Safe-Driving-Trainings – A Way to Enhance Driving Expertise for Young Drivers?

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Abstract A concept for Safe-Driving-Trainings with a focus on risky behavior and safety related attitudes has been evaluated. 519 participants have been tested before and after the training by means of a questionnaire with the topics: technical driving competence, awareness of risks, and propensity for anticipation. A control group (131 subjects) was used to check for the possibility of response artifacts. Three months later, 92 members of the treatment group and 25 members of the control group have been tested again. The results show significant positive changes in driving competence, risk awareness, and safety related attitudes, especially anticipation, due to the training. Compared to the control group the participants have become more risk aware and they regard of risk avoiding behavior as more important. The results show that this concept for Safe-Driving-Trainings has not only short-term but, more importantly, long-term positive effects on the safety-relevant attitudes and cognitions of young drivers.

Introduction

The accident statistics for young drivers, especially young male drivers, show that this group exhibits a propensity for accidents far beyond that of any other subgroup of drivers. E.g. in Germany 25 % of all accidents with injuries are caused by young drivers (18 – 24 years old) despite the fact that this group comprises only 8,3% of all drivers [1], The reasons for this are usually assumed to be a combination of a lack in driving competence and an age/ gender dependent positive general attitude towards risk-taking.

One major approach to attack this problem consists of campaigns for safe driving. The effects of such campaigns in 7 European countries have been evaluated by the EU-funded project CAST (Campaigns and Awareness-raising Strategies in Traffic Safety) with generally positive results [2].

An alternative, or better, additional approach centers on further training after obtaining the driving license by means of safe-driving trainings. Countries like Austria have therefore introduced the mandatory participation in safe-driving trainings during the first year after obtaining the driving license. However, traditional trainings with a focus on maneuvering cars effectively in difficult situations (e.g. slippery roads, curves with decreasing radius etc.) might even increase the propensity for risk-taking attitudes [3]. as predicted by Wilde's model of risk-homeostasis [4]. For this reason, these novel trainings are intended not only to improve the driving competence but at the same time to modify the attitude towards traffic-related risks. A time-series analysis of traffic accidents before and after the introduction of this measure (2003) indicates a marked decline, which is stronger than the general decline in traffic accidents in the EU during the same time interval.

The positive results in CAST as well as the time-series analysis of accidents in Austria indicate that raising the risk awareness and the subsequent attitude changes towards risk-taking are one decisive reason for the success of campaigns as well as trainings with a focus on traffic safety.

In collaboration with the Austrian Motor and Touring Club (ÖAMTC) which administers the Austrian safe-driving trainings the German Auto Motor Club (ADAC) has developed a program which could be introduced into the German regulations for obtaining a permanent driving license. The effectivity of this program for inducing safety relevant attitudes and realistic expectations concerning risk has been evaluated by means of specifically developed instruments for the assessment of cognitions and attitudes pertinent on safe driving.

Theory

Keskinen [5] has developed a hierarchical model of attitudes and cognitions underlying driving behavior (Figure 1) in order to explain the high propensity for young drivers to cause accidents, Kerwien [6] has used this model to interpret the effects of voluntary safe-driving trainings.

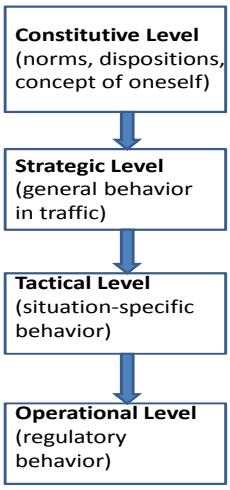

Figure 1. Keskinen's model of driving behavior

From Ajzen's [7] theory of planned behavior (Figure 2) it becomes apparent that the "constitutive level" plays only an indirect role in determining concrete driving actions, for this reason an instrument has been developed which is (i) specific for young drivers, (ii) focuses on general and (iii) situation-specific behavioral aspects in traffic.

