CAMPAIGNS AND
AWARENESS-RAISING
STRATEGIES IN TRAFFIC SAFETY

CAST

EDITORS
SONJA FORWARD AND ALI KAZEMI

A THEORETICAL APPROACH TO ASSESS ROAD SAFETY CAMPAIGNS

EVIDENCE FROM SEVEN EUROPEAN COUNTRIES

Project co-financed by the European Commission Directorate-General
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A theoretical approach to assess road safety campaigns
Evidence from seven European countries

Editors

- **Sonja Forward**
- **Ali Kazemi**

Authors

- **Adamos, G.** University of Thessaly, (UTh), Greece
- **Ausserer, K.** Factum, Austria
- **Brijs, K.** Hasselt University, Transportation Research Institute (IMOB), Belgium
- **Brijs, T.** Hasselt University, Transportation Research Institute (IMOB), Belgium
- **Daniels, S.** Hasselt University, Transportation Research Institute (IMOB), Belgium
- **Divjak, M.** University of Ljubljana, Faculty of Arts (ULFF), Slovenia
- **Forward, S.** Swedish National Road and Transport Research Institute (VTI), Sweden
- **Haupt, J.** Factum, Austria
- **Kazemi, A.** Swedish National Road and Transport Research Institute (VTI), Sweden
- **Krol, B.** The Road and Bridge Research Institute (IBDIM), Poland
- **Malasek, J**. The Road and Bridge Research Institute (IBDIM), Poland
- **Nathanail, T**. University of Thessaly, (UTh), Greece
- **Phillips, R. O.** Institute for Transport Economics (TØI), Norway
- **Risser, R.** Factum, Austria
- **Tamis, K.** Ministry of Transport, The Netherlands
- **Ullberg, P.** Department of Psychology, University of Oslo, Norway
- **Vaa, T.** Institute for Transport Economics (TØI), Norway
- **Zabukovec, V.** University of Ljubljana, Faculty of Arts (ULFF), Slovenia

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Belgian Road Safety Institute
(BIVV - IBSR)

1405 Haachtsesteenweg - Chaussée de Haecht
B-1130 Brussels
Belgium

www.bivv.be
www.ibsr.be

Belgisch Instituut voor de Verkeersveiligheid
Institut Belge pour la Sécurité Routière

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Preface

Campaigns and Awareness-raising Strategies in Traffic Safety (CAST) is a targeted research project supported by the European Commission. It was set up to meet the Commission's need to enhance traffic safety by means of effective road safety campaigns. The CAST project covered the period from 2006 to 2009, and was geared to fulfil the need for tools among campaign practitioners. CAST has developed two such tools to help practitioners design and evaluate road safety campaigns. The design tool contains detailed guidelines for designing and implementing a campaign, based on both existing research and new results produced by the CAST project. The evaluation tool is aimed at helping users conduct the best evaluations, ones that are tailored to the specific characteristics of each road safety campaign and are well-suited to assessing the campaign's effectiveness. With these two tools, practitioners can accurately evaluate their campaigns and also ensure that new campaigns will be planned and executed in a way that will have the optimal impact.

The CAST project was carried out by a consortium of 19 partners and coordinated by the Belgian Road Safety Institute (IBSR-BIVV). It included all of the major European organisations with skills and experience in the area of road safety campaigns, bringing together expertise from throughout the EU.

More information on the CAST project can be found on the CAST website, www.cast-eu.org.

Executive summary

The main aim of the following publication is to present the results from seven different campaigns conducted within the Cast project. The campaigns were carried out in seven different countries (Austria, Belgium, Greece, the Netherlands, Poland, Slovenia and Sweden) and the topic of the campaigns covered a broad area; speeding, seat-belts usage, drinking and driving, child restraints and the use of bicycle helmets. The target groups were general and selected and the activity itself used several sources such as printed material, the media, internet, direct communication and combined actions with the police. The campaigns were local, regional and national and in most cases the evaluations were carried out before and after the event(s). The theoretical framework used to evaluate the campaigns was an extended and sometimes modified version of the Theory of planned behaviour (Ajzen, 1985)[1] and in one instance the Transtheoretical model (Prochaska & DiClemente, 1983)[2] .

Briefly, the Theory of planned behaviour considers both volitional and in involitional behaviours and it assumes that people engage in behaviours if the expected outcome is perceived to be of benefit to themselves. The model predicts that a person's intention to perform a certain behaviour is determined by attitude, subjective norm and perceived behavioural control. Behaviour refers to an observable act and intention as a willingness to try. Attitude is the individual's evaluation of performing a particular behaviour. Subjective norm describes a person's perception of the social pressure put on him/her to perform, or not perform the behaviour. Perceived behavioural control measures perceived rather than actual capability and have been found to predict behaviours which are not completely under a person's control (Ajzen & Madden, 1986)[3]. The Transtheoretical model, on the other hand, is a theory explaining the process of change. It argues that a person would go through six different stages before a new behaviour is established: Pre-contemplation (have no intention to change their behaviour, resist change); contemplation (start to become aware of the problem and the cost and benefits weigh about the same); preparation (start to prepare themselves for change), action (have changed but the risk is still high that they will return to their old behaviour); maintenance (the behaviour have started to become a habit); and termination (the new behaviour is established and the person are less likely to return to their old behaviour). One of the advantages with this approach is that the intervention can be matched to the different needs of the individuals which in turn can provide valuable information when evaluating the campaign. For instance, if the target group is people in the pre-contemplation stage, then we should not expect that one campaign only should result in behavioural changes. Instead a change in attitudes, indicating that they have become more aware of the problem, should be considered as an effective intervention.

1 Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In Kuhl, J. & Beckmann, J. (Eds.), Action-control: From cognition to behaviour. Heidelberg: Springer.
2 Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking. Toward an integrative model of change. Journal of Consulting and Clinical Psychology, 51, 390-395.
3 Ajzen, I., & Madden, T. (1986). Prediction of goal-directed behaviour: Attitudes, intentions and perceived behavioural control. Journal of Experimental Social Psychology, 22, 453-474.

The results from the different evaluations can be summarised as follows:

The results from Sweden showed that an educational program to increase helmet use amongst a group of employees was successful in that their perception of the same became significantly more positive after the event and an increasing number would also consider using a helmet in the future. The results also showed that theory of planned behaviour (TPB) was effective in predicting the intention to a wear helmet. The strongest predictor was perceived behavioural control followed by subjective norm. The weakest TPB predictor was attitude. Prediction of helmet wearing intention was significantly improved when anticipated regret and past behaviour were added to the model. Furthermore, through the use of the Transtheoretical model it was possible to determine that the participants had, on average, moved one step in the direction towards change and that an increasing number were either starting to prepare themselves or actually using the helmet.

In the seat belt campaign carried out in Belgium three groups were evaluated, the first one was presented with the material implicitly (pre-attentive), that is billboards set up in college campuses, the second group was exposed to the campaign in a more direct way with billboards being projected on a screen in a lecture room (attentive), the third group acted as a control group and was not exposed to the campaign. The results from the evaluation showed that there was no difference between the control group and the pre-attentive group after the campaign. However, the attentive group differed significantly from both the pre-attentive group and the control group. The attentive group was, when it came to using the seat belt, more confident and motivated than the other two groups. Their intention to use the belt was also greater. It could therefore be concluded that the attentive group displayed more control and was more likely to use seat-belt after the campaign. Furthermore, the results supported the basic assumptions of the TPB-framework, explaining around 60% of the variance in intention. The most important factor was perceived behavioural control which might be due to the campaign slogan emphasising that seat belts are easy to use.

The national campaign carried out in the Netherlands was successful in increasing the use of seat belts after the campaign. The evaluation, which included both questionnaires and observations, showed that drivers and passengers who had been observed to be non-users believed that seat belt use is less important than those who wear the seat belt. The effects were significant for all trip lengths and for all positions in the car. 'Own safety' was the most mentioned reason for using the seat belt. Furthermore, both users and non-users were less likely to agree with compulsory seat belt use in the back seat. This proves consistent with the lower level of risk perception and perceived importance towards seat belt use by rear passengers. This study was also able to demonstrate that observed behaviour was closely linked to self-reported behaviour.

Children's use of child restraints was the focus of another campaign evaluated by the team in Austria. A one hour interactive lesson and distribution of information to parents and children revealed interesting findings. Taking part in the interactive lesson had positive effects on the behaviour of the children. Pupils showed more awareness of the topic after the lesson and were more likely to remind another passenger if they failed to use the seat belt. Furthermore, parents who got the information were more likely to buckle-up in the near future.

They also expressed fewer excuses for not buckling up, like short distances driven, being in a hurry, etc. The results assessing the effects of the variables within the Theory of planned behaviour showed that they were able to predict 26% of the intention to buckle-up. The most important variable was behavioural belief indicating that consequences dealing with their own feelings (unsafe and uncomfortable) but also the likelihood of being fined are important when we want to understand seat belt use.

The results from the anti speeding campaign in Slovenia revealed a small but positive effect of the campaign in terms of changes in normative beliefs, personal norms, intentions and self-reported speeding. This implies that when people have been exposed to the campaign they were less likely to speed, and felt that others would not accept this behaviour and that they themselves felt more obliged to keep to the speed limits than before the campaign. In accordance with some of the other evaluations the results showed that TPB was effective in predicting the intention to speed. The strongest predictor after the campaign was perceived behavioural control followed by attitude and subjective norm. The addition of personal norm significantly increased the explained variance, indicating that speeding is also linked to drivers own value system. However, since an unforeseen event happened during the campaign, that is a new law increasing the fine for speeding, it was difficult to decide if the effect was due to the campaign or the new law.

In Greece a campaign against drinking and driving was evaluated and the results showed that the campaign had greater effect on passengers than drivers. However, the drivers in the after study were more likely to agree with statements concerning negative outcomes of drinking and driving and more easily convinced not to drink and drive even if the differences between the before and after study were not significant. This indicates that the campaign affected the target behaviour but the effect was not substantial. The use of TPB was successfully applied to predict the intention to drink and drive. In this instance both descriptive norm and past behaviour were important factors increasing the explained variance of intentions over and above the variables already included in the model. The explained variance of past behaviour was also increased by introducing descriptive norm and intention.

In Poland a fairly extensive campaign was carried out including a range of different media sources such as TV, ads in cinemas, posters, indoor advertising in restaurants and pubs, internet, and newspapers. The results from this regional campaign showed that the most effective channel for reaching the target group (i.e. young drivers) was TV and outdoor advertising. Posters in churches and advertisements shown in cinemas were least visible for this group. The results also showed that after the campaign a larger proportion of young drivers reported they would prefer not to drive when they go to or come back from a party. A significant number also reported that they would prevent others who have been drinking from driving, after the campaign.

From the evaluations using an extended version of the Theory of planned behaviour it can be concluded that it was able to successfully predict a range of different behaviours. With regard to helmet use it explained 59%, seat belt use 26% and 55%, speeding 68% and drink driving 37%.

The inclusion of descriptive norm, personal norm, anticipated regret and past behaviour increased the prediction of helmet use with 4%, past behaviour and habits increased the prediction of seat belt use by 12%, past behaviour and descriptive norm increased the prediction of drink driving by 39% and the inclusion of past behaviour increased the prediction of speeding by 4%.

The use of campaigns have been debated and sometimes dismissed as being of little use. However, a number of meta-analyses have shown that campaigns can be effective in reducing the number of accidents[1] . In this publication a chapter is devoted to meta-analysis describing the method in some detail and the results from 228 different campaigns. For instance, the results showed that road safety campaigns result in a 9 percent decrease in accident levels. More specifically seat belt use increase and speeding decrease. Campaigns using some form of intimacy appear to be effective. That is using some form of personal element or other people, when communicating the message. To deliver the message where it is most important and where the behaviour takes place is also important. Finally the use of enforcement can also be useful as an accompanying measure.

1 (see Delhomme et al., 2009).

1 Introduction. The challenge of changing road user behaviour via campaigns.

Forward, S and Kazemi, A.[1]

In 2006, 39.443 people were killed on roads in countries which today make up the European Union (European Road Safety Observatory, 2008). In 2001 a White Paper including a European policy on transport was published by the European Commission (2001). In this paper the EC stated that persons killed on the roads should by 2010 be reduced by 50%. The paper argues that a sustainable transport system needs to consider not only economic and environmental viewpoints but also social factors. To reduce road crashes and researchers sometimes refer to the “5 E’s approach” (Education, Encouragement, Enforcement, Engineering and Evaluation). Education targets the road user and tries to change the attitudes and behaviour of individuals through various forms of communication. Encouragement is sometimes intertwined with education and can include some form of incentive programmes. Enforcement refers to legal actions such as traffic enforcement. Engineering describes measures taken to improve transport infrastructure and last but not least Evaluation aims to assess if the strategy used was successful or not.

To achieve greatest effect the 5 E’s should be used in combination. However, this is not always the case and work aimed at the road users have not been emphasized to the same extent as enforcement and engineering. Indeed, in a fairly recent report published by the European Transport Safety Council (ETSC, 2003) no references are made to measures aimed directly at behavioural change and in a Memo from the European Commission it is stated that actions encouraging road user behaviour in most Member States are “regrettable” (European Commission, 2007). This indeed raises a great deal of concern especially if we consider that the majority of road crashes are due to the human factor (Sabey & Taylor, 1980).

If the targets set by EU should be met it is important to understand human factors in more detail. Research has found that the main factors contributing to accidents are: errors, lapses, and violations. Lapses refer to situations in which the driver forgets to put the car in the right gear, errors refer to a failure to see for example oncoming traffic or to misjudge their speed and violations refer to more deliberate actions such as speeding and drink-driving (Reason, Manstead, Stradling, Baxter & Campbell, 1990). Among these factors, it is violations which have been found to be the strongest predictor of road accidents rather than lapses or errors (Gras, Cunill, Sullman, Planes & Aymerich, 2004; Parker, West, Stradling & Manstead, 1995a; Reason et al., 1990; Rutter, Quine & Chesham, 1995; Sullman, Meadows & Pajo, 2002).

1 Swedish National Road and Transport Research Institute, Sweden.

In order to reduce the number of violations, the focus needs to be on the motivation behind unsafe driving practices and it is those, which need to be challenged and changed, and one way of accomplishing this, is by using campaigns.

Road safety campaigns

Campaigns can be defined in different ways and building on existing descriptions of road safety campaigns (Rice & Atikin, 2000) the CAST consortium adopted a new, general definition:

> "Purposeful attempts to inform, persuade, and motivate a population (or sub-group of a population) to change its attitudes and/or behaviours to improve road safety, using organised communications involving specific media channels within a given time period, often supplemented by other safety-promoting activities (enforcement, education, legislation, enhancing personal commitment, rewards, etc.)." (see Delhomme et al., 2009).

In this definition three types of campaigns are distinguished: mass media campaigns (to reach a larger audience), face-to-face campaigns (personal communication) and education (safety trainings).

Road safety media campaigns are not always separate initiatives. Besides the traditional media and advertising activities, these campaigns consist regularly of different kinds of other traffic safety measures such as new legislation, police enforcement, personal influence and local events. These campaigns are described as 'integrated media campaigns'. For instance, studies have found that a combination of education and enforcement increases the success of a campaign. The result from a meta-analysis was able to demonstrate that 8.5% of crashes could be reduced if traffic safety campaigns were combined with traffic enforcements. If this was followed by yet another campaign then this figure increased to 15% (Delhomme et al., 1999).

Theoretical approach

Before carrying out a detailed design of the means of interventions it is important to gather as much information as possible about the target group. In this instance a theoretical approach is needed in order to determine what factors predict their behaviour and decide which elements of the same should be targeted by a traffic safety campaign. This approach has also been substantiated by a number of meta-analyses which have shown that traffic safety campaigns which are grounded into a theory are substantially more effective in reaching their goals when compared to campaigns where no such theoretical background supports the intervention. (e.g., Delaney, Lough, Whelan & Cameron, 2004; Delhomme et al. 1999; Rutten & Van den Bulck, 2007). In addition to providing valuable input when designing the campaign a theory should also be used as a framework for evaluating the same and formulating hypotheses. To change unsafe behaviour is usually a long term process. It is therefore unrealistic to expect that road users will suddenly change their behaviour after being exposed to a campaign, especially if the behaviour has become habitual.

It is therefore very important that the evaluation not only includes an assessment of primary objectives (i.e. behaviour) but also has secondary ones that are stipulated by the theory as predicting behaviour (i.e. attitudes, norms etc.).

In this report two different theoretical frameworks are used when evaluating the different campaigns, the Theory of planned behaviour (Ajzen, 1985) and the Transtheoretical model (Prochaska & DiClemente, 1983).

Theory of planned behaviour

This model considers behaviours which are volitional but is also valid for behaviours where imperfect control exists.

The theory includes three major factors: attitude; subjective norm and perceived behavioural control. A behavioural intention is regarded as a sufficient immediate cause of behaviour and describes motivation or the willingness to perform the behaviour. A schematic representation of the Theory of planned behaviour (TPB) (Ajzen, 1985) is presented in Figure 1.

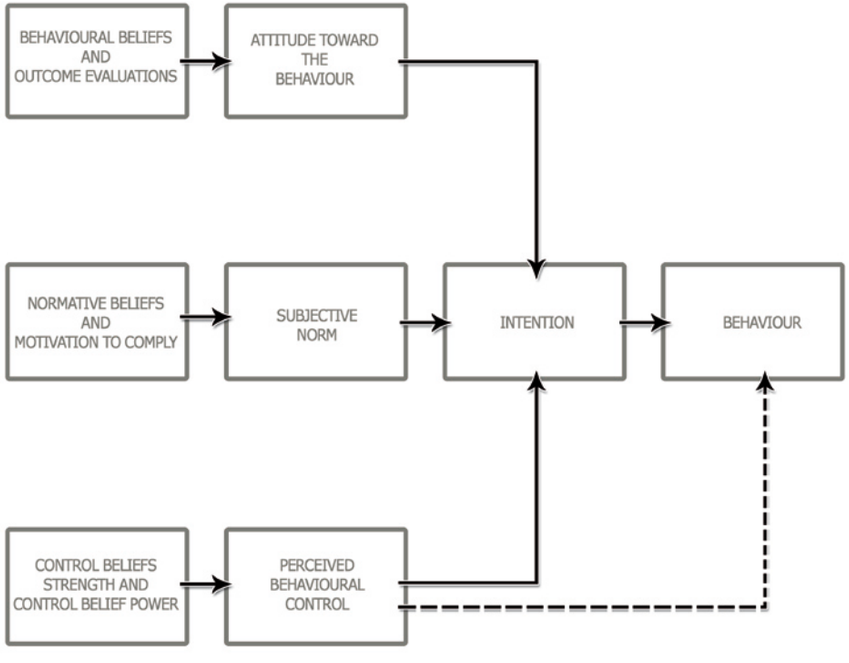

Figure 1. Theory of planned behaviour (Ajzen, 1985).

