysis & Prevention*, 27 (4), 571-581.
- Rößger, L., Schade, S., Schlag, B. & Gehlert, T. (2011). Acceptability of traffic violations and enforcement. Research Report VV06, German Insurance Association, Berlin – in German

Presentation 4: Psychological background of driving violations: the underestimated effect of norms and values

L. Rößger¹, J. Schade¹, T. Gehlert² & B. Schlag¹

¹ *Dresden University of Technology, Traffic and Transportation Psychology, Dresden, Germany*

² *German Insurer's Accident Research, Traffic Behaviour / Traffic Psychology, Berlin, Germany*

The acceptance of and compliance with traffic rules and regulations plays a crucial role for traffic safety. Several studies have successfully applied the Theory of Planned Behavior to explain individual differences in traffic rule violations (e.g. Parker et al., 1992). Furthermore, additional variables such as enforcement and differences between violations have been proposed (e.g. Rößger et al. 2011). The present study aims to integrate these developments into a comprehensive model of driving violations and to validate the extended model using different types of driving violations.

A telephone interview survey was conducted with 1.009 German road users. The interview focused on three violations: speeding, red light running and driving while intoxicated. For each traffic rule, a traffic scenario was presented creating a dilemma between complying with the rule and accepting inconveniences for driving (e.g. braking sharply) or to violate. Likely behavior, past behavior, habits, acceptability, personal and social norms, instrumental expectations (e.g. risk perception, sanction probability) and situational factors were measured. Structural equation modeling was applied to identify direct and indirect predictors of driving violations and to examine their predictive power.

For speeding analyses reveal significant direct effects of the personal norm and situational affordances. That means, the stronger the personal norm for not speeding and the less supportive road characteristics are the less likely will be speeding. The personal norm in turn is influenced by peer group norms and risk perceptions. Surprisingly, there was no effect of descriptive norms on

personal norms. Rather the descriptive norm directly affects behavior as well: the more road users perceive that violating speed limits is a common behaviour in society the more likely they violate speed limits themselves. Enforcement variables such as perceived sanction probability exert an indirect effect on speed violations via the personal norm: the more likely participants expect a formal sanction the stronger their own personal norm to comply with the regulation. This supports the idea of a positive influence of enforcement measures on norm internalization. Moreover, we could identify a strong effect of personal norms on the perceived influence of unfavorable situational conditions. That suggests that people with a strong personal norm for complying with speed limits are less prone to positive situational affordances for speeding. Overall, the model provides a good fit to the data (GFI = 0.941, AGFI = 0.920, RSMEA = 0.058). For red light running, the structural equation model shows similar relations and a similar good fit to the data (GFI = 0.938, AGFI = 0.919,

RSMEA = 0.054). The effect of personal norm on the red light running seems to be even stronger than for speeding. However, the psychological background of driving while intoxicated is considerable different. Here the perceived behavioral control seems to be the key variable indicating that there might be an addiction issue associated it.

The paper will further discuss the results and their implications for new intervention strategies.

References

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