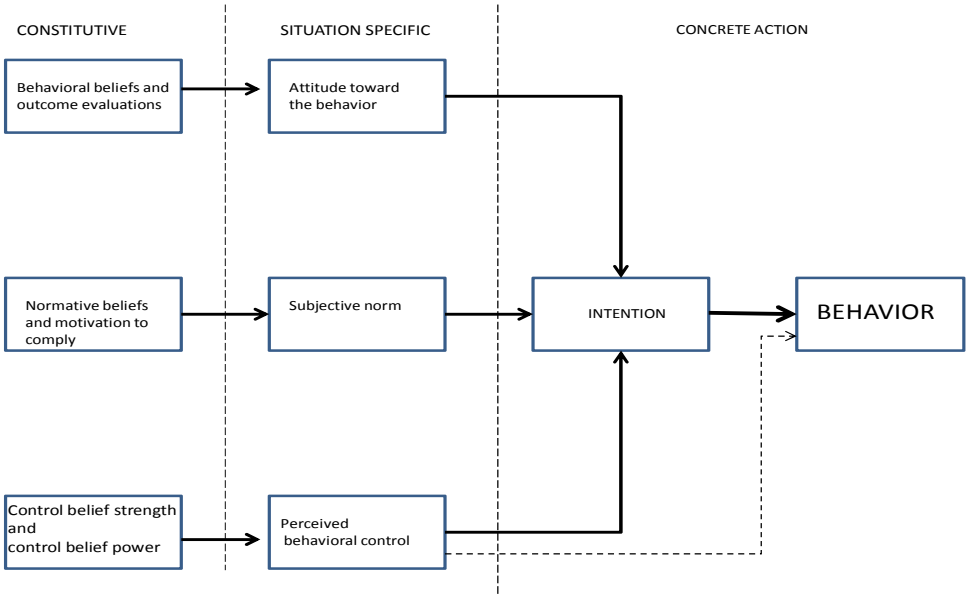

Figure 2. Ajzen's model of planned behavior

An instrument for the evaluation of the safe-driving training of the ADAC has been developed according to these theoretical concepts.

Evaluation instrument

The instrument, the "Regensburg Safe-Driving-Questionnaire", consists of three main self-assessment scales:

(i) driving competence (5 items),
(ii) ability to anticipate (3 items), and
(iii) ability to handle risky situations in traffic (4 items),

four scales focusing on risk factors specific for young drivers:

(iv) distraction (4 items),
(v) speed (10 items),
(vi) alcohol consumption and driving (4 items),
(vii) being a driving novice (3 items)

one scale on safety orientation

(viii) anticipatory driving (10 items).

In addition, subjects were asked specific questions about their seating position and the handling of controls (brakes and steering wheel).

The items of scales (iv) to (vii) are mixed randomly and the order of presentation changes for every application of the questionnaire making repeated applications in panels possible. The internal consistency of the scales has been tested with Cronbach's Alpha (0.61 – 0.79) and can be regarded as sufficient to good.

Experimental procedure

The experimental procedure for the evaluation follows a before-after design, that is, in the experimental group the questionnaire was presented immediately before the training, immediately after the training, and 3 months after the training. In order to control for artifacts, a control group has been tested in the morning, in the afternoon, and 3 months later. The first two presentations were paper-and-pencil, the third presentation was by means of e-mail with an electronic version of the questionnaire plus for the experimental group an open question about the effect of the training.

The experimental group consisted of 519 people (317 male, 202 female). 70% were younger than 20 years (mean age 19.4 years). The control group consisted of 131 people (29 male, 102 female) with a mean age of 23.3 years.

In the testing after three months, 92 people from the experimental group participated and 25 from the control group. Extensive testing of correlations between scale patterns and drop-out indicates that the drop-out was random.

Results

The distribution of the data has been analyzed for deviations from the normal distribution. Because of the good fit of the normal-distribution assumption, standard t-tests and analyses of variance have been used. The alpha-level has been adjusted for multiple tests.

The main results are given in Table 1. Highly significant effects (p(alpha) < 0.01) are indicated by triple asterisks, other significant results (p(alpha) <0.05) by double asterisks. Interactions are not reported, except for the risk-factor speed where the gender effect might be important for the design of further trainings.

Table 1. Overview of the statistical analysis of the data

Scale	Short-term effects	Long-term effects	Comparison with the control group
Self-assessment: **Driving competence**	***	***	***
Self-assessment: **Ability to anticipate**	***	***	***
Self-assessment: **Ability to handle risky situations in traffic**	***	***	***
Risk factor: **Distraction**	***	**	***
Risk factor: **alcohol consumption and driving**	**	---	---
Risk factor: **Being a driving novice**	***	---	---
Risk factor: **speed**	***	---	*** only if controlled for gender
Competence in anticipatory driving	***	**	***
Both hands on the steering wheel	***	***	***
Right foot on the braking pedal	***	***	***
Upright sitting position	***	***	***

At the end of the electronic questionnaire the participants were asked to answer the following question: What are the main effects of the safe-driving training which still influence your behavior in traffic. The results of the content analysis of the answers is given Figure 3.

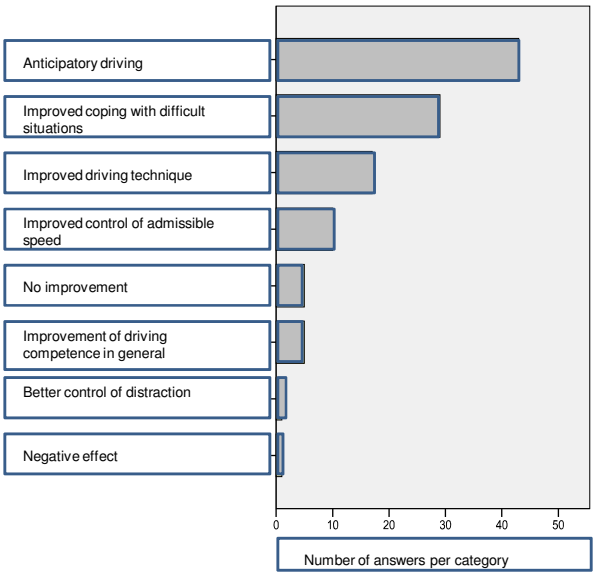

Figure 3. Subjective evaluations of the safe-driving training by the participants after 3 months.