The TPB predicts that personal decisions (intentions) to carry out a certain behaviour is based on a combination of attitudes toward the behaviour, subjective norm and perceived behavioural control. Behaviour refers to an observable act and intention as a willingness to try. The latter has a central role within the TPB and is regarded as a sufficient immediate cause of behaviour and describes motivation. However, perceived behavioural control can also have a direct effect on behaviour if the behaviour is not under complete volitional control and when this perceived notion of control truly reflects reality (Madden, Scholder & Ajzen, 1992). In situations with high actual control the variable is expected to be less significant. The broken arrow, in the figure, between perceived behavioural control and behaviour implies that it is not always crucial but that it can act on behalf of actual control.

Attitude is the outcome of a number of beliefs regarding the expected value of the attitude object. Subjective norm deals with the impact of the social environment on behaviour. It is described as the individuals' perception about other people's reaction to them performing or not performing a certain behaviour. Perceived behavioural control refers to a persons' perception about his/her own capability to perform an act and does not deal with the amount of control a person actually has. In general it should capture if the respondent feels confident about his/her ability to perform the behaviour or not. The persons perceived control may be based on past experience, own or others, and/or second hand information.

Attitude, subjective norm and perceived behavioural control, also described as global or direct measures of intention, are determined by three belief-based or indirect measures, namely: behavioural beliefs, normative beliefs and control beliefs. The differences between global measures and belief-based measures have been described as follows: "the global measure focuses directly on the concept in question, the belief-based measure focus on the presumed determinants from which the concept can be inferred" (Ajzen & Driver, 1991, p. 188). The model makes no prior assumption about the nature of these beliefs. Instead pilot studies, asking the respondent to list their beliefs about an object and the consequences, are used on each occasion to elicit relevant beliefs.

How to measure the constructs within the Theory of planned behaviour

The questionnaire usually starts with a scenario asking the respondent to imagine themselves in the depicted situation. A study measuring speeding might include the following scenario:

> "You are driving through an urban area. The time is 11.30 on a fine and dry day. The road has a 50 km/hr speed limit but you are driving at 65 km/hr."

To make the situation even clearer a picture describing the same can be included.

Behaviour
In the guide from 2006 Ajzen suggests three different ways to collect self-reported behaviour. The first asks how many days in the past month the behaviour has been carried out, the second uses a Likert scale with seven different options, ranging from *Every day* to *Never*. The third method proposed is to ask the respondents to estimate how often they have carried out the act in the past month. The response is made on a bipolar scale ranging from *Never* to *Every day*. Ideally the behaviour should be observed on more than one occasion. The results are then aggregated across occasions and contexts. However, this procedure is both time consuming and expensive and is therefore rarely used (Forward, 2008).

Intention
Two to three items are usually used to measure intention. *I plan to do*, *I will do* (Ajzen & Driver, 1992) and *I tend to* (Ajzen, Brown & Carvajal, 2004) or, as suggested by the guide how to construct TPB questionnaire, a combination of all three (Ajzen, 2006). For instance:

> I plan to wear a seat belt in the situation indicated by the scenario in the coming month
>
> completely disagree □ □ □ □ □ □ □ completely agree

Direct measures of intention

Attitude
A measure of attitude is typically obtained by asking the respondent to rate pairs of adjectives in response to a statement (i.e., "For me to speed in an urban area in the forthcoming month is"). The scale usually includes instrumental (i.e., harmful-beneficial, useless-useful) and affective attitudes (i.e. enjoyable-unenjoyable and boring-interesting).

Subjective norm
A measure of subjective norm is obtained by asking the respondent to judge people's approval or disapproval. If the study is about speeding in an urban area, respondents might be asked: "most people who are important in my life think I should engage in this activity" followed by a 7-point rating scale ranging from *unlikely to likely*.

Perceived behavioural control
A direct measure of perceived behavioural control includes two different types of control; *capability*, previously known as self-efficacy, and *controllability*. These two items are assessed by different questions but theoretically they are dealt with as a unitary factor and should be correlated (Ajzen, 2006). Capability deals with the ease or difficulty of performing the behaviour. For instance "For me to overtake the vehicle in front of me would be". This is then rated on a 7-point bipolar scale from *impossible – possible*. Controllability refers to perceived control over its performance and can be assessed by the following statement: "It is mostly up to me whether I overtake or not" and then rated on a 7-point bipolar scale from *strongly disagree – strongly agree*. The items are then averaged to provide a measure of perceived behavioural control.

Indirect measures of intention

Behavioural beliefs and outcome evaluations
Behavioural beliefs can be assessed using the following statement: "Speeding in an urban area will make my driving more adjusted to other drivers". This is then rated on a 7-point bipolar scale from *extremely unlikely – extremely likely*. Outcome evaluation is assessed asking: "To adjust my driving to other drivers is" followed by a 7-point bipolar scale *very important – not important* at all. To form an aggregate measure of an attitude each behavioural belief is multiplied by the corresponding outcome evaluation, the resulting product is then summed across the number of salient beliefs.

Normative beliefs and motivation to comply
The indirect measure of subjective norm is normative beliefs. Normative beliefs describe social norms and stand for the person's belief that significant others' think that the individual should or should not perform the behaviour. Through the use of a pilot study it is established who the target group consider to be significant to themselves. The following questions can be used to measure normative beliefs:

"My family thinks that

I should □ □ □ □ □ □ □ should not

speed in an urban area".

Normative beliefs are then related to motivation to comply in so far as the latter modifies the first. Motivation to comply refers to the individual's general motivation to comply with the expectations of particular referents and is independent of the behaviour in question. Motivation to comply can be assessed by asking: "When it comes to speeding, how much do you want to do what your family thinks you should do? This is then scored on a scale from *not at all to very much*. To form an aggregated measure of subjective norm normative beliefs is combined with motivation to comply,

However, the combination of the two constructs has received rather weak support (Ajzen, 1991; Miniard & Cohen, 1981). For instance, it has been found that it suppressed the correlation between direct measures of subjective norm and belief-based measures (Ajzen, 1991) and that the effect of subjective norm on intention was due to normative belief and not motivation to comply (Ajzen & Driver, 1991; Doll & Orth, 1993). These observations have many times resulted in that motivation to comply has been entirely ruled out (e.g.; Beck & Ajzen, 1991; Charng, Piliavin & Callero, 1988).

Control beliefs strength and control belief power
Control beliefs strength indicates the perceived likelihood (or frequency) of a given factor being present. Control belief power assess if these factors have the power to facilitate or impede the performance. These factors could be internal (e.g. self-efficacy and skills) or external (e.g. opportunities and constraints). External facilitators can also be other people but here Ajzen (2002b) clearly states that it only deals with a person's own power to secure help from others. The items used to capture these factors should be carefully selected by some form of pilot study.

For example, the results from a pilot study might indicate that being in a hurry would make speeding more likely. In the survey respondents are then asked to indicate on a 7-point scale if they are more likely to speed if they are in a hurry. In the guide from 2006 control belief strength is assessed by a question about demand: "I expect that my work will place high demands on my time in the forthcoming month" followed by a rating scale from *strongly disagree to strongly agree.* Control belief power is assessed by a question about ease or difficulty "My work placing high demands on my time in the forthcoming month would make it…" followed by *much more difficult to much easier.* To form an aggregate measure of perceived behavioural control the two control beliefs are multiplied and then summed across the number of salient beliefs.

Theory of planned behaviour and transportation psychology

Within the area of transportation psychology the TPB has been successfully applied to a range of road user behaviours, such as: drink and driving (Parker, Manstead, Stradling, Reason & Baxter, 1992; Åberg, 1993), speeding (Elliott, Armitage & Baughan, 2003, 2005; Forward, 2009; Letirand & Delhomme, 2005; Parker et al., 1992; Wallén Warner & Åberg, 2008), dangerous overtaking (Forward, 2009; Parker et al., 1992), overtaking on the inside, cut across traffic, weave in and out of traffic (Parker, Manstead, & Stradling, 1995b), close following (Parker et al., 1992), and lane discipline (Parker et al., 1995a). For instance, studies used to predict the intention to speed in a built up area demonstrated that the model predicts 31 to 48 percent of the variance in intention (Elliot et al., 2003; Forward, 2009; Parker et al., 1992a; Wallén Warner & Åberg, 2008). When analysing the indirect measures of attitude, subjective norm and perceived behavioural control in some more detail the results show that traffic violators believe that their behaviour will have positive consequences. The attitude towards speeding could be that it makes the driving more comfortable and that they get to the destination quicker. Violators would also believe that others approve of their behaviour. However, the results from the variable measuring perceived behavioural control have presented some conflicting results. On the one hand violators tend to perceive themselves to have low control but on the other hand a low control is usually linked to a positive attitude. In this context a low control can therefore be interpreted as a way to rationalize the behaviour (see Forward, 2009).

Additional variables not included in the theory

Despite the evidence in support of the theory there is some results which suggest that the theory would benefit from taking into account additional factors. A number of additional variables have been suggested and the most important ones include past behaviour, descriptive norm and personal norms.

Past behaviour
According to the TPB, past behaviour relates to intentions for future use but the effect is indirect and is mediated by the variables already included. Despite this, Fishbein and Ajzen (1975) recognized the effect of habit and that it may interfere with the intention-behaviour relationship.

Within the field of transportation research past behaviour has been used to predict the intention to speed in an urban area and dangerous overtaking increasing the variance with 17% (Forward, 2009).

Descriptive norm
Descriptive norm measure an individual's belief about other people's behaviour. It has been described as something which *is* done rather than something which *ought* to be done (injunctive) as is the case with subjective norms. Deutsch and Gerard (1955) added that it represents something which was seen as normal, regardless if it was morally correct or not.
In a meta-analysis based on 14 studies using descriptive norm in combination with the Theory of planned behaviour showed that this variable increased the variance with 5 percent over and above the model predictors (Rivis & Sheeran, 2003). In the study by Forward (2009) descriptive norm increased the variance by 10% when predicting the intention to overtake with poor visibility and 4% in the prediction of speeding in an urban area.

Personal norm
Personal norm can be described as social norms which have become internalized. It measures a sense of moral responsibility, what the individual feels that he or she ought to do. Several studies have tested this variable and in the context of road safety Parker et al. (1995b) was able to show that personal norm together with "anticipated regret" contributed substantially to the prediction of intention to commit driving violations.

The change process

Campaign designers may also wish to aid or influence the behaviour-change process and in this context a model describing the process of change is useful.

The Transtheoretical model was developed by Prochaska and DiClemente (1983) outlining six stages before a new behaviour could be firmly established. The main advantage of this approach is to match intervention to the needs of the target group/individuals.

1. *Precontemplation* – the individual has no intention of changing his/her behaviour; s/he resists change.
2. *Contemplation* – the individual starts to become aware of the problem; the cost and benefits weigh about the same.
3. *Preparation* – the individual starts to prepare herself/himself for change.
4. *Action* – the individual has changed, but with a high risk that s/he will return to her/his old behaviour.
5. *Maintenance* - the new behaviour has started to become a habit.
6. *Termination* - the new behaviour is established and individuals are not likely to return to their old behaviour.

These stages are not irreversible as it is possible for a person to move both forward and backward. It has therefore been suggested that the word 'stage' should be replaced by 'phase' (de Vries, Mudde & Dijkstra, 2000).

Objectives

The aim of the current report is to present evaluations of campaigns in seven European countries. Most of the evaluations have used survey methodology based on an extended version of the Theory of planned behaviour measuring self-reported attitudes, norms, intentions, past behaviour and perceived risk.

Structure of the report

Each evaluation is presented in a separate chapter in the following order:

Chapter 2 provides a detailed description of the procedure used to carry out a meta-analysis. It also present the results from a database including 228 individual campaigns conducted with the Cast project.

Chapter 3 presents a campaign encouraging the use of cycle helmets. This study was carried out by Swedish National Road and Transport Research Institute (VTI) in Sweden and is a local campaign including a before and after study. The intervention is educational, carried out by professionals at the target group's workplace. In addition to this, they were encouraged to sign a bicycle helmet contract.

Chapter 4 describes a local campaign carried out in Belgium by Hasselt University – Transportation Research Institute (IMOB). The study used two experimental groups and presented them with either posters or projected campaign material.

Chapter 5 contains a study carried out by the Ministry of Transport/Passenger Transport Division in the Netherlands. It was a national campaign combined with police enforcement focusing on seat belt usages. The campaign used a wide range of stimuli including poster, billboards, internet and articles in local newspaper. The evaluation was carried out before and after the event.

Chapter 6 focuses on the use of child restraints presenting an evaluation carried out by FACTUM in Austria. It was a local campaign including a before and after study with the target group both pupil and parent. The intervention included a one hour interactive lesson and the distribution of information to parents.

Chapter 7 deals with speeding and reports on a national campaign combined with police enforcement carried out in Slovenia and evaluated by the University of Ljubljana, Faculty of Arts (ULFF). The campaign used TV, radio and posters.

Chapter 8 presents an evaluation of a drink driving campaign carried out in Greece by the University of Thessaly, (UTh). It is as local campaign including a before and after study. The media used in this instance was posters.

Chapter 9 presents the results from an evaluation of a regional drink driving campaign. The campaign was evaluated by The Road and Bridge Research Institute (IBDIM) and the Ministry of Transport in Poland and includes a before and after study together with a range of different sources such as: TV and radio spots, advertisements in cinemas, posters, indoor advertising in restaurants and pubs, internet, and newspapers.

Chapter 10 finally presents main conclusions and recommendations based on the material presented in this publication.

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2 Do road safety campaigns work? A meta-analysis of road safety campaign effects.

Ross Owen Phillips [1], Pål Ulleberg [2]** and Truls Vaa**

Abstract

This chapter describes the use of meta-analysis to estimate the size of the effect that road safety campaigns have according to several outcome measures. Readers new to meta-analysis are guided through the method using a worked example before the results are presented. The results summarise a database of 437 individual campaign effects and associated variables extracted from 228 different campaign evaluation studies, most reported within the last 30 years in 14 different countries. According to weighted average effects, calculated after accounting for publication bias, road safety campaign result in a 9 percent decrease in accident levels, a 25 per cent increase in seatbelt use, a 16 per cent reduction in speeding, a 37 per cent increase in yielding behaviour, and a 16 per cent increase in risk comprehension. Since these overall estimates summarise effects of disparate campaigns, a brief consideration is also given to related work aiming to identify individual predictors of campaign success.

1 * Institute of Transport Economics, Norway.
2 ** Department of Psychology, University of Oslo, Norway.

Introduction

Knowledge about the effects of road safety campaigns is required to inform the decisions of politicians and planners wishing to improve road safety. While the content and delivery of individual road safety campaigns varies so widely, it is difficult to make valid generalizations from single campaign evaluations. Attempts must therefore be made to retrieve and summarize a number of campaign evaluations, either by literature review or more systematically by meta-analysis.

Meta-analysis is a statistical technique used to summarize the results of a group of individual studies sharing a common research hypothesis and a common measure of effect. It is being used increasingly to summarise the effects of road safety interventions (Elvik & Vaa, 2004), and in particular road safety campaigns (Delhomme et al., 1999; Elliot, 1993; Delhomme et al., 1999; Vaa, Assum, Ulleberg & Veisten et al., 2004). The change in the number of road accidents is most often used to assess the effectiveness of road safety campaigns in meta-analysis, since it is the measure of ultimate importance. Delhomme et al. (1999) estimated that campaigns coincide with a 9 per cent reduction in accidents during the course of campaigns, increasing to 15 per cent following campaign completion. The methodology used was somewhat advanced by Vaa et al. (2004), and similar conclusions drawn.

This chapter describes an attempt made during the CAST project to carry out an updated and expanded meta-analysis of the overall effect of road safety campaigns, not only on accidents but on various car driver behaviours (seatbelt use, speeding and yielding) and assessments of risk (CAST, 2009). Since a basic understanding of meta-analysis is essential if its results are to be applied successfully, a presentation of these results is preceded by an explanation of the procedure used to generate them. Later on in the chapter, attempts to isolate factors associated with campaign effectiveness are briefly described.

Meta-analysis

Meta-analysis is essentially a systematic review of available estimates of effect of a particular intervention. In the case of the effects of road safety campaign interventions, estimates are retrieved from studies that attempt to evaluate the campaigns by looking at the coincidental change in a single type of outcome measure. One commonly used outcome measure is the change in the number of accidents, another is driver behaviour (e.g. change in the percentage of drivers stopped who were wearing a seatbelt before and during a campaign). However, this is not always sufficient so, knowledge about road safety, attitudes to road safety, or campaign recall are also used.

Several different forms of meta-analysis have been described and different theoretical considerations have been detailed elsewhere (e.g. Hedges & Olkin, 1985; Lipsey & Wilson, 2001; Hedges & Olkin, 1985). Our aim here is to describe in simple terms the specific meta-analytic procedure used to generate the results for the CAST project, and outline what we consider to be the most pertinent theoretical considerations.
The procedure used is outlined in Table 1.

Table 1. Stages in meta-analysis of road safety campaign effects.

Stage	Description
Study retrieval and data extraction	Criteria are set in order to determine: 1. The outcome measure of interest; 2. Which campaign evaluation studies will be selected; 3. Data to be collected describing the content and delivery of the evaluated campaign.
Description of the sample of campaign effects	Once retrieved, the set of campaign effects is described in order to better understand the sample being summarised. The campaigns evaluated can also be described using the data collected on content and delivery.
Overall effect Calculation of overall effect	A simple statistical procedure is used to provide a weighted average of the group of individual effects, in which a weight is assigned to each effect according to its statistical reliability.
Summary for whole group of effects and subgroups of effects.	The output of meta-analysis is a single summary effect, here in terms of percentage change in outcome measure coinciding with road safety campaigns. A confidence interval is provided with each summary effect. The summary effect can describe the whole group of retrieved effects, or only certain types of campaign (subgroups). The latter are defined according to the data collected on content and delivery.

Study retrieval and data extraction

For the CAST project, studies describing the evaluation of a road safety campaign carried out over the last 40 years were considered. The definition of a road safety campaign (defined during the CAST project) was as follows:

> *"Purposeful attempts to inform, persuade, and motivate a population (or sub-group of a population) to change its attitudes and/or behaviours to improve road safety, using organised communications involving specific media channels within a given time period, often supplemented by other safety-promoting activities (enforcement, education, legislation, enhancing personal commitment, rewards, etc.)." (see Delhomme et al., 2009).*

Each retrieved study was scanned by a researcher for any reported campaign effects (i.e. the change in an outcome measure taken either before-and-during or before-and-after the campaign). Some studies only reported measures taken during or after the campaign, so were omitted. Outcome measures collected were accident counts, percentage seatbelt use, percentage speeding, percentage drink-driving, percentage yielding to pedestrians, percentage expressing positive road safety attitude, percentage correctly comprehending road safety risks, and percentage with correct knowledge.
A total of 228 studies containing suitable campaign effects were identified. Of these studies, 44 were generated by the systematic selection and summary of road safety campaigns by CAST partners. A further 144 studies were included as the result of re-assessment of road safety campaign evaluations used in previous meta-analyses (Delhomme et al, 1999; Vaa et al, 2004; Elliott, 1993; and Elvik and Vaa, 2004; Vaa et al, 2004). A literature search for more recent road safety campaign evaluations, performed using accessible and relevant databases, resulted in the retrieval of a further 40 studies. Of these 221 studies, 182 contained information that could be used in the final meta-analysis[1].

Relevant data were systematically extracted from each study using a spreadsheet. The spreadsheet was designed to capture and structure variables describing the evaluation study, the delivery of the campaign, the content of the campaign, and the effects of campaign on the outcome measure. The spreadsheet was elaborated as the data was collected in order to capture any aspect of campaign delivery or content that might influence campaign effectiveness.

In addition to the measure of effect itself, the variables collected describe the way the effect is reported (study author; date of study; publication medium; unit of outcome measure; use of control group), the content of the campaign (basis of content; whether it addresses risk of harm or detection; whether shocking effects are shown; use of humour; whether social norms are addressed; whether the overall appeal is emotional or rational or both), how that content is delivered (television, radio, newspapers, posters, billboards, leaflets, video, cinema, fixed signs, variable message signs, personal communication), and whether that delivery is accompanied by enforcement and/or a change in the law.

Sample description

The 182 studies passing selection criteria contained 437 different campaign effects judged as suitable for entry into the CAST database. This sample of effects is meant to be representative of all safety campaign evaluations carried out in recent times in the Western world. To enable the reader to make a judgment about this, various characteristics of the sample are described. These should be carefully considered when assessing the general applicability of conclusions from meta-analysis of this sample. Sample description is based on the variables collected during data extraction.

1 For example, speed measures reported simply as kph or mph in the absence of standard deviations or number of people surveyed could not be used. Studies reporting percentages without numbers. Other studies contained unusual outcome measures of which there were not a sufficient number for meta-analysis could not be used.

Outcome measure

Different types of outcome measure included in the final sample are given in Table 2.

Table 2. Different types of outcome measure reported by the 182 studies identified.

Outcome measure	Campaign effects	Observed	Self-reported
seatbelt use	133	119	14
accidents	119	118	1
attitude	39	0	39
speeding	28	21	7
risk perception	24	0	24
drink-driving	23	4	19
recall	23	0	23
knowledge	17	0	17
yielding behaviour	13	11	2
cycle helmet use	26	7	19
Total	**437**	**280**	**157**

Table 2 also shows for each group of effects, whether outcome measures were evaluated by others (i.e. observed) or self-reported by the target group. The outcome measures 'accidents', 'seatbelt use', 'speeding' and 'yielding' were mostly observed, and are therefore considered more reliable. Drink-driving behaviour, attitudes, risk appreciation, knowledge, intentions and recall were mostly self-reported.

The general outcome measure 'accidents' comprises mostly three main measures: 'all types' of accidents (38 effects), 'personal injury' accidents (39 effects) and 'drink-driving' accidents (32 effects). Drink-driving accidents could be based either on the number of accidents during drinking hours, relative to those during non-drinking hours, or more directly on an involved driver being over the drink-drive limit.

Of the 437 effects in the sample, 152 were based on changes in outcome measure taken before-and-during a road safety campaign, while 220 were based on before-and-after measurements. The remaining 65 were based on measures taken before-during-and-after a campaign intervention. In the latter case a weight-adjusted average of the during and after measurements was taken in order to keep the analyses simple while at the same time maintain power.

There were corresponding control effects for 192 out of the 437 effects in the sample. More than half of the studies used in the sample thus did not employ control groups.

Evaluation studies

Most of the effects derive from studies published during the last 30 years. Only 13 out of 433 campaign effects pre-date 1980. 213 effects derive from studies published in the 1980s, 137 from those published in the 1990s and 74 are from the present decade. The studies reporting effects were published via one of two main publication channels: refereed scientific articles (161 effects) or research institute reports (156 effects). 34 of the effects are from unpublished sources, 33 from government reports and 24 from conference papers.

Campaign scope

Effects were reported for 20 different types of road safety campaign theme (Table 3). The most common themes were seat-belts, drink-driving, speeding, and general road safety. Table 4 shows the different types of campaign in our sample, according to the outcome measure used to assess them. In some cases the same outcome measure is used to evaluate different types of road safety campaign.

There are 175 effects from campaigns carried out in the USA, 172 from Europe, and 87 from Australasia or Japan. A breakdown by individual country is given in Table 5. A tendency for particular countries to focus on certain types of campaigns was noted. Most notably, many of the effects of seatbelt campaigns in the sample derive from the USA (104 out of 149 seatbelt-themed campaign effects), while almost half of the drink-driving campaign effects are from Australia (45 out of 105 drink-drive-themed campaign effects).

The campaign associated with each effect was categorized according to its delivery at a local, regional or national level. A local campaign was any campaign carried out on a population in an area up to and including a single town or city, while a regional campaign was one encompassing one or more counties or federal states. Of the effects, 180 were for local campaigns, 168 for regional campaigns and 67 for national campaigns.

Table 3. Number of effects extracted according to campaign theme.

Campaign theme	Effects
seat-belt	149
drink-driving	105
speeding	69
general / multiple	22
child restraints	14
children in traffic	13
yielding to pedestrians	12
interaction with commercial road users	8
awareness of elderly road users	8
other	26
unknown	11
Total	**437**

Table 4. Number of effects extracted for each campaign theme according to outcome measure.

Outcome measure	Campaign theme					
	seat-belt	drink-drive	speed	general/ multiple	other	unknown
seatbelt use	118	2	-	-	12	1
accidents	5	41	29	9	25	10
attitude	6	10	7	3	12	-
speeding	-	-	21	6	1	-
risk comprehension	8	9	4	2	1	-
drink-driving	1	22	-	-	-	-
recall	5	11	3	-	4	-
knowledge	3	2	3	2	6	-
behaviour towards pedestrian	-	-	1	-	12	-
other	3	8	1	-	7	-
Total : (437)	**149**	**105**	**69**	**22**	**81**	**11**

Table 5. Number of effects derived from each country carrying out road safety campaigns.

Country	Effects
USA	175
Australia	82
Sweden	70
Canada	23
Norway	19
Netherlands	18
Denmark	13
Austria	9
Czech Republic	7
UK	7
Germany	5
New Zealand	4
multinational	3
Portugal	1
Japan	1
Total	**437**

Most of the effects (271) were those of campaigns targeting a single, specified group of road users. 50 effects were reported for campaigns targeting more than one type of target group, while 103 effects were from campaigns that did not specify a target group.

The campaigns in the sample lasted from a single day to several years (Table 6). For all themes the most frequent campaign length was between 12 and 52 weeks, apart from seat-belt-themed campaigns, which most frequently lasted from one to four weeks.

Table 6. Number of effects according to campaign theme and length.

Duration	Theme					
	general	speed	drink-drive	seat-belt	other	total
0 - 1 week	2	3	0	12	2	19
1 - 4 weeks	2	15	12	65	7	101
4 – 12 weeks	3	10	27	48	9	100
12 - 52 weeks	4	31	38	31	27	131
> 52 weeks	5	6	22	4	18	55
missing						31
Total						**437**

Campaign delivery

Road safety campaigns are often delivered with increased police enforcement, which has been reported to enhance campaign effects (e.g. Delhomme et al, 1999). Of the 433 effects reported here, 202 were for campaigns accompanied by increased enforcement. 61 out of 149 seat-belt-themed campaign effects were enforced, 34 out of 105 drink-drive campaigns enforced, and 32 out of 69 speed campaigns enforced. We included both primary and secondary enforcement measures[1].

The delivery methods used by campaigns to convey their message are ranked in Table 7, according to frequency of associated campaign effects. Television, newspapers, radio, leaflets and posters are the most commonly used delivery channels in this sample. Mass-media campaign effects can be defined as those deriving from campaigns that use at least one of the three methods (television, radio and newspaper) to deliver their message. There are 314 such effects in this sample. A total of 203 effects are derived from campaigns that use all three methods.

Types of communications categorized as 'personal' were information or seminars delivered in person; two-way discussions with a peer, teacher, or safety expert; group discussions; and personally addressed letters.

1 Primary enforcement describes situations where the primary reason for the police to stop drivers is to check and enforce driver behaviour. Secondary enforcement describes checks and controls carried out only after the driver is stopped for another, primary reason.

Table 7. Number of effects according to method of delivering campaign message. Any one campaign often uses more than one of these methods.

Method of delivery	Effects
television	285
newspapers	273
radio	232
leaflets	220
posters	205
personal	130
billboards	70
reward	51
numerous minor elements*	49
video / DVD	36
cinema	32
variable message sign (feedback)	27
website	23
fixed message sign	17
competitions	14
pledge cards	12

*describes a campaign using several minor channels for message delivery, such as stickers or streamers and, isolated information displays or 'freebies'.

Campaign content

Only 60 of the 437 effects in the sample came from campaigns basing their content on prior consultation with a sample of the target group, and only 81 from those basing content on an explicitly stated psycho-social theory or model.

The campaign associated with each effect was also characterised in the way it addressed risk. In the case of 224 campaign effects, risk was specifically addressed. Of these 163 addressed risk of detection, 69 addressed risk of harm to self and 60 addressed risk of harm to others.
Only 22 effects were associated with studies reporting that the campaign used shocking effects in order to show the consequences. These campaigns might be considered to be 'fear campaigns'. A breakdown of the use of other emotional dimensions in content is shown in Table 8. A single campaign can use more than one of these dimensions (e.g. humour and emotional content). However, most campaigns in the sample use rational content to inform and persuade the road user, rather than emotion, humour, shock or incentive.
Finally, 93 effects were of campaigns whose content was judged to address social norms.

Table 8. Number of effects according to emotional dimension of campaign (a single campaign can use more than one of these dimensions).

Content	Effects
emotional	36
rational	197
emotional and rational	66
incentive	45
humour	42
shock	22

Summary of sample description

In summary, an average of about two campaign effects have been extracted from each identified study. Of the 437 effects, over half are derived from evaluation studies not employing a control group. The most common outcome measures reported are percentage seatbelt use and number of accidents, and the most common campaign themes are seatbelts, drink-driving and speeding. Almost all studies in the sample have been published within the last 30 years, most often in peer-reviewed journals or institute reports. Most of the studies describe campaigns carried out in Europe or the USA. The campaigns in the sample target a wide range of population sizes, from less than one hundred to over one million, and their duration ranges from a single day to several years. They use a range of delivery methods, most commonly television, radio, newspapers, leaflets and posters. Several delivery methods are normally combined within a single campaign. Most campaigns do not have a theoretical basis and do not develop their content by consulting the target beforehand. The most common basis for campaign content is previous campaigns, but a third of the effects come from campaigns that have no explicit basis. Half of the effects are from campaigns that attempt to raise awareness of risk (risk of being detected or risk of harming self or others), and most are for campaigns that use rational rather than emotional persuasion.

Calculation of overall effects

The process used to calculate overall effects can be outlined as follows:

- The individual effects collected from evaluation studies are expressed as change in outcome measure (accident counts or percentage behaviour) occurring before and during / after a campaign. Each effect is expressed as an odds ratio from which the natural logarithm (ln) is taken.
- Each ln odds ratio is then weighted based on the number of people or counts observed in the study.
- Individual weighted ln odds ratios are then summed and the sum divided by the sum of individual weights to give an overall effect.
- The population of effects is checked for publication bias and homogeneity in order to ensure that the overall effect is not overestimated.

The process is described in more detail below, beginning with the expression of effects as ln odds.

The log odds method

Data extraction resulted in a total of 119 effects of road safety campaigns on accidents being entered in the CAST database. Treatment of each of these effects is exemplified here using one effect extracted from Diamantopolou (2002). Data describing a campaign effect were extracted from Diamantopolou and entered into the database as shown in Table 9. An odds ratio of the effect was calculated using the formula[1-2] :

(accident counts after campaign / accident counts before campaign) /
(accident counts after campaign [control] / accident counts before campaign [control])

Table 9. Treatment of effects data exemplified using an effect of a campaign on accident counts taken from Diamantopolou (2002).

Number of accidents before campaign	356
Number of accidents before campaign in control group	350
Number of accidents after campaign	1242
Number of accidents after campaign in control group	1109
Odds ratio	1,1011
Ln odds ratio	0,0963
Weight	135.630
Ln odds ratio x weight	13.057

The effect of a campaign can be easily derived from the odds ratio. By subtracting 1 from the odds ratio, and then multiplying by 100 we obtain the percentage effect. Thus in our example we can say the campaign had an undesirable effect, increasing accidents counts by 10.1% ([1.101 – 1] x 100). Odds ratios also allow the extra reliability of studies with higher sample numbers to be accounted for in the meta-analysis by allocating extra 'weight' to such effects. For example, in Diamantopolou's (2002) evaluation, the counts recorded after the campaign are higher, because the counting period was longer than that used before the campaign. Expressing each effect as an odds ratio allows direct comparison of longer and shorter periods of counts, and the extra reliability of longer counting periods (from greater n size) can therefore be maintained and accounted for in the meta-analysis.

In meta-analysis, then, the odds ratio is treated in two ways: (i) it is transformed to its natural logarithm (in order to improve the statistical distribution of the collected set of effects), and (ii) it assigned a weight. A weight is calculated for each individual effect using the formula[3] :

1/(1/[n before campaign] + 1/[n after campaign]
+ 1/[control n before campaign] + 1/[control n after campaign])

1 For all other outcome measures accident count data is substituted by percentage data (Christensen, 2003).
2 The control denominator is simply omitted for non-controlled effects.
3 The reader might appreciate the anomaly that where there are no control data, greater weight is assigned. However, an adjustment is made for this by doubling the weight denominators for non-controlled effects.

Thus the greater the number of accident counts the effect is based on, the greater the weight assigned to the effect. A final weighted effect is then obtained by simply multiplying the ln odds ratio by the weight.
Once a weighted effect has been obtained for each individual effect in a set of effects, an overall effect for the set is calculated by dividing the sum of the individual weighted effects by the sum of the individual weights, and then inversing the natural logarithm to obtain the overall effect in terms of the original odds ratio, which can then be converted to a percentage effect, as described above.

In this way, we calculated that the overall weighted effect of road safety campaigns on accident counts *according to the effects extracted from the studies retrieved* is a statistically significant reduction of 11%. The result is presented in Table 10.

Table 10. Overall effect of road safety campaigns on road accidents according to the effects extracted from the studies identified.

Group	Effect (%)	95% confidence interval (%)	Significant? (p < 0.05)
All accident effects (n = 119)	- 11	(- 12; -10)	yes

Testing for publication bias

Publication bias describes a tendency for authors and editors to publish only those studies demonstrating desirable, statistically significant effects. To put it another way, it is a tendency to avoid publishing those studies that fail to demonstrate desirable effect. There is documented evidence for publication bias (Light & Pillemer, 1984), and it means that any set of effects gathered from accessing a selection of available studies will be incomplete in that it will lack those undesirable or non-significant effects that were never published. The problem is that the true overall effect cannot be derived from sample of effects that does not fairly represent the whole set of effects. Fortunately, statistical tests are now available that can be used to detect publication bias for a sample of effects.

One way to observe publication bias is to plot the weight of each effect, which as we have seen can be considered as the relative number of participants or counts in that study, against the effect size, as shown in Figure 1. It is reasonable to assume that the individual effects in such a plot should be normally distributed about the true effect size, which should be approached with greater proximity by those studies with greater weight. There is said to be publication bias where this normal distribution is skewed in the direction of 'favourable' effect.

Figure 1 indicates that there is indeed publication bias for the set of effects based on accident counts included in the CAST database (bias can be seen in normal distribution of the clear diamonds). Several methods have been developed to correct the overall effect of a set of effects for which publication bias has been indicated.

The 'trim-and-fill' method proposed by Duval and Tweedie (2000a & b) attempts to represent the true distribution of effects by adding in the 'missing' or unfavourable data points. A computer algorithm is used to generate two estimates of the number of studies that should be added to the 'depleted' side of the distribution in order to make it normal. The two estimators are called R and L.

R is generated by first modifying the effect set by subtracting the average of all effects from each individual effect. The mathematical sign of the modified effects is then disregarded while they are ranked in order of size. Sign is reallocated to the resulting rank values, in order to find the number of effects along an uninterrupted sequence of one mathematical sign, beginning with the largest effect value going down. The number 1 is subtracted from the number of effects in this uninterrupted sequence to obtain R.

For the accident data in Figure 1 it is estimated that there are no missing studies using R. This can be explained in simpler terms by referring to the extreme negative and positive ln effect values in Figure 7.1. Independent of sign, the data point with the highest value is (-)1.31, but the next highest is (+)1.11, and so the number of ranks of one particular sign in the highest valued sequence is 1. Thus according to the R estimator there are no missing studies because 1 - 1 = 0.