Discussion

In general, the results show that the evaluated safe-driving training concept is very effective, not only for a short term but also for the longer term of three months. It should be taken into account that for novice drivers three months comprise a high proportion of their acquisition time for driving competence and the reported effects are therefore indicative for a high impact on the development of driving competence. In detail:

Self-assessment

Participants of the safe-driving training report an improvement immediately after the training and after three months. Female participants report the same improvement but at all points of testing regard their competence more critically. If a skidding device is used in the training, also the male participants become more self conscious regarding their competence.

Especially the results of the male participants might be interpreted as the possibility that the training induces the unwanted effect of risk-homeostasis. However, the results in the risk factors indicate that the increase in risk-awareness counteracts such tendencies.

Risk awareness: Distraction

The training induces an increase in the awareness for risks due to distraction. The positive difference to the control group shows an effect of the training which goes beyond the ‘normal’ effect of mere experience.

Risk awareness: alcohol consumption and driving

At all points of testing the participants were extremely aware of the negative effect of alcohol on driving. The training has an additional effect. However, due to the drop-out of participants and the resulting smaller sample size in the testing after three months the effect is no longer significant.

Risk awareness: Being a novel driver

The training raises the awareness for the specific risks for driving novices. That after three months this effect is no longer significant might also be due to the reduced sample size.

Risk awareness: Speed

Before the training, the participants exhibited a higher preference for "sportive", that is, fast driving than the control group. This makes obvious one important novice-specific risk factor which is especially pronounced in male participants. The training raises the awareness for this risk factor for male and female participants but more strongly for female drivers. This gender-specific effect remains stable after three months.

Competence in anticipatory driving

The training has an immediate and long lasting effect on the establishment of anticipatory driving as an important behavioral goal in traffic and on the perception of the participants that they can influence their personal risk by anticipatory driving. The difference to the control group indicates that this effect of the training is stronger than the effect of mere experience over time.

After three months, the open question about the main effect of the training revealed that the most important subjective effect of the training for the participants was the improvement in anticipatory driving.

Concrete behavior: sitting position, foot position for braking, two-hand grip on the steering wheel

As expected, the specific tips for concrete behavior have been highly effective, short term as well as long term. Again, the significant differences to the control group indicate the importance of additional training after obtaining the driving permit.

Conclusions

In line with the results of the EU-project CAST (campaigns and awareness-raising strategies in traffic safety), this evaluation of a safe-driving training concept with a focus on risk shows that a relatively short and inexpensive training can result in significant changes in attitudes and cognitions relevant for risk-awareness and safe driving. These changes can be regarded as one necessary precondition for the realization of the "Vision Zero" proclaimed by the European Commission.

References

[1] Statistisches Bundesamt, Verkehrsunfälle von 18 – 20Jährigen im Straßenverkehr, http://www.destatis.de, 2009.

[2] Forward, S. & Kazemi, A. (eds.) A theoretical approach to assess road safety campaigns – evidence from seven European countries, Brussels, Belgisch Instituut voor de Verkeersveiligkeit, 2009.

[3] Schlag, B., Ellinghaus, D. & Steinbrecher, J., Risikobereitschaft junger Fahrer, Bremerhaven, Wirtschaftsverlag NW.

[4] Wilde, G., Wirkung und Nutzen von Verkehrssicherheitskampagnen. Ergebnisse und Forderungen – ein Überblick, Zeitschrift für Verkehrssicherheit 20, 227 – 238, 1974.

[5] Keskinen, E. Warum ist die Unfallrate junger Fahrer und Fahrerinnen höher? In: Junge Fahrer und Fahrerinnen (42 – 55), Bensheim, Bundesanstalt für Straßenwesen Heft M 52.

[6] Kerwien, H., Absenkung des Fahranfängerrisikos durch freiwilliges Dazulernen. Formative Evaluation des Modells „Freiwillige Fortbildungsseminare für Fahrerlaubnisinhaber auf Probe, Bensheim, Bundesanstalt für Straßenwesen FE 82.264/2004, 2009.

[7] Ajzen, I., From intentions to actions: A theory of planned behavior, in: J. Kuhl, & J. Beckmann (eds.) Action-control: From cognition to behavior, Heidelberg & New York, Springer, 1985.