L estimates not the number of *extreme* values missing on the depleted side of the distribution, but the number of values missing across the depleted side of the effects. To begin with, the effects are again ranked according to size, independent of sign, and the signs of the original effects reattributed to their rank values. The rank values are then divided into two sets, according to sign. Then the following equation is used[1] :

$$L = (4T_n - n[n+1]) / (2n-1)$$

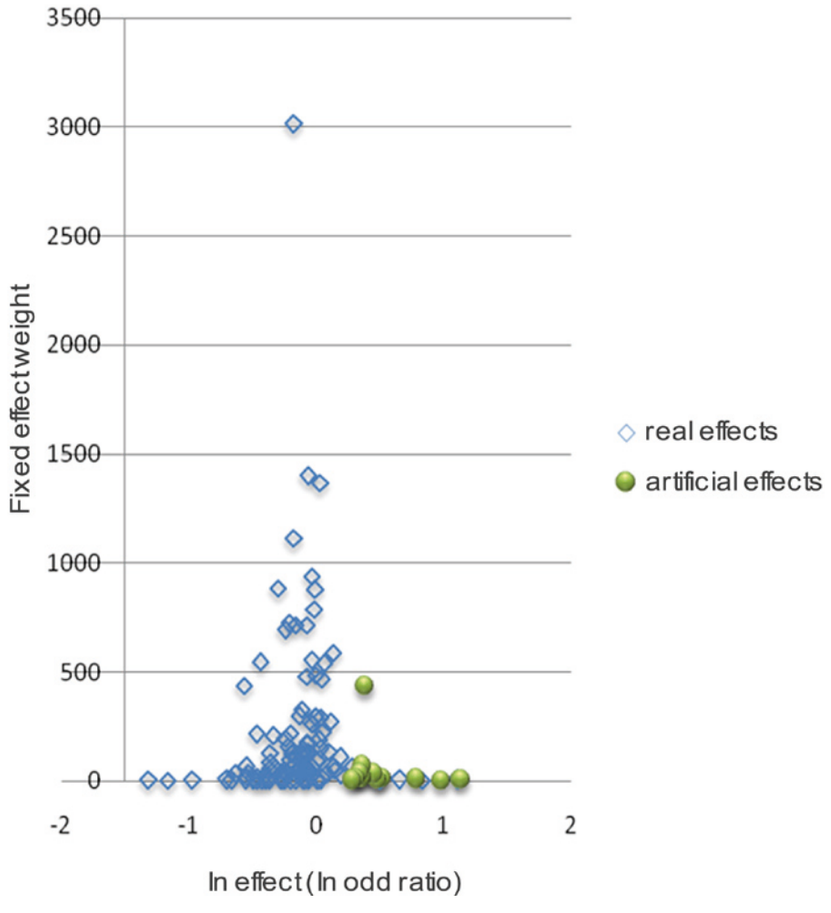
where T_n is the sum of rank values in the largest rank set, and n is the total number of effects in the group being analysed for bias . For the accident data in Figure 1, the estimator of missing effects L = 13. We can see by looking at Figure 1 that, relative to the left, a number of effects are indeed missing across the right hand side.

Consultation of the two estimators R and L together is recommended by Duval and Tweedie (2000a). In our conservative approach, we simply use whichever estimator gives the largest value.

Trim-and-fill generates compensatory effects to fill the distribution by copying the most extreme values on the favoured side and 'pasting' them into the distribution with the opposite mathematical sign. This is exemplified for the accidents count effects in Figure 1 (solid circles added).

1 This is actually used in reiterative rounds of testing of the data set in order to achieve an optimal solution, using a computer algorithm.

Figure 1 Correcting for publication bias in effect of road safety campaigns on accident numbers using trim-and-fill.



A meta-analysis is then re-run on 'complete' sets of effects to give a more accurate estimate of the overall effect.
There are several points that should be borne in mind when considering data corrected for publication bias:

- An assumption is made that a skewed distribution is caused by publication bias and not by other systematic variation. Other explanations for systematic variation are, however, possible. Smaller studies could actually be more effective. Bias could also be explained by campaigns having a stronger impact on accident fatalities than other types of accidents (fatal accidents relatively infrequent and therefore less weight).

- Sometimes correcting for publication bias simply doesn't make sense. For instance, some seatbelt studies with very low initial use rates report over 30-fold increases in percentage of people using seatbelts. Filling in 'missing' values by generating 30-fold *decreases* in seatbelt use is not sensible.
- Caution should be taken when comparing corrected overall effects generated from unequal sized sets of effects, especially where one group of effects has n < 15. This is because the effects of detecting and compensating for publication bias are more extreme for smaller groups of effects.

Table 11 shows overall effects of road safety campaigns on accident counts or seatbelt usage rates, before and after correcting for publication bias. Although the effects remain significant, they are somewhat reduced because 13 campaigns have been added to compensate for assumed publication bias. The resulting conservative estimate suggests that road safety campaigns reduce accident numbers by 9 %.

Table 11. Overall effect of road safety campaigns on accidents: fixed effects before and after publication bias.

Outcome measure	Account for publication bias?	Effect (%)	95%confidence interval (%)	Significant? (p < 0.05)
Accidents (n = 119)	no	**- 11**	**(- 12; -10)**	**yes**
	Yes, generate 13 effects to compensate	**-9**	**(- 11; -8)**	**yes**

Testing for heterogeneity

One must decide whether to use a so-called fixed-effects or random-effects model when carrying out meta-analysis. A fixed-effects model assumes that the same intervention (in our case a road safety campaign) will have the same effect regardless of whether it is carried out on different populations, at different times or in different countries. Any variation that is observed will just be due to chance. A random-effects model, on the other hand, assumes that characteristics of the situation, as well as the intervention itself, can cause variations in the true effect that is being estimated, as indeed can characteristics of the method used to measure the effect. The derivation of overall effect described above is based on a fixed-effects model.

The true overall effect of a heterogeneous set of effects can be inaccurately described using a fixed-effects model, whereas the true overall effect of a homogeneous set of effects will be estimated quite accurately by both fixed- and random-effects models. However, because the random-effects model reports larger confidence intervals, reflecting the greater uncertainty assumed, it is preferable to use a fixed-effects model on a homogenous dataset.

A statistical test can be used to inform the decision about which model will give the best estimate of overall effect for a set of effects. The test assesses whether there is significant heterogeneity among the set of effects (Everitt, 2002). Non-significant heterogeneity implies homogeneity, in which case a fixed-effects model is therefore used to describe the overall effect. Where the level of heterogeneity is significant, a random-effects model is used, and an estimator is introduced to account for possible unknown sources of systematic variation between individual effects.

The test statistic used to inform about heterogeneity is called Cochrane's Q (Christensen, 2003). Where Q is significantly larger than expected for a homogenous data set, homogeneity is rejected, and a random-effects model employed. For our set of accident effects, Q is significantly larger than expected for homogenous data set and a random effects model is therefore used to describe the overall effect. The random effects model derives an overall effect of campaigns on accidents of -12%. As shown in Table 12, although the apparent effect is greater, we can be considerably less confident about this estimate compared with that generated using a fixed-effect model. Table 12 also shows an estimate of overall effect based on a random-effects model after accounting for publication bias.

It is this final estimate, - 9 %, that we would present, not least because it is the most conservative in terms of both the effect size and confidence with which we can apply this effect to campaigns of the future.

Table 12. Four possible estimates of the overall campaign effect on accidents. Each overall effect is based on n individual effects (excluding the artificial effects generated by trim-and-fill).

Outcome measure	Model	Account for publication bias?	Effect (%)	95% confidence interval (%)	Significant? (p < 0.05)
Accidents (n = 119)	**fixed effects**	no	**-11**	**(- 12; -10)**	**yes**
	random effects		**-12**	**(-15; -9)**	**yes**
	fixed effects	Yes, generate 13 effects to compensate	**-9**	**(- 11; -8)**	**yes**
	random effects		**-9**	**(-12;-6)**	**yes**

Overall campaign effects according to different outcome measures

The meta-analysis procedure described above was used to derive conservative estimates of overall campaign effects for each of the outcome measures for which there were at least five individual effects. The results are shown in Table 13[1] .

As stated above, according to our sample road safety campaigns result in an overall significant reduction in accidents of nine per cent. Campaigns evaluated in the sample also produced favourable overall changes in road user behaviour, according to several different measures. We calculated a substantial overall increase of 25 per cent in the use of seatbelts, a decrease of 16 per cent and 17 per cent, respectively, in speeding and drink-driving behaviour and an increase in 37 per cent of drivers yielding to pedestrians. Apart from the drink-driving result, each of these results were statistically significant.

There were also favourable overall outcomes on some non-behavioural measures. Not surprisingly, campaigns resulted in an overall substantial, if somewhat variable, increase (120 per cent) in the recall of the campaign, but they also had a significant ability to increase understanding of risk (16 per cent). The effect of road safety campaigns on attitudes was low and non-significant, and the effect on relevant road safety knowledge inconsistent.

Table 13. Overall effect of road safety campaigns on different outcome measures, after accounting for publication bias. Each overall effect is based on n individual effects.

Outcome measure	Effect (%)	95% confidence interval (%)	Significant? (p < 0.05)
All accident effects (n = 119)	- 9	(-12; -6)	yes
% using seatbelts (n = 133)	+25	(+18; +31)	yes
% speeding (n = 28)	-16	(- 25; -6)	yes
% drink-driving (n = 23)	-17	(- 46; +28)	no
% yielding to pedestrians (n = 13)	+37	(+14; +65)	yes
% expressing favourable attitude (n = 39)	+5	(-0; +11)	no
% risk comprehension (n = 24)	+16	(+4; +30)	yes
% correct knowledge (n = 17)	+44	(-10; +132)	no
% recalling campaign (n = 23)	+120	(+30; +273)	yes

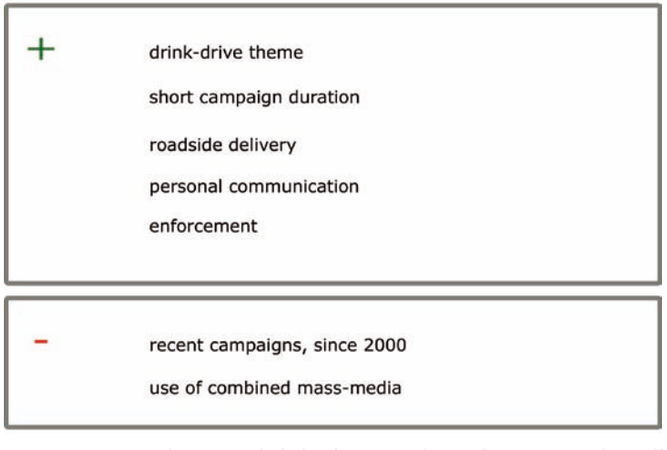
1 The original studies from which these overall effects are derived are given in the original project deliverable (Vaa et al., 2009).

Predictors of campaign effect

From the confidence intervals listed in Table 13 it can be concluded that there is considerable variation in the size of campaign effects reported by individual campaign evaluations. Undoubtedly this is in part due to the content chosen by campaign designers and the way they choose to deliver that content. One way to learn about the effects of certain types of campaigns is to calculate overall effects for subgroups of campaign effects, where each subgroup is defined by the campaign content and delivery variables (Vaa & Phillips, et al., 2009). However, subgroup analysis alone is quite a crude way to identify factors influencing the effect of campaigns. This is because it is simply a set of bivariate tests in which associations existing between only one variable (i.e. size of selected influencing variable) and another (i.e. size of the campaign effect) are assessed. In reality, several factors or variables interact to influence campaign effects. Because subgroup analysis does not account for associations between campaign effect and a selected variable *in the presence of other influencing variables on which it may be dependent*, it is only a crude approximation of the influences of variables that exist in reality. One way to assess systems of variables together is to use meta-regression.

Meta-regression is statistical process in which a model of predictor variables is developed using theoretical and statistical reasoning together with the results output from subgroup analyses, and then test to estimate how much the sample of weighted effects varies according to (i) the model of predictor variables together; and (ii) each predictor variable in the model.
While the main focus of this chapter is to give the overall effect of campaigns according to different types of outcome measure, we do not elaborate further on the process of meta-regression here[1]. However, to inform the interested practitioner we outline here our conclusions drawn from an extended meta-regression based on accident counts (Figure 2).

Figure 2. Final model of relative influence of campaign factors on reducing accident counts. Factors in italics are included only approach significance in random-effects meta-regression models, but have theoretical grounds to be included and /or were found to be significant in a previous meta-regression analysis (Vaa et al., 2004).



Note. Factors in italics are included only approach significance in random-effects meta-regression models, but have theoretical grounds to be included and /or were found to be significant in a previous meta-regression analysis (Vaa et al., 2004).

1 Further details on this are available from Vaa et al. (2009) and Phillips, Ulleberg & Vaa (2009).

A suggestion from subgroup analyses that campaigns using some form of personal communication with the target audience have somewhat improved effects was consolidated by our meta-regression analyses. The use of a personal element or the use of other people as channels for the delivery of the campaign message implies that an increased level of **intimacy** with the target could be important, possibly because it increases the likelihood that the target attends to and processes the campaign message.

That roadside delivery is also positively associated with beneficial campaign effects suggests that delivery of the message to drivers at a place that is in terms of space and time proximal to the target behaviour is beneficial in terms of campaign effect. In other words, achieving **immediacy** in the delivery of a campaign message might be important. In terms of accident counts, short campaign duration is also beneficial according to multivariate analyses, something which also implies a sense of immediacy. In shorter, more intense campaigns, the message may be more likely to be received at a time that is proximal to carrying out of the target behaviour.

Taken together, intimacy and immediacy suggest that those campaigns that make the target person think carefully about the message in the context of the driving behaviour would tend to be more successful at achieving effects during or after the campaign. Lack of evidence linking mass-media methods such as television or radio to greater improvements in campaign effects is in line with the idea that intimacy and immediacy are beneficial to campaign outcomes, though we insist that mass media methods still have clear advantage in terms of audience reach, and longer term and socially infectious persuasion.

When other factors are controlled for, our results indicated that the use of measures to enforce the campaign message can lead to improved reductions in accident counts, even though the use of enforcement was only near significance according to a random effects meta-regression model. Given the conservative tests of statistical significance applied in random effects meta-regression, we concluded that the use of enforcement as an accompanying measure can be beneficial.

In making these conclusions we draw attention to the nature of campaign evaluations in our sample, and the assumptions made, which are described here and in the original deliverable (Vaa & Phillips et al., 2009).

Conclusions

Based on a conservative meta-analytical summary of an extensive database, we can say that on the whole not only do road safety campaigns work, but they work well. This assertion is based on a number of different outcome measures, including risk comprehension (16 per cent increase), yielding behaviours (37 per cent increase), speeding (16 per cent reduction), seatbelt use (25 per cent increase) and accident reduction (9 per cent decrease). We do not find that campaigns are significantly effective at reducing drink-driving behaviour, possibly because there is a remarkably wide range of effects evident for campaigns using this measure. A summary of 39 results also shows no significant overall effect of campaigns on attitude.
While we have attempted to delineate theoretical and methodological limitations throughout this report, willingness to accept the conclusions we draw should depend on the level of agreement with decisions we have made and assumptions we have taken during treatment of the data.

Finally, we have outlined briefly our conclusions based on meta-regression analysis of the group of effects. This analysis suggests that the concepts of intimacy and immediacy may be important when influencing a campaign target. The interested reader should consider the original reports to consider these particular findings further (Vaa et al., 2009;& Phillips, Ulleberg and Vaa, 2009; Phillips, Ulleberg & Vaa, 2009).

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3 Evaluation of the Swedish Bicycle Helmet Wearing Campaign 2008

Ali Kazemi and Sonja Forward[1]

Abstract

The aim of this study was to evaluate the effect of a Swedish educational programme encouraging the use of bicycle helmets. A non-representative sample consisting of employees working for the same insurance company located at three different locations in Sweden was selected. Two served as an experiment group and the third as a control or comparison group. Measurements were taken before and after the campaign.

The educational campaign was held by the Swedish Falck Ambulance. The session lasted for one hour. The emphasis of the campaign was to focus on accidents and injuries to the brain when not wearing a helmet. The participants were also given an opportunity to sign a bicycle helmet contract on receipt of which they received a helmet free of charge.

The data was collected using a web-based self-report survey. The results revealed that the proportion of people who used a helmet when biking to work had increased substantially amongst those taking part in the session. It also showed that after the campaign the intention to use the helmet was greater amongst the experiment group than amongst the control group. The results also showed that Theory of planned behaviour (TPB) was effective in predicting the intention to wear helmets. The strongest predictor was perceived behavioural control followed by subjective norm. The weakest TPB predictor was attitude. Prediction of helmet wearing intention was significantly improved when anticipated regret and past behaviour was added to the model. The results from the Transtheoretical model showed that participants in the experimental group had on average moved one step closer to termination. In conclusion, the campaign succeeded in substantially increasing the proportion of people who started to prepare themselves for change or actually taking safety actions (i.e., wearing a helmet).

1 Swedish National Road and Transport Research Institute, Sweden.

Executive summary

This report contains the results of the evaluation study concerning the effects of the Swedish bicycle helmet wearing campaign 2008. This campaign started in 17 February and ended in 29 April.

The target group for the campaign was employees working for an insurance company. The principal *messages* of the campaign were "some decisions will last forever" indicating occurrence of brain injuries if bicycle helmets are not used and "bicycle helmet is for the cyclist what the seat belt is for the motorist". The principal aim of this study was to investigate if an educational campaign was able to increase the use of bicycle helmet wearing. A non-representative sample consisting of employees working for the same insurance company but located at three different towns was selected. Employees at two of the locations served as an experiment group and employees at the third as a control group. The question posed was thus whether an educational campaign would increase helmet use in the experiment group receiving the educational treatment as compared to the control group which was not exposed to any treatment. Adopting a theoretical approach to evaluate such campaigns and explaining differences in helmet use was also an important purpose of this study.

The educational campaign was held at the employee's place of work and the instructors worked for the ambulance service. The instructors described an ordinary working day and shared some of their experiences involving accidents in general and bicycle accidents in particular. The instructors also highlighted the importance of exercising and that biking is a good way to keep fit. The campaign was held eight times to ensure that as many as possible would be able to participate in the workshops. In addition to the lecture participants were encouraged to sign a bicycle helmet contract affording the employees the opportunity of receiving a helmet free of charge if the person promised to wear the helmet when biking.

The design of the evaluation study was the pre-test post-test control group design which gives a total of four groups and enables the researcher to make different comparisons among them.

Before the educational intervention, both the experimental group and the control group were asked to respond to a number of questions in a web survey. The main part of the questionnaire was based on an extended version of the Theory of planned behaviour, TPB (Ajzen, 1991). It included the conventional questions dealing with behavioural belief, normative belief, control belief and intention to wear a bicycle helmet when travelling to work, but in addition to this it also included past behaviour, anticipated regret and descriptive norm. In addition to this the survey also included a set of question based on another theoretical model, measuring where on a scale from 1 to 6, the individual is, with regard to change (i.e. the Transtheoretical model, TTM[1]). That is, has the individual started to change or is s/he still ignoring the problem? The questionnaire ended with a number of items asking the participant about their socio-economic background. Six weeks after the last educational session was held, employees responded to a post-campaign web survey tapping the same questions as in the first one.

1 Prochaska & DiClemente (1983).

In addition to these questions the experiment group, were asked questions about the educational campaign and if they had signed the helmet contract.

As the principal aim of any evaluation is to determine how far the intervention has achieved its objectives a number of analyses were carried out to establish the effect. The results of the survey revealed that the experiment and control groups were approximately equivalent prior to the campaign in that no significant mean differences were observed between the two groups. The intention to use a bicycle helmet was greater among experiment group participants than among control group participants. The number of participants who owned a bicycle helmet in the experiment group before the campaign increased significantly after the campaign. This, of course, is most likely to be related to the fact that of the 133 participants who attended the lecture 103 received a bicycle helmet after signing the contract.

The results further revealed that their behavioural beliefs were affected by the campaign in that participants in the experiment group agreed, more than the control group, with the statement that: using a helmet means that they are acting as good role models for others. Moreover, experiment group participants agreed less with the statement that wearing a helmet would mean that others would look at you (in a negative way) than control group participants. Surprisingly, the behavioural belief item that stated that if a bicycle accident happens, the risk for head injury would be smaller was not affected by the campaign. This can be explained in terms of a so called 'ceiling effect' indicating that participants before the intervention were already well aware of this and therefore further improvements would be almost impossible.

When only focusing on the experiment group before and after the event a number of significant changes in the right direction could be noted. For instance, anticipated regret was affected by the campaign in that participants after the campaign agreed to a greater extent with the statement that biking without a helmet gives them bad conscience than before the campaign. The results show furthermore that participants after the campaign believed to a greater extent that their work colleagues used bicycle helmets than before the campaign. They also reported to a greater extent than before the campaign that it was more probable that they would use a helmet if they were in a hurry, if the traffic was heavy, if the helmet was nice looking, and if they somehow could store their helmets afterwards. It is interesting to note that the campaign affected participants' willingness to use the helmet even if they were in a hurry.

By employing the Transtheoretical model the study was able to evaluate if the campaign had moved the participants closer to taking action. The results show that in the experiment group the number of participants in the pre-contemplation stage and in the contemplation stage diminished after the campaign (15% and 17.3% respectively) than before the campaign (26.2% and 43.6%). This indicates that the number of people who had become aware of the problem had increased but also that a larger number of people had started to question their own behaviour. The same also applied to the proportion of people who either had started to prepare themselves for action or actually made some actual effort to change.

The proportion of people in the preparation stage increased from 8.7% to 19.5%) and in the action stage from 10.3% to 25.6%. With regard to those who had reached the stage of maintenance the increase was from 3.6% to 13.5% and finally at the final stage, when the new behaviour is firmly established, increased from 7.7% to 9%.

The same changes which had taken place amongst the participants in the experimental group were not noted amongst the control group participants. This is an important result as it shows that people who have been educated in the importance of using helmets are planning to use the same (even though they have not used one previously).

So far the effects of the campaign have been presented by comparing experiment participants before and after the campaign and by comparing experiment and control group participants after the campaign. The next step is to assess the effects through the use of the Theory of planned behaviour, both the original model and an extended version of it. A series of linear multiple regression analyses were performed to examine the explanatory power of TPB in the context of bicycle helmet wearing. The dependent variable was the intention to wear a helmet when biking. Aggregated measures of attitude, subjective norm, and perceived behavioural control were used as predictors or independent variables. The results showed that before the campaign the model explained the intention to wear a bicycle helmet equally well in both the experimental and the control group. This would then further support the notion that these two groups were compatible. After the campaign some interesting results were presented since the variance explaining the intention to use a helmet in the experimental group had increased substantially whereas the same could not be observed in the control groups. This could indicate that the campaign had made participants beliefs more salient and therefore more consistent with their intentions.

In this study an extended version of the TPB was tested as the aim of this research was to achieve an increased understanding of what affects bicycle helmet wearing. Thus, we conducted a hierarchical regression analysis, for both the control group and experimental group, in which the aggregated measures of attitude, subjective norm, and perceived behavioural control were entered in the first step of the analysis, descriptive norm, personal norm, and anticipated regret in the second step, and past behaviour in the third and final step. The dependent variable was intention to wear helmets when biking to work. The aim of hierarchical regression analysis was to test for significance of incremental (additional) variance, that is, variance explained over and above what was explained by the predictors in the preceding steps of the analysis.

The results showed that 59.1 % of the variance in intention to wear a helmet was explained by the constructs within the theory. The strongest predictor was perceived behavioural control. It means that the more control the person has over the situation, the greater is the intention to use a helmet. Subjective norm contributed also significantly to the amount of explained variance. This effect indicates that the stronger the perceived pressure is from others to use the helmet, the greater the intention to wear a helmet. The weakest predictor was attitude. When descriptive norm, personal norm, and anticipated regret were added to the model, the amount of explained variance increased from 3.9 % to 63 %. The variable contributing mostly to this effect was anticipated regret.

This would then imply that if they felt bad about not using a helmet then they were more likely to use it. Furthermore, when past behaviour was added to the model in Step 3, the magnitude of the explained variance increased by around 1.7 % to 64.7 %.

In sum, it could be concluded that an educational campaign which also include elements of reinforcement (i.e. to be given a bicycle helmet when signing a contract to use the same) significantly increases the likelihood of using a bicycle helmet.

Introduction

Every year a large number of cyclists are either killed or injured in traffic. During 2008 30 cyclist died and 337 were severely injured (Vägverket, 2009). Considering the size of population and the extent to which bicycling takes place in everyday life, the fatality rate in Sweden is higher than in the Netherlands, and only slightly less than in the United States (Nolen, 2004).

Bicycle fatalities in Sweden include both accidents that involve collisions with motor vehicles and so called single accidents. A large proportion of the casualties suffered from head injuries (i.e. to the skull, brain and the face) could have been prevented or reduced if a helmet was used (Björnstig et al., 1992; Dorsch, Woodward, & Somers, 1987; Henderson, 1995; Nolen, 2004, Nolen, Ekman, & Lindqvist, 2005; Rivara et al., 1998; Thompson, Rivara, & Thompson, 1996). In a meta-analysis it was shown that helmets reduce the risk of fatalities by 73%, skull and brain injuries by 60%, and face injuries by 47% (Attewell, Glase, & McFadden, 2001). These results were further supported by the Cochrane Review (Thompson, Rivara, & Thompson, 2003). Taken together, these data confirm and attest to the importance of bicycle helmet wearing.

The question then arises what factors affect people's tendencies to wear bicycle helmets? One factor is age with children up to the age of 12 being more prone to wear bicycle helmets than adults (Healy & Maisey, 1992; MacKay, Klassen, & Cushmen, 1998; Thulin, 2008; TTM Consulting, 1994). Socio-economic status, in terms of income and education, have also been shown to be related to helmet use in such a way that the more educated and the higher income one has (or one's parents have), the more one is willing to use a helmet. General risk behaviour is another factor which can be linked to non usage (i.e. smoking, gambling, and alcohol consumption) (Nolen, 2004).

Previous research in this area have also been able to demonstrate that helmet wearing is associated with past behaviour (Sutton, 1994), parental and peer encouragement (Lajunen & Rasanen, 2001), safety and risk perceptions (DiGuiseppi, Rivara, & Koepsell, 1990; Finch, 1996), law enforcement and legislation (Ashby, Routley, & Stathakis, 1998).

The bulk of previous research have focused on explaining helmet wearing but only a few studies have assed the effects of educational campaigns on increased helmet wearing. Thus, as a remedy the present evaluation study focuses on an investigation of the effects of educational campaigns and extends previous research results by examining adults' use of bicycle helmets and by adopting a theoretical approach to evaluate such campaigns. The theoretical models used in the study reported herein (i.e., Theory of planned behaviour and Transtheoretical model) are described in detail in the introductory chapter of this volume.

The aim of this study is to evaluate the effect of an educational campaign by comparing employees at one insurance company located at three different towns in Sweden. Employees at two of the locations served as an experiment group and the third as a control or comparison group. The question posed was thus whether an educational campaign would make attitudes, norms and intentions more in favour of helmet use in the experiment group receiving the educational treatment as compared to the control group which was not exposed to any treatment.

Method

Sample and Design

Data was collected using a web survey. The participants worked for the same insurance company but in three different towns. Employees at two of the locations served as the experiment group and were thus exposed to the campaign (i.e., an educational session focusing on the functions of human brain, brain damages and the importance of wearing a helmet when biking). Employees at the third location served as a control group. In the experiment group, a total of 195 employees (of 280) answered the survey before the campaign which gives a response rate of 72.2%. After the campaign 143 people responded to the survey but of those 10 had not taken part in the program and where therefore excluded, giving a response rate of 52.9%. In the control group, a total of 55 employees (of 80) answered the survey which gives a response rate of 68.8%. After the campaign, the corresponding response rate was 50% (n=40). The characteristics of the samples are given in Table 1 and Table 2.

Table 1. Number of participants across gender and groups.

Group		Frequency	Percent
Experiment_pretest	Female	109	55.9
	Male	86	44.1
Control_pretest	Female	24	43.6
	Male	31	56.4
Experiment_posttest	Female	82	61.7
	Male	51	38.3
Controll_posttest	Female	16	40.0
	Male	24	60.0
Total		423	100

Table 1 shows that the number of female participants were larger than the number of male participants in the experiment groups before and after the campaign. Table 2 shows that the mean age was equal across the groups.

Table 2. Age statistics across the four groups.

Group	Frequency	Minimum age	Maximum age	M	SD
Experiment_pretest	195	23	65	44.6	10.3
Control_pretest	55	26	60	44.9	9.6
Experiment_posttest	133	24	64	45.9	10.1
Control_posttest	40	26	63	45.8	10.2

Random assignment of participants into experiment and control groups was not feasible. Thus, the observed effects cannot unambiguously be related to the campaign. The control group can here thus be regarded as a comparison group, and the experiment and comparison groups that are constructed in this way are in the literature referred to as intact groups. The comparison group was selected to match the experiment group in relevant respects (e.g., the nature of work, age, gender). Taken together, we constructed four groups according to the following scheme:

- Experiment group before the campaign/intervention (Experiment_pretest)
- Control group (Control_pretest)
- Experiment group after the campaign/intervention (Experiment_posttest)
- Control group (Control_posttest)

The apriori data expectations in this kind of designs are:

- Experiment_pretest vs. Control_pretest (i.e., statistically non-significant mean differences)
- Experiment_pretest vs. Experiment_posttest (this difference is expected to be significant)
- Control_pretest vs. Control_posttest (this difference should be non-significant)
- Experiment_posttest vs. Control_posttest (this difference is expected to be significant)

Procedure

The educational campaign

The educational campaign was held by Falck Ambulance personnel. For practical reasons, different persons (two male and one female ambulance drivers) led the educational session. However, all educational staff used standardized educational materials. The session lasted for one hour. The session was given in several occasions (i.e., eight) to ensure that all the insurance company employees would be able to attend the session. A total of 218 employees participated in the educational campaign at a cost of SEK 21.900.

The emphasis in the educational campaign was placed on describing human brain and its functions. Furthermore, the educational staff described an ordinary working day and shared some experiences of accidents in general and bicycle accidents in particular. They showed 18 slides that illustrated a simulated bicycle accident covering all the stages from bicycling to how the target person falls of the bike (see appendix for a short description of the presentation). The staff also pointed out the importance of exercising and that biking is a good way to keep in shape and encouraged them to wear helmets. The seminar included both humor and fear (Figure 1 and 2 present two examples from the slide show).

Figure 1. Homer's brain.

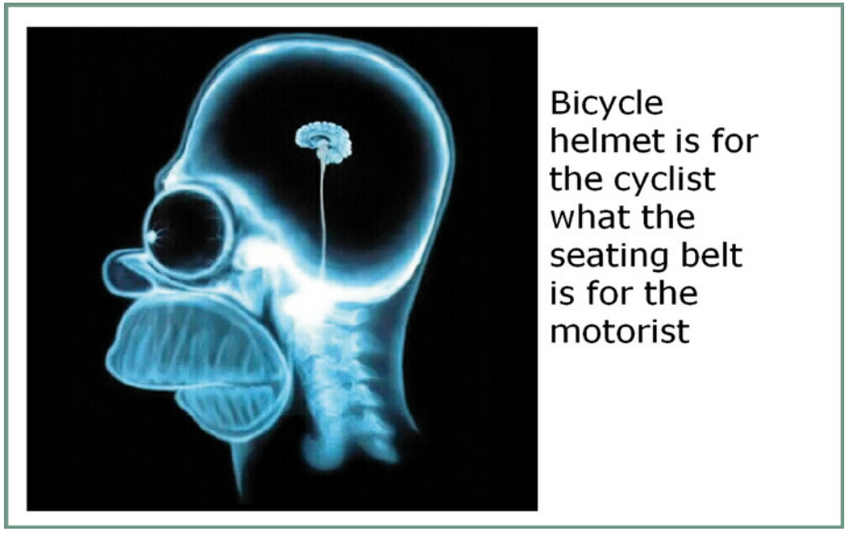
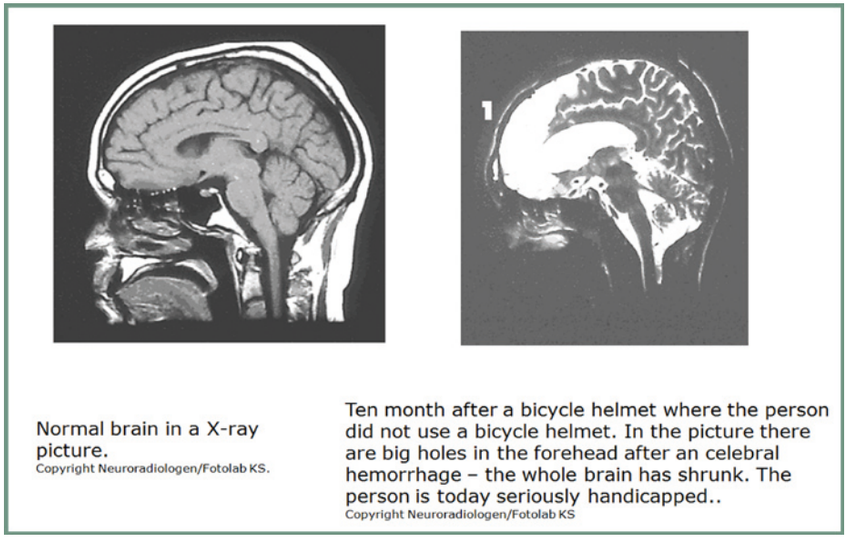


Figure 1 shows Homer in Simpson who has a very small brain. The picture emphasize that we might have more to protect than Homer has. Figure 2 shows two photos of a brain , the first is a normal brain and the second a brain ten months after a bicycle accident.

Figure 2. Normal brain in X-ray.



Subsequent to the educational session, the participants were given an opportunity to sign a bicycle helmet contract according to which the employees received a helmet for free if they committed themselves to wearing the helmet when biking. This resulted in that 155 helmets at a cost of SEK 27 250 were handed out.

Web Survey

Both before and after the intervention the employees responded to a number of questions in a web survey. The same questions were answered also by the employees in the control group.

The questionnaire included *background / demographic* questions (i.e., gender, age, education, distance from home to work, whether they have driver's license, whether they own a helmet) and their travelling habits to work (i.e., to what extent they: bike, drive, use public transportation, and walk to work). The latter questions were answered on a 7-category ordinal scales ranging from never (7), more seldom (6), once a month (5), more than once a month (4), once a week (3), more than once a week (2), to everyday (1).
Subsequently, participants were asked questions about *past behavior* (i.e., "How often do you use a helmet when you bike to work?", and "How often do you use a helmet when you bike on your spare time?"). Thereafter, a *general behavioural intention* question was asked (i.e., "How probable is it that you will use a helmet when you bike to work in the coming two months?").

Question about *stages of change* was also included in the survey, i.e., "Which of the following alternatives describe you in the best way today?" ("I do not use a bicycle helmet today and have no intention to do so either" [pre-contemplation], "I do not use bicycle helmet, but I have thought about maybe starting to use one when biking" [contemplation], "I never or seldom use a bicycle helmet, but I will soon start using one on a regular basis" [preparation], "I use bicycle helmet rather regularly" [action], "I always/almost always use bicycle helmet since more than 6 months ago" [maintenance], and "I always use bicycle helmet since several years ago and will continue doing that" [termination]).

Personal norm and *anticipated regret* were, respectively, tapped by single items ("Adult bicyclists should always use a helmet", "To bike without wearing a helmet gives me a bad conscience"). *Descriptive norm* was tapped by five items ("How common do you think it is that people in your vicinity use bicycle helmets on a regular basis: a) your closest friends, b) your closest relatives, c) your work colleagues, d) adult bicyclists in your area, e) biking children in your area").
Subsequently, respondents were then presented with a scenario and asked to imagine that:

> "it is early summer and you are going to bike to your workplace. The weather is fine and the biking is on bicycle lane most of the way, but also on ways with car traffic".

Questions about *behavioral beliefs* were then posed ("What would it mean to you if you used a bicycle helmet in the situation that was described earlier? Does it mean that: a) you are a good role model for others?, b) you ruin your hair style, c) sense of freedom decreases, d) it would be uncomfortable, e) you would feel that others look at you, f) you would think that the helmet is ugly, g) you would feel like a fool, h) it would get warm, i) if a bicycle accident happens the risk for head injury would be smaller"). *Perceived behavioral control* was tapped subsequently ("Would it be possible or impossible for you to use a helmet in the situation described earlier?").

Control belief was assessed by multiple items ("How probable or improbable would it be to use a bicycle helmet if the following were true?, a) if you are in a hurry when you should get going, b) if the helmet looked nice, c) if you bike in heavy car traffic, d) if there is storage for the helmet after biking, e) if the helmet is comfortable").

Normative belief was assessed by asking the respondents "How important do you think it is to the following people that you use a helmet in the situation described earlier? a) your wife/husband or boyfriend/girlfriend, b) someone else close to you, c) your work colleagues, d) other bicyclists in your vicinity". The survey ended with posing a specific *behavioural intention question* ("If you were to bike in a situation resembling the one described earlier, how probable is it that you would use a bicycle helmet?"). All the questions referring to the scenario were measured on 7-point rating scales ranging from 1 (strongly agree/very common/most probable/very important/) to 7 (strongly disagree/very uncommon/most improbable/very unimportant).

Six weeks after the last educational session was held, employees responded to a post-campaign web survey tapping the same questions as in the first one. Both experimental and control groups responded to the questions. For the experiment group, questions tapping *perceptions* of the educational campaign and a *helmet contract* were asked. This follow-up questionnaire started with asking the respondents if they hade participated in the educational campaign. The next question asked whether the campaign had affected respondents' toward using bicycle helmets in the future. Thereafter, they were asked about their general attitude toward these kinds of campaigns arranged by workplaces. The respondents also rated the extent to which they perceived the content of the campaign as comprehensive, trustworthy, thought provoking, informative, and frightening. The post-campaign questionnaire also included questions about attitudes toward signing a bicycle helmet contract.

Descriptive norm (DN), attitude (A), perceived behavioural control (PBC), and subjective norm (SN) were assessed by multiple items and were thus, respectively, checked for reliability (internal consistency). By averaging the responses to items pertaining to respective construct, composite indices/scales were created measuring attitude, perceived behavioural control, subjective norm and descriptive norm. Cronbach's alphas (reliability estimates) were .74 (for DN), .81 (for A), .92 (for PBC), and .90 (for SN).

Results and Discussion

The results section is divided into three subsections: 1) Descriptive statistics, 2) Campaign effects analyses and 3) Model testing.

Descriptive statistics

In this section, descriptive statistics are presented including all the participants who replied to the web survey (n=423).

Bivariate correlations

In this subsection the relationships between the study variables are described bivariately (i.e., two by two).

Table 3. Bivariate correlations.

	1	2	3	4	5	6	7	8	9	10
1. General intention										
2. Specific intention	.52**									
3. Use helmet to work	.56**	.30**								
4. Use helmet at spare time	.59**	.59**	.45**							
5. Personal Norm	.22**	.48**	.11*	.31**						
6. Anticipated Regret	.38**	.61**	.16**	.45**	.59**					
7. Descriptive Norm	.21**	.36**	.06	.23**	.23**	.39**				
8. Behavioural belief	.09	.23**	.08	.20**	.24**	.14**	.02			
9. Control belief	.41**	.74**	.24**	.46**	.50**	.56**	.32**	-.23**		
10. Normative belief	.24**	.58**	.05	.30**	.47**	.53**	.42**	-.13**	.58**	
11.Perceived Behavioural Control (general)	.23**	.51**	.11*	.26**	.50**	.41**	.29**	-.37**	.61**	.41**

Note. *$p < .05$; **$p < .01$.

Table 3 shows that general intention (i.e., “How probable is it that you will use a helmet when you bike to work in the coming two months?”) is significantly and positively associated with all variables except for behavioural belief. This means that knowing about individuals’ behavioural beliefs will not help us in knowing something about the intention to use bicycle helmets. In contrast, specific intention (“If you were to bike in a situation resembling the one described earlier, how probable is it that you would use a bicycle helmet?”) is significantly correlated with all the variables.

This indicates that distinguishing between these two types of intention in measurements makes a difference. The correlation between behavioural belief and specific intention indicate that individual who did not agree with the statements that a bicycle helmet would be uncomfortable or ugly or that it leads to a decrease in sense of freedom, the more likely it is that they also would wear a helmet. The variable presenting the greatest relationship with intention was control belief followed by anticipated regret. This would then indicate that people who perceived that it was easy to use the helmet and who would feel regret if they failed to was also more likely to use it.

Number of signed helmet contracts

The educational campaign was held eight times to ensure that as many as possible would be able to participate in the campaign. Table 5 shows how many of the participants also signed the contract.

Table 4. Number of signed helmet contracts: Male and female.

Number participants who took part in the educational program			Number of singed contracts (% of the total)		
Total	Male	Female	Total	Male	Female
133	51	82	103 (77%)	34 (67%)	69 (82%)

Table 4 shows that a large majority of those who took part in the survey also signed the bicycle helmet contract. It also shows that more females than males signed the contract.

Perceptions of the educational campaign

In addition to questions related to their perception of bicycle helmets the survey also included questions about the campaign itself, see Figure 3.

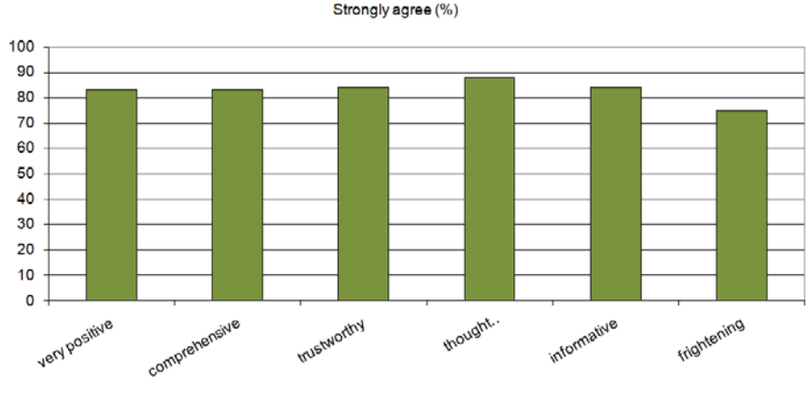


Figure 3. Perceptions of the educational campaign.

The diagram shows the percentage of people who agreed strongly with the statements (i.e. 1 or 2 on a scale from 1 to 7). It shows that of those who participated in the educational campaign 83% perceived the program as very positive, 83% as comprehensive, 84% as trustworthy, 88% as thought provoking, 84% as informative, and 75% as frightening.

Campaign effects analyses

As expected, no significant mean differences were observed ($p > .05$) between the pretests of experiment and control groups indicating that these groups were approximately equivalent and thus comparable in relevant respects prior to the educational campaign. Furthermore, as the control group did not receive the educational treatment (i.e., campaign) we expected the participants' responses in the pre- and posttests to be approximately the same. This was supported in that no significant mean differences were revealed ($p > .05$). All survey questions were included in these analyses (independent samples t-tests).

The main dependent variable was the reported intention to use bicycle helmets. Independent samples t-tests were used to first compare intention to use helmets in the experiment group prior and subsequent to the campaign, and second to compare the intention between the experiment and control groups after the campaign. Expected differences were found. Thus, the intention to use a bicycle helmet was greater after than before the campaign, and the intention to use a bicycle helmet was greater among experiment group participants than among control group participants after the campaign (see Table 5 and Table 6). This was true for both measures of intention, i.e., general as well as specific. Other mean differences are also reported in Table 5 and Table 6. These differences are interpreted in the following.

Inferential tests like the independent samples t-test tells us whether there is a reliable difference between the means that we compare. However, a statistically significant t-test does not tell us how large of an effect the independent variable (in this case the campaign) has had. Measures of effect size are many and indicate the strength of the relationship between the independent variable (e.g., the campaign) and the dependent variables (e.g., the intention to wear helmet). A common measure of effect size that is used as a complement to independent samples t-tests is *Cohen's d*. Table 5 and Table 6 provide information of this measure. To interpret the Cohen's d value, one can follow Cohen (1992). Cohen provides the following guidelines: effect sizes of d = .20 (small effect), d = .50 (medium sized effect), and *d* = .80 (large effect).

Table 5. Comparing the experiment group participants before and after the campaign.

Variables	Group	M	SD	t	Cohen's d
Own a helmet	Before	1.55	.50	8.51***	2.01
	After	1.13	.34		
Use helmet at spare time	Before	5.69	2.10	7.10***	0.30
	After	3.78	2.76		
Behavioural intention (general)	Before	5.47	2.43	5.41***	0.23
	After	3.90	2.90		
Anticipated regret (biking without a helmet gives me bad feelings)	Before	3.58	2.36	2.07*	0.11
	After	3.03	2.36		
Descriptive norm (work colleagues)	Before	4.07	1.68	4.63***	0.33
	After	3.24	1.44		
Control belief 1(if in hurry)	Before	3.77	2.39	4.08***	0.20
	After	2.72	2.16		
Control belief 2 (nice looking helmet)	Before	3.11	2.16	1.95*	0.10
	After	2.62	2.28		
Control belief 3 (in heavy traffic)	Before	2.52	2.03	2.52**	0.14
	After	1.96	1.85		
Control belief 4 (storage of helmet)	Before	3.08	2.38	2.31*	0.10
	After	2.47	2.29		
Behavioural intention (specific)	Before	3.64	2.22	5.64***	0.29
	After	2.26	2.10		
Stage of change	Before	2.45	1.46	-5.27***	0.37
	After	3.32	1.52		

Note. *p < .05; **p < .01; ***p < .001. Only significant effects/differences are reported here. Statistically non-significant differences are omitted due to space limitations. A low mean value indicates that they are in favour of using a helmet and that they perceive more control.

Table 5 shows that the number of participants who owned a bicycle helmet in the experiment group increased significantly after the campaign, presumably as a consequence of the helmet contract that was offered and signed by many (see Table 4). There is an increased use of helmets in the spare time after the campaign.

Moreover, anticipated regret was affected by the campaign in that participants after the campaign agreed to a greater extent with the statement that biking without a helmet gives them bad conscience than before the campaign. The results show furthermore that participants after the campaign believe to a greater extent that their work colleagues use bicycle helmets than before the campaign. This was also expected as the participants have no reason to believe that the tendency to use helmets has been changed among their friends, relatives, other adult bicyclists or biking children in their vicinity as these categories of people did not participate in the campaign and were neither offered a helmet.

From the viewpoint of the Theory of planned behaviour, interestingly, the only variable that was affected by the campaign was control belief. Specifically, participants after the campaign reported to a greater extent than before the campaign that it was more probable that they would use a helmet if they were in hurry, if the traffic was heavy, if the helmet was nice looking, and if they somehow could store their helmets afterwards.

It is interesting to note that the campaign affected participants' willingness to use the helmet even if they were in a hurry. The results in Table 5 also show that participants after the campaign have moved from 2.45 to 3.32, that is from being between contemplation and preparation they have moved closer to the action phase. Figure 4 shows the use of helmets when biking to work before and after the intervention.

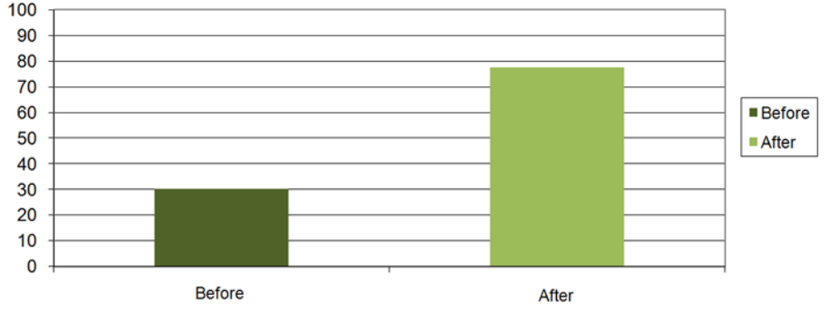


Figure 4. Percentage of participants in the experiment group wearing helmet when biking to work prior and subsequent to the campaign.

Figure 4 displays that the number of cyclists who used helmets before the campaign increased considerably from 30.3% to 77.4% after the campaign.

Table 6. Comparing the experiment and control groups after the campaign.

Variables	Groups	M	SD	t	Cohen´s d
Own a bicycle helmet	Experiment	1.13	.34	-6.16***	2.53
	Control	1.55	.50		
Use helmet on spare time	Experiment	3.78	2.76	-3.13**	0.19
	Control	5.30	2.47		
Intention to use helmet in the coming two months (general)	Experiment	3.86	2.91	-2.20*	0.12
	Control	5.00	2.73		
Being a role model for others (behavioural belief)	Experiment	1.79	1.57	-2.44*	0.25
	Control	2.53	1.97		
Have a feeling that others look at you (behavioural belief)	Experiment	5.40	2.11	2.25*	0.19
	Control	4.50	2.52		
Intention to use a helmet if in a situation like the one described in the scenario (specific)	Experiment	2.26	2.10	-2.82**	0.23
	Control	3.38	2.44		
Stages of change	Experiment	3.32	1.52	2.65**	0.46
	Control	2.58	1.74		

Note. *p < .05; **p < .01; ***p < .001. Only significant effects/differences are reported here. Statistically non-significant differences are omitted due to space limitations. A low mean value indicates that they are in favour of using a helmet.

As previously noted, both general and specific measures of intention was affected by the campaign. Thus, the intention to use helmets was reported to be higher after the campaign in the experiment group as compared to the control group.

The number of participants who owned a bicycle helmet was higher in the experiment group than in the control group. This is as previously stated due to the free helmets that were offered as a part of the campaign.

Comparing the experiment and control groups after the campaign also reveals that behavioural belief (or specifically, being a role model for other people) is affected by the campaign in that experiment group participants agreed more than control group participants with the statement that using a helmet in a situation like the one described in a scenario means that they are acting as good role models for others. Moreover, experiment group participants agreed less with the statement that wearing a helmet would mean that others would look at you (in a negative way) than control group participants. This indicates that lesser importance is attached to such beliefs after a campaign that focuses on injuries that result from not wearing a helmet. For instance, the behavioural belief item that stated that if a bicycle accident happens, the risk for head injury would be smaller was not affected by the campaign (Before M=1.57; after M=1.39). A possible explanation is the 'ceiling effect' stating that further improvements is very difficult since the participants were already aware of the risks of not using a helmet before the campaign. The other behavioural belief items were not related to the contents of the educational campaign and responses to them were thus not expected to be affected by the campaign.

Another interesting finding pertains to the stages of change which show that participants who were exposed to the campaign had moved to a significantly higher stage when tested after the event. This finding indicates that the campaign has been successful in affecting participants' propensity to use helmets to a greater extent. Figure 5 illustrates this finding more descriptively and includes results from both the pre test and the post test.

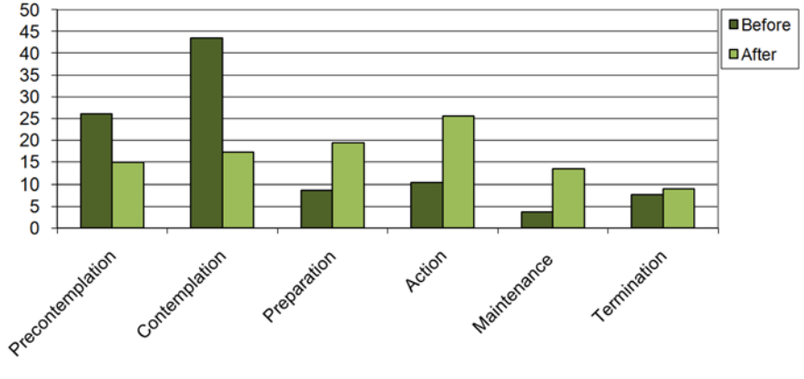


Figure 5. Number of participants in different stages of change across experiment and control groups prior to and after the educational campaign.

Figure 5 shows that the number of participants in the pre-contemplation stage ("I do not use a bicycle helmet today and have no intention to do so either") and in the contemplation stage ("I do not use bicycle helmet, but I have thought about maybe starting to use one when biking") becomes lesser after the campaign (15% and 17.3% respectively) than before the campaign (26.2% and 43.6%). In the higher stages of change, the pattern was reversed as expected, that is, the number of people in the preparation (will start using one; from 8.7% to 19.5%), action (use rather regularly; from 10,3% to 25.6%), maintenance (have always used in the last six months; from 3,6% to 13.5%), and termination (have always used in the last several years and will continue using; from 7.7% to 9%) was lesser before than after the campaign. These findings are related to both the information given by the campaign but also the helmets that were freely distributed after a contract was signed.

Testing the Theory of planned behaviour in the context of bicycle helmet wearing

As already mentioned, another aim of the present study was to test predictions of Theory of planned behaviour (Ajzen, 1991). A series of linear multiple regression analyses were performed to examine the explanatory power of TPB in the context of bicycle helmet wearing. The dependent variable was the intention to wear a helmet when biking. The aggregated measures of attitude, subjective norm and perceived behavioural control were entered simultaneously in the analyses as predictors or independent variables. Four separate analyses were run, one for each group/sample. The results are presented in Table 7. Attitude contributed significantly to the explained variance in intention only in the control group before the campaign sample. Thus, in other samples, attitude did not affect the extent to which participants intended to use helmets. In contrast, perceived behavioural control and subjective norm accounted, respectively, for significant amounts of variance in participants' intention to wear bicycle helmets in all samples. A significant beta weight for attitude indicates that people who intended to use the helmet had positive attitudes towards the same. Significant beta weights for perceived behavioural control and subjective norm, respectively, indicate that those who intended to use the helmet perceived fewer barriers towards executing the same and believed that others who are important to them find it acceptable that they use the helmet.

Table 7. Summary of multiple regression analyses predicting specific intention to wear a helmet.

Groups	Predictors	Beta	t	p	Adjusted R2	Model significance
Experiment before the campaign	A	.04	.85	ns		
	PBC	.56	9.04	***		
	SN	.22	3.56	***	.51	69.32***
Control before the campaign	A	.28	2.91	**		
	PBC	.41	3.63	***		
	SN	.30	2.66	*	.53	20.91***
Experiment after the campaign	A	.01	.31	ns		
	PBC	.79	16.89	***		
	SN	.18	3.87	***	.82	209.80***
Control after the campaign	A	.03	.27	ns		
	PBC	.35	2.42	*		
	SN	.45	3.11	**	.45	11.41***

Note. ß = Standardized regression coefficients. ***p < .001; **p < .01; *p < .05; ns=non significant.

Testing an extended version of TPB

As previously noted, one of the aims of the present study was to predict the intention to use a bicycle helmet using an extended version of TPB. Thus, a hierarchical regression analysis was conducted in which the aggregated measures of attitude, subjective norm and perceived behavioural control were entered in a first step of the analysis, descriptive norm, personal norm, and anticipated regret in a second step, and past behaviour in a third and final step. The dependent variable is specific behavioural intention to wear helmets when biking to work. The aim of hierarchical regression analysis is to test for significance of incremental (additional) variance, that is, variance explained over and above what was explained by the predictors in the preceding steps of the analysis. In this analysis all groups (experiment and control before and after the campaign) are treated as one sample. and the results are shown in Table 8.

Table 8. Summary of hierarchical regression analysis predicting specific intention to wear a helmet.

Predictors	R^2	R^2 Change	F Change	β Step 1	β Step 2	β Step 3
Step 1						
Attitude				.07*	.07*	.06
Perceived B Control	.591	.591	207,04***	.59***	.50***	.46***
Subjective norm				.24***	.15***	.17***
Step 2						
Descriptive norm	.630	.039	14,78***		.05	.05*
Personal norm					.01	.00
Anticipated regret					.23***	.22***
Step 3						
Past behaviour	.647	.017	20,87***			.14***

Note. ß = Standardized regression coefficients. *p < .05. **p < .01. ***p < .001.

The results show that 59.1 % of the variance in intention to wear a helmet is explained by TPB. The strongest predictor is perceived behavioural as indicated by the magnitude of the beta weights. It means that if it was perceived as possible for them to use the helmet then they would also use it. Subjective norm contributes also significantly to the amount of explained variance.

This effect indicates that the stronger the pressure is from others the greater the likelihood is that they will use the helmet. The weakest TPB predictor is attitude which would indicate that the attitude of intenders and non-intenders are fairly similar.

The amount of explained variance was increased to 63% in the second step when descriptive norm, personal norm and anticipated regret were added to the model. The greatest contribution was by anticipated regret which measured how they felt about not using a helmet. Those who felt bad about not using one is more likely to use it. When habit or past behaviour is added to the model in Step 3 the amount of explained variance is increased to 64.7 %.

Conclusions and recommendations

This study was set out to design, implement and evaluate a bicycle helmet wearing educational campaign using a theory-based approach in order to predict, explain, and promote helmet wearing among adult bicyclists in Sweden. A non-representative sample was used in that employees who worked for the same insurance company located at three different towns in Sweden were compared to each other before and after an educational campaign. Employees at two of the locations were offered or exposed to the campaign, while employees at the third company were not.

The results showed that the campaign was effective in enhancing helmet wearing when biking to work. It also showed that the intention to wear a helmet among participants in the experimental group had increased significantly when compared with before the campaign. The same differences were not presented amongst the participants in the control group.

Behavioural beliefs

Campaign participants were more likely than control participants to endorse the belief that wearing a helmet would make them feel to be a good role model for other people. On the other hand, campaign participants were less likely than control participants to endorse the belief that wearing a helmet would give the negative feeling that others look at them. The other measured behavioural beliefs were not affected by the campaign. Thus, we recommend future campaign studies to more specifically emphasize the importance of being a role model for others when it comes to traffic safety.

Normative beliefs

Normative beliefs were not affected by the campaign. However, normative beliefs (e.g., “I think that it is important to my colleagues that I use a helmet”) predicted participants’ intention to wear a bicycle helmet. This finding has important practical implications as it shows that the perceptions of what significant others think we should do may be more important than our personal norms. Thus, we recommend future campaigns to more actively engage normative beliefs than what was done in the present campaign in the contents of the campaign as people in general as social creatures are much influenced of what others think about them.

Control beliefs
Participants after the campaign reported to a greater extent than before the campaign that it was more probable that they would use a helmet if they were in a hurry, if the traffic was heavy, if the helmet was nice looking, and if they somehow could store their helmets afterwards. It is interesting to note that the campaign affected participants' willingness to use the helmet even if they were in a hurry as being in a hurry may be used as an excuse for not wearing helmets.

Extended version of Theory of planned behaviour
The results showed that 59 % of the variance in intention to wear a helmet was explained by the Theory of planned behaviour. The strongest predictor was perceived behavioural control followed by subjective norm. The weakest predictor was attitude. The amount of explained variance was increased by 5.6 % to 64.7 % by adding descriptive norm, personal norm, anticipated regret and past behaviour to the original TPB model.

Stages of change
The campaign was also successful in having an impact on participants' propensity to use helmets to a greater extent. The results showed that the number of participants in the pre-contemplation stage and in the contemplation stage became lesser after the campaign (15% and 17.3% respectively) than before the campaign (26.2% and 43.2%). The same positive effect was presented with regard to the other stages but this time the pattern was reversed, that is, the number of people in the preparation (from 8.7% to 19.5%), action (from 10.3% to 25.6%), maintenance (from 3.6% to 13.5%), and termination (from 7.7% to 9%) was greater after the campaign. Comparing the experiment and control groups after the campaign, a majority of the experiment participants were in the stage 3 (i.e., preparation) whereas the majority of the control participants were in the stage 2 (i.e., contemplation). This difference was statistically significant. This indicates that people who have been educated in the importance of using helmets plan to use helmets (even though they have not used one previously). This is important as this clearly demonstrates the power of campaigns if they are thoughtfully designed.

Availability of safety cues
In safety promoting campaigns (in this case helmet wearing) it is important to make the safety tools (in this case helmets) available to people. In this study, participants of the campaign were offered helmets free of charge. The results showed that this was successful since many signed the contract which obligated them to use the helmet when cycling. This would then also be in agreement with Berkowitz and Lepage (1967) who argued that when something is made available the probability of its use increases considerably.

The results also showed that those who own a helmet were also more likely to use it. However, we do not know whether it is the availability of helmets or commitment (i.e., signing a contract) that leads to people using helmets. Future campaign studies should pay closer attention to this issue which can be regarded as a way to reinforce the behaviour. It could therefore be concluded that an educational campaign aimed at groups of people who work in the same place was successful in changing the participants' willingness to use a bicycle helmet.

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Appendix

The following description summaries the presentation but leaves out the visual presentation.

1. The instructor from Falck Ambulance starts with talking about his/her everyday work. S/he continues with mentioning what number to call in an emergency and how important it is to give the correct and specific information. If an accident happens at their office, how important it is to meet up the ambulance personnel and guide them through locked doors to the injured person. The instructor underlines the importance of time in an accident, especially if the person suffers from head injuries.

2. The instructor then underlines the importance for a bicyclist to always be aware of the traffic situation and obstacles that may exist.

3. The third slide shows a picture Homer in Simpson who has a very small brain. This picture is shown to emphasize that we might have more to protect than Homer has. The instructor then asks everyone in the audience, how many use seat belt when driving a car?

4. A short film is shown of a simulated bicycle accident. It simulates a sudden stop for the biker and the "dummy" flies over the bar of the bike and lands on his head. The bicyclist wears a helmet and on the film you can see where the bicyclist lands. When the instructor shows this video s/he also explains that often you hold on to the bars on the bike when falling down and therefore the head is almost always first to hit the ground.

5. The fifth slide shows the police statistics of the number of people who were killed in bicycle accidents. The diagram shows persons killed between the ages of 25 to 64 years old and between the years of 2000-2006.

6. The next slide symbolizes the large amount of unknown accidents which are not reported to the police, although these people are/have been in need of Medicare.

7. A picture of the brain including the nerves and blood vessels are shown.

8. The next slide shows the brain in section and illustrates how thin the skin is outside the brain.

9. The ninth slide shows the whole brain. Whilst showing this picture the instructor talks about the central functions of the human brain.

10. A film is then shown of the brain from the inside. When showing this film the skin around the brain disappears and the contents of the brain are shown. The audience learns about the functions and the various centres in the brain; memory, speech, hearing, etc. The instructor points out the importance of having a non-injured brain for a normal life. The instructor asks the audience how they protect their computer. Brain is the human body's computer and we cannot replace it so we should take good care of it is the message. At the end of the film a bicycle helmet comes down onto the head.

11. The next slide shows two pictures of a brain; the first picture shows a normal brain in a X-ray. The second picture shows a brain ten months after a bicycle accident in which the person was not wearing a helmet. The instructor explains the difference between a normal and an injured brain and what causes this kind of brain damage.

12. A slide with different helmets is shown.

13. This slide tries to encourage cycling emphasizing that it is a good exercise. The message is that it is good both for you and the environment. But that they should not forget their helmet.

14. A slide is then shown of a brain surgery.

15. This slide points out he features of a good bike; the bicycle lamp, pedals and the reflex.

16. The last slide in the presentation points out the positive qualities of biking.

4 Evaluation of the isolated effects of a seat-belt campaign in Belgium

K. Brijs, S. Daniels and T. Brijs[1]

Abstract

A Belgian national safety belt campaign was evaluated by means of a questionnaire survey in a convenience sample of students. The evaluation was conducted by using a three group after only design including one control group and two experiment groups. The first experiment group, the attentive group, was exposed to the campaign material in a very direct, attentive way, whereas the second experiment group, the pre-attentive group, was exposed only indirectly. The framework of the Theory of planned behaviour was used. t-tests and ANOVA-analyses were executed in order to compare the mean scores on each TPB-construct between the different groups. The comparison of the pre-attentive group and the control group revealed no significant differences. However, the attentive group differed significantly from both groups. For instance, the attentive group was more motivated and confident than the other two. This would then indicate that how and where the stimuli are presented is of great importance. Furthermore, the results supported the basic assumptions of the TPB-framework.

1 Hasselt University – Transportation Research Institute (IMOB), Belgium.

Executive summary

A Belgian national safety belt campaign was evaluated by means of a questionnaire in a convenience sample of students. The evaluation was done through a three group after-only design with the use of one control group and two experimental groups. Participants were university and high school students. The experiment groups consisted of students following courses at one location whereas students at three other locations served as a control group.

The first experiment group, the pre-attentive group, was inattentively exposed to a number of campaign billboards in the central hall of the main university building. The second experimental group, the attentive group, was exposed to the campaign in a very direct and bold manner. While the questionnaires were completed, the billboard campaign image was projected on a screen in front of the lecture room and the attention was explicitly directed towards it. The control group consisted of students from two high schools that never were in the building where the campaign material was shown.

A total of 575 questionnaires were suitable for analysis, of which 197 were in the pre-attentive group, 168 in the attentive group and 210 in the control group.

The questionnaire was designed according to the Theory of planned behaviour. The different questions were related to the different TPB-constructs such as behavioural beliefs, normative beliefs, control beliefs, attitudes, subjective norms, perceived behavioural control, intentions and self-reported behaviour. Each TPB-construct was considered to be measurable by of one or more dimensions. Those dimensions were each measured by one or more different items. Furthermore, questions about age, gender, driving license status, car use frequency, car use role (i.e. if one is usually a driver or a passenger when sitting in a car), past behaviour and habits were also included in the questionnaire.

In order to compare the mean scores on each construct between the different groups, i.e. to reveal some possible differences between the three groups on certain items a t-test and ANOVA-analyses were executed. No significant differences between the pre-attentive group and the control group were found. Some variables differed significantly between the attentive group and the control group: perceived behavioural control (automatism), perceived behavioural control (motivation), habit, past behaviour, behavioural intention and scenario-related behaviour.

Furthermore, the results supported the basic assumptions of the TPB-framework. That is, behaviour was formed by means of a multi-stage process with indirect factors (i.e., behavioural, normative and control beliefs) exerting an effect on behaviour although this is mediated to a large extent by those factors having a direct relationship with intention (i.e. attitude, subjective norm and perceived behavioural control).

Introduction

Observations in the year 2003 revealed that on average still only 6 out of 10 Belgian drivers and front passengers wore their seat belt. Moreover, survey data indicated that less than 50% of the rear seat passengers were regularly wearing their seat belt (BIVV, 2004). Particularly in comparison with some other countries like Canada and Sweden these percentages appeared to be very low and thus insufficient.

Nonetheless, seat belts generate important safety benefits and are believed to have, after their introduction 50 years ago, contributed considerably to the mitigation of the consequences from road accidents. Moreover they are considered to be a cheap and consequently a cost-efficient means to reduce the severity of traffic injuries (BIVV, 2004).

Compulsory seat belt wearing has been part of the highway code for many years. Wearing seat belts is in Belgium mandatory for car drivers and front passengers since June 1975. From 1991 onwards the seat belt has become compulsory also on the rear seats. In 2000 the compulsory seat belt wearing was extended to all motor vehicles (such as lorries and busses) on any seat that is equipped with seat belts (BIVV, 2004). However, according to a study by Silverans et al., (2005) carried out during 2003, the public perception of the risk to get fined for not wearing seat belts is rather low. More than half of the respondents (56.5´2%) argued that the risk of being charged was “low” to “very low”.

A survey about a previously held campaign revealed some reasons why people declare to not (always) using their seat-belt. The results are provided in table: 1. The three most important reasons were forgetfulness (“I don’t think about it”), discomfort (“restricts freedom to move”) and negligence (BIVV, 2004).

Table 1. Why don’t you wear the seat belt?

	Drivers (%)	Front passengers (%)	Back passengers (%)
Do not think about it	35	41	39
Discomfort, lack of freedom to move	37	28	24
Negligence	22	23	18
Not convinced of the usefulness	11	10	12
Not necessary if one drives carefully	5	5	5
Too much in a hurry	9	6	2
Risk to get locked in case of accident	7	6	5
I don’t drive too fast	4	3	2
Due to health reasons	3	1	0
Not necessary in the back of a car	/	/	24

Source: BIVV, 2004.

Campaign on seat belt usage

To increase the use of seat belt the Belgian Road Safety Institute decided to launch a national campaign on seat belt use. The campaign was part of a longer term strategy to increase the use of seat belts and other protective devices. More specifically the aim of the campaign was to increase the seat-belt wearing rate by 2005 to 67% in the front seats and 55% on the rear seats. By 2009 the target was to reach 87% on front and 75% on rear seats. If this aim was achieved it would reduce the number of traffic victims with an estimated number of 187 killed, 1062 seriously injured and 7463 slightly injured in 2009 compared to 2001 (BIVV, 2004).

The campaign was elaborated by the Belgian Road Safety Institute (BIVV/IBSR) and was partly sponsored by a private insurance company. The central slogan of the campaign was: "The safety belt. One second changes everything" (Dutch: "De gordel, 't is zo gebeurd", French: "La ceinture, une seconde qui change tout"). The message was twofold: on the one hand it refers to the ease of wearing a seat belt. Fastening the seat belt is very convenient, is quickly done and should happen routinely: it takes only one second. On the other hand it refers, supported by the picture of the broken windshield, to the unexpected and sudden nature of an accident.

Figure 1.Central campaign slogan in Dutch and French (Source: www.bivv.be, www.ibsr.be)

The target group of the campaign consisted of vehicle drivers and occupants. Since the image of the broken windshield was used, it can be assumed that mainly drivers and front seat passengers were considered as the target group. The depicted person is a young male, highlighting the elevated risk level within this age and gender group. Although the campaign material contains those specific elements, the campaign was generally intended to reach the whole population of vehicle drivers and passengers as a non-specific target group (BIVV, 2004).

The campaign used of a set of different media, such as a television spot, posters, a website, leaflets, brochures and car stickers.

As previously shown by Silverans et al., (2005) the public perception of the risk to get fined for not wearing seat belts was rather low the police services were therefore requested to raise their enforcement activities regarding the non-use of seat belts during the period of the campaign. However, no specific information is available on the nature or the intensity of the enforcement that was put in place in reality.

Objectives of the evaluation study

The present study evaluates the effectiveness of a Belgian seat belt campaign in light of the basic assumptions underlying the Theory of planned behaviour (TPB). One of the reasons that motivated us to focus on the TPB in particular, was an empirical study recently published by Simsekoglu & Lajunen (2008) in which a TPB-based model for the explanation of seat belt use showed better goodness-of-fit compared to other models such as the Health Belief Model.

The main purpose of the current study was twofold. First of all, we wanted to test whether being exposed to a seat belt campaign would affect (or not) those variables that are identified by the TPB as key determinants of behaviour. Next to that, we wanted to verify whether the basic assumptions underlying the TPB could be supported (or not).

Method

Participants

Participants were 575 university and high school students aged between 18 and 25 years (mean age=20, 311 male and 264 female). Eighty-sex percent had a current driving licence. The sample was gathered by means of a convenience 'student' sample. More specifically, participants were recruited from university and high school students at Hasselt University and its association partners.

Design

The evaluation was carried out by means of a three group after-only design with the use of one control group and two experimental groups. The experimental groups consisted of students following courses at one location whereas students at three other locations were used and selected as control group. Since the assignment of subjects to the different groups in the experiment was not fully randomized, the current design is to be qualified as a quasi-experimental design.

The first experimental group was exposed to a number of campaign billboards in the central hall of the main university building. This central hall is an obligatory passing point whenever students go to the lecture rooms. This group was expected to be largely unaware of the non-attended information. This situation can be expected to be reasonably comparable to the real-traffic situation in which road users are confronted with billboards alongside highways. This group is further called the *pre-attentive group* (see Yoo 2005 for a detailed discussion of the 'pre-attentive' concept). The entire pre-attentive group filled out the questionnaire on the same day as the stimulus exposure.

The second experimental group was exposed to the campaign in a very direct and attentive way. While the questionnaires were completed, the campaign billboard was projected on a screen in front of the lecture room. In the introductory briefing and in the questionnaire students were explicitly asked to look at the projected campaign material. This group is further called the *attentive group*.

The *control group* consisted of students from two associated high schools that never need to enter the building where the campaign material was shown. They were therefore not exposed to the campaign stimulus and they could not 'interfere' with the two treatment groups.

Table 3. Groups and conditions.

Group	Conditions	Material
Pre-attentive	Implicit exposure	Billboards
Attentive	Explicit exposure	Classroom projection
Control	No stimulus exposure	-

Validity

Different aspects of the study design determine to which extent results can be considered as internally as well as externally valid. We briefly focus on three such aspects, i.e., sample type, randomisation of subject assignment, and measurement set-up.

The use of student samples has its pros and cons, speaking in terms of internal and external validity (Enis et al. 1972). Although in general, people are rather sceptical about the use of student samples for scientific purposes, there are three arguments that uphold our decision to opt for a student sample.

First of all, as for external validity, critics typically point out that student samples often do not allow researchers to generalize results to the overall population. Nevertheless, in our case, there is something to say in favour of selecting students as 'model type' respondents, because the campaign under study was tailored more precisely at young adolescents.

Secondly, the use of student samples becomes less problematic in cases where the focus is on internal rather than external validity. Since our second objective is to test the assumptions underlying the TPB for this specific sample (and not to see whether TPB can be generalized to other populations!), this study can be considered as one where focus is primarily on internal validity. Studies aimed at exploring and testing the validity of theories traditionally do so within settings that are controlled for disturbances as much as possible. Potential biasing effects might, among other factors, be caused by the heterogeneous composition of the sample used. Even though such sample-specific biases can never be completely ruled out, one way to proceed is to select a student sample. Indeed, as Enis et al. (1972) argue themselves, student samples are typically known for their more homogeneous composition.

Thirdly, meta-analyses stemming from various disciplines and research areas have already shown that effect sizes do not always differ significantly between student and non-student samples (e.g., Liefeld 1993; Verlegh and Steenkamp 1999).

Like the sample type, randomisation of subject assignment and measurement set-up, mainly affect causal induction, i.e., the degree to which one can ascribe the observed effects to the manipulated conditions. Ideally, one should compare randomly assigned treatment group(s) with a control group with, for each group, a pre- and a post-measurement.

Pre-and post-measurement in the treatment group allow the researcher to establish whether the imposed intervention has generated an effect (i.e., whether the values for certain output variables have changed or not). Besides that, comparison with a control group is needed in order to 'guarantee' that the observed effect can be attributed (only) to the intervention, and not to other potentially intervening variables.

When strictly observed in a setting like ours (with no random assignment and no pre-test), finding a difference on the output variables between the treatment and the control groups might still be caused by other factors than the intervention itself. First of all, the observed effect might be due to systematic differences in the group samples (such systematic differences between samples indeed might still exist because subjects have not been assigned to their groups in a fully randomized manner!). Secondly, the absence of a pre-test makes there is nothing the scores on the output variables for the treatment group can be compared with. The lack of such a within-group point of comparison makes that we cannot determine whether the intervention has changed scores on the output variables for the treatment group. These two elements taken together explain why the results of our study should be interpreted with care.

Material

The same poster used during the 2004 campaign was replicated in this campaign. The central slogan of the campaign was: "The safety belt. One second changes everything" (Dutch: "De gordel, 't is zo gebeurd", French: "La ceinture, une seconde qui change tout").

Figure 2. Central campaign slogan in French (Source: www.bivv.be, www.ibsr.be).

Procedure

All data were collected by means of self-report measures. That is, subjects completed classical self-administered paper-pencil survey questionnaires. For each response session, lecturers were asked to offer 30 minutes time within their course in order to enable students to complete a questionnaire. Answering instructions made respondents explicitly aware of the fact that this was a questionnaire, probing for personal opinions instead of in/correct answers.

Students throughout the three different groups completed the same questionnaire, except for the students in the attentive group, who received a number of additional questions regarding the campaign itself. For the attentive group two different versions of the questionnaire were composed, being different only with respect to the order of the questions. One version probed for stimulus-related variables first and for seat-belt related variables next while the other version did so vice-versa. The underlying motivation was to verify whether order of questions causes any response bias.

Filling out the questionnaires always took place within regular classroom settings. Total time of administration took no longer than 15 minutes. Respondents were informed that their data would be dealt with anonymously. A total of 575 questionnaires were suitable for further analysis, of which 197 in the pre-attentive group, 168 in the attentive group and 210 in the control group.

Questionnaire

The final version of the questionnaire was first pre-tested on a group of 26 model respondents in order to find out whether instructions as well as questions were clear and whether wording had to be changed or not. As previously mentioned, two different questionnaires were developed, one with stimulus-related questions for the attentive group and one without such questions for the control group. Below, we present a more detailed overview of the structure the most extended version of the questionnaire (i.e., the attentive-group questionnaire).

The attentive group questionnaire consisted of three sections. Section 1 asked for respondent –related background information. Section 2 (only for attentive group!) contained questions related to the campaign stimulus itself. Section 3 focused on the campaign theme (i.e., seat belts) and measured the different variables appearing within the TPB + some additional variables (i.e., habit and past behaviour), shown to be relevant as determinants of behaviour (e.g., Ajzen 2002; Rhodes & Courneya 2003; Davies 2008).

Section 1: Background information

This section contained 14 questions: (1) sex, (2) age, (3) education of father, (4) education of mother, (5) driver status, (6) car use, (7) car use frequency, (8) chance of getting fined for not wearing seat belt, (9) past control for wearing seat belt, (10) past fines for not wearing seat belt, (11) familiarity with the campaign stimulus shown, (12) recognition of campaign stimulus shown, (13) last time respondent was confronted with the stimulus (14) type of medium the stimulus was supported by.

Section 2: Stimulus-related questions

This section probed for three specific concepts related to the campaign stimulus: (1) overall attitude toward the stimulus, (2) *cognitions related to the stimulus* and (3) emotions related to the stimulus.

Overall attitude toward the stimulus was measured by four items (good/bad, appealing/unappealing, positive/negative and likeable/dislikeable) put on a 7-point semantic differential (-3/+3). This is in line with the approach proposed by Holbrook and Batra (1987) and Shiv et al. (1997).

Cognitions related to the stimulus was operationalized as a four-dimensional construct with each dimension being captured by four items, all measured by means of 5-point Likert scales (1 = strongly disagree, 5 = strongly agree). This was in line with the approach followed by Burke & Edell (1989). Dimension 1 was labelled informativeness and measured by the following items: stimulus is informative, has a clear message, and easy to understand. Dimension 2 was called *interestingness* and consisted of four items: the stimulus makes me curious, is boring (reverse coded!) is interesting, and catches my attention. Dimension 3 *relevance* contained the following items: stimulus is important, relevant, helpful, and useful. Dimension 4 *execution and style* was measured by the items beautiful, original, stylish and eye-catching.

Emotions related to the stimulus was operationalized as a two-dimensional construct with each dimension being captured by four items, all measured by means of 5-point Likert scales (1 = not at all, 5 = very strongly). This was again in line with the approach followed by Burke & Edell (1989). Dimension 1 *fear* contained four items: the stimulus makes me feel anxious, worried, fearful, and threatened. Dimension 2 *joy* was captured by the following four items: the stimulus makes me feel enjoyed, optimistic, happy, and enthusiastic.

Section 3: TPB-questions related to seat belt

This part of the questionnaire queried for a series of TPB-variables related to the theme of the campaign, i.e., seat belts. The operationalization procedure was in narrow accordance with instructions provided by the manual entitled *Constructing questionnaires based on the theory of planned behaviour*: A manual for health services researchers (e.g., Francis et al. 2004).
An important part of this methodology was to develop a very precise situational context, scenario, serving as a reference point for answering the questions throughout the entire survey. Only one scenario was used and this scenario was kept constant over the three groups in order to enable comparability between results. The scenario stated “imagine yourself in the situation depicted below somewhere in the coming three months as a car driver or a car passenger.

Special care was taken of the so-called ‘correspondence principle’, i.e., the fact that all constructs appearing in the TPB are measured at the same level in terms of target, action, context and time (Ajzen & Fishbein 2005). This is mainly done in order to avoid evaluative inconsistencies. More in detail, respondents were offered a visual stimulus, i.e., a photo of a specific road scene (see Figure 3) and instructed about the fact that, all the TPB-related questions had to be answered with this particular road situation in mind. Next to that, scale endpoints were mixed throughout the questionnaire in order to prevent the risk for response sets (i.e., the tendency to answer questions in the same way, regardless of their content) to occur (Francis et al. 2004). However, in order to avoid this to be counterproductive in that it might confuse subjects or simply slip their attention, we made them aware of this before filling out the questionnaire.

Figure 3. visual stimulus evoking specific road scene.

In general, 10 constructs were measured, i.e., behavioural beliefs (BB), normative beliefs (NB), control beliefs (CB), attitude (ATT), subjective norm (SN), perceived behavioural control (PBC), behavioural intentions (BI), habits (HAB), past behaviour (PB) and behaviour (B). Below, we briefly discuss how each of these was operationalized.

Behavioural beliefs (BB): in total, four behavioural or 'outcome' beliefs (i.e., safe feeling, good feeling, lower fine risk, lower injury risk) were measured. For each of these beliefs, we had one item probing for strength and one for evaluation. This is in line with the findings of Elliott et al. (2005). Strength questions were put on 7-point unipolar scales (1 = very unlikely, 7 = very likely) while evaluation questions were on 7-point bipolar scales (-3 = negative, +3 = positive). The scores for both items were multiplied with each other, resulting in a so-called 'single behavioural belief index'. The four resulting belief indexes were then averaged and divided by four (i.e., the total number of behavioural beliefs), leaving us with an 'overall behavioural belief index' that served for further data analysis.

Normative beliefs (NB): in total, four reference groups were selected for the measurement of normative beliefs (i.e., friends, parents, other road users and police). For each of these, we had one item probing for strength and one for 'motivation to comply'. Strength questions were put on 7-point unipolar scales (1 = disagree, 7 = agree). Motivation to comply questions were also on 7-point unipolar scales (1 = absolutely not, 7 = completely). The scores for both items were multiplied with each other, resulting in a so-called 'single normative belief index'. The four resulting belief indexes were then averaged and divided by four (i.e., the total number of normative beliefs), leaving us with an 'overall normative belief index' that served for further data analysis.

Control beliefs (CB): four reference control beliefs (i.e., when being hasty, when being busy in mind, when meeting other road users, when driving only a short distance) were assessed. For each of these, we had one item probing for 'power' and one for 'frequency'. Power questions were put on 7-point unipolar scales (1 = real probably will not wear seat belt, 7 = real probably will wear seat belt). Frequency were also on 7-point unipolar scales (1 = never, 7 = often). The scores for both items were multiplied with each other, resulting in a so-called 'single control belief index'. The four resulting belief indexes were then averaged and divided by four (i.e., the total number of control beliefs), leaving us with an 'overall control belief index' that served for further data analysis.

Attitude (ATT): was assessed in a direct manner, that is, by means of four 7-point bi-polar (-3, +3) scales (i.e., wearing seat belt is disadvantage/advantage, bad/good, positive/negative, unacceptable/acceptable). Scores for the individual scales were averaged and divided by the total number of items, resulting in an attitude index score that served for further analysis.

Subjective norm (SN): was also captured in the direct manner by means of four 7-point unipolar scales (1= disagree, 7 = agree). Items were worded in terms of how people being important to the subject think (or not), wish (or not), accept (or not) and approve (or not) the subject should be wearing the seat belt. Scores for the individual scales were averaged and divided by the total number of items, resulting in a subjective norm index that served for further analysis.

Perceived behavioural control (PBC): was again measured in a direct manner by means of four 7-point unipolar scales (1= disagree, 7 = agree). Questions were aimed at uncovering whether wearing the seat belt would be easy (or not), would be dependent exclusively on the subject (or not), would be dependent upon the subject's own will (or not), and finally, whether the subject was confident (or not) in that s/he would be wearing a seat belt. Growing empirical evidence indicates that the concept 'perceived behavioural control' can be split up into two factors, i.e., one rather being related to the individual's confidence in being able to perform the target behaviour and another more related to the idea that the performance of the targeted behaviour is a mostly a matter of being internally motivated to do so. In line with these findings, we considered 'perceived behavioural control' as a bi-dimensional concept with the first dimension labelled as PBC1 (confidence) and the second PBC2 (motivation). For more detailed information on the conceptual structure of 'perceived behavioural control', see for instance Kraft et al. (2005), Godin & Kok (1996), and Terry & O'Leary (1995).

Behavioural intention (BI): was measured by means of two 7-point unipolar scales (1 = disagree, 7 = agree). Items were formulated in terms of preparedness and probability of wearing seat belt in the future. Scores on both scales were averaged and divided by two, resulting in a behavioural intention index that served for further analysis.

Habits (HAB): were assessed by means of three items on a 7-point unipolar scale (1 = disagree, 7 = agree). The questions asked whether wearing a seat belt was something subjects did spontaneously (or not), automatically (or not) and whether they sometimes forgot to wear the seat belt (or not).

The last item was reverse coded afterwards. Scores on the scales were averaged and divided by three, resulting in a habits index that served for further analysis.

Past behaviour (PB): consisted of six items on a 7-point unipolar scale (1= never, 7 = always) and asked respondents about their wearing a seat belt when driving inside the city centre, outside the city centre, when having bad weather, when having good weather, when driving on a highway, and during daytime driving. Scores on the scales were averaged and divided by six, resulting in a past behaviour index that served for further analysis. Let us be reminded here also that past behaviour, a variable standing for frequency of performing a certain type of behaviour in the past, is not the same as habits (for a more detailed discussion on this, see for instance Ajzen 2002).

Behaviour (B): was measured by means of a single item on a 7-point unipolar scale (1= never, 7 = always). It was formulated in terms of whether the respondent wears a seat belt in a situation as the one evoked by the photo. As such, the behaviour variable probes for what we will be referring to from now on as 'scenario-specific behaviour' (Bscenario).

Data analysis

Data were imputed and analyzed by means of SPSS 16.0. Data analysis was done in four steps. First, we prepared the data for analysis. Next some descriptive statistics were calculated. Then, we looked for scale structure and reliability. Finally, we tested for group differences and structural relationships between TPB constructs. Each of these steps will be commented on in more detail below.

Data preparation

After imputation, data were first screened and cleaned if necessary. More in detail, we scanned the data files for potential outliers and we spotted missing values. The latter were replaced by mean values (i.e., so-called 'data imputation'). Also skewness and kurtosis were checked for with each item in order to find out whether data were normally distributed (or not). Q-plots indicated no normal distribution in the data.

Once data were cleaned, we calculated 'single belief index scores' for each of the behavioural, normative and control beliefs (= 3x4 = 12 in total). As described throughout the previous section, this was done by multiplying 'strength' and 'evaluation' scores for behavioural beliefs, 'strength' and 'motivation to comply' scores for normative beliefs and 'power' and 'frequency' scores for control beliefs. This was a necessary step in order to be able to perform an exploratory factor analysis for the different belief constructs in the questionnaire.

In addition, for the attentive group a non-parametric t-test was done on the mean values of the two subgroups in order to check if the order of the questions would affect the outcome of certain variables. Since this test revealed no significant differences all the questionnaires were merged and subsequently treated as one group.

Before exploratory factor analysis was executed, we first generated some descriptive statistics, containing more information about the profile and the composition of the three group samples.

Results

Descriptive statistics

The tables below inform the reader on the following sample-related characteristics and distributions across the three groups: gender, age, driver status, car use, car use frequency, past seat belt control and past fining for not wearing seat belt.

Table 4. Gender across groups.

			Sex		
			Male	Female	Total
Treatment	Control	Count	115	95	210
		% within treatment	54.8%	45.2%	100.0%
	Pre-attentive	Count	105	92	197
		% within treatment	53.3%	46.7%	100.0%
	Attentive	Count	91	77	168
		% within treatment	54.2%	45.8%	100.0%
	Total	Count	311	264	575
		% within treatment	54.1%	45.9%	100.0%

Tabel 4 shows that the proportion of men and women in the different groups was fairly similar.

Table 5. Age across groups.

	N	Min	Max	Mean	SD
Control group	210	18	25	20.21	1.797
Pre-attentive group	197	18	24	18.91	1.196
Attentive group	168	18	24	19.96	1.121

The minimum age in all groups was 18 years old. With regard to the average age the participants in the control group was slightly older than the two other groups.

Table 6. Driver status across groups.

			Driver status		
			Driver licence yes	Driver licence no	Total
Treatment	Control	Count	165	45	210
		% within treatment	78.6%	21.4%	100.0%
	Pre-attentive	Count	177	20	197
		% within treatment	89.8%	10.2%	100.0%
	Attentive	Count	158	10	168
		% within treatment	94.0%	6.0%	100.0%
	Total	Count	500	75	575
		% within treatment	87.0%	13.0%	100.0%

Although the participants in the control group were slightly older than the rest it was fewer of them who had obtained a driving licence.

Table 7. Car use across groups.

			Car use			
			Driver	Passenger front seat	Passenger back seat	Total
Treatment	Control	Count	114	85	11	210
		% within treatment	54.3%	40.5%	5.2%	100.0%
	Pre-attentive	Count	113	74	10	197
		% within treatment	57.4%	37.6%	5.1%	100.0%
	Attentive	Count	110	53	5	168
		% within treatment	65.5%	31.5%	3.0%	100.0%
	Total	Count	337	212	26	575
		% within treatment	58.6%	36.9%	4.5%	100.0%

Tabel 7 shows that the participants were more likely to drive the car rather than being a passenger. However, some variations between the different groups can be seen since the attentive group was more likely to drive the car than the rest.

Table 8. Car use frequency across groups.

			Use frequency				
			Daily	Regularly	Sometimes	Never	Total
Treatment	Control	Count	94	71	45	0	210
		% within treatment	44.8%	33.8%	21.4%	.0%	100.0%
	Pre-attentive	Count	98	83	15	1	197
		% within treatment	49.7%	42.1%	7.6%	.5%	100.0%
	Attentive	Count	83	65	20	0	168
		% within treatment	49.4%	38.7%	11.9%	.0%	100.0%
	Total	Count	275	219	80	1	575
		% within treatment	47.8%	38.1%	13.9%	.2%	100.0%

Participants in all groups used the car fairly regularly and many of them on a daily basis.

Table 9. Seat belt control over past 3 years across groups.

			Control past 3 years			
			Control yes	Control no	Don't know	Total
Treatment	Control	Count	36	165	9	210
		% within treatment	17.1%	78.6%	4.3%	100.0%
	Pre-attentive	Count	28	164	5	197
		% within treatment	14.2%	83.2%	2.5%	100.0%
	Attentive	Count	20	147	1	168
		% within treatment	11.9%	87.5%	.6%	100.0%
	Total	Count	84	476	15	575
		% within treatment	14.6%	82.8%	2.6%	100.0%

Table 9 shows how likely it is that the police would check if they were using the seat belt during the past three years. The results show that their perception of sanction is rather low with around 80% perceiving low risk.

Table 10. Seat belt fines over past 3 years across groups.

			Fines past 3 years		
			Yes	No	Total
Treatment	Control	Count	12	198	210
		% within treatment	5.7%	94.3%	100.0%
	Pre-attentive	Count	3	194	197
		% within treatment	1.5%	98.5%	100.0%
	Attentive	Count	0	168	168
		% within treatment	.0%	100.0%	100.0%
	Total	Count	15	560	575
		% within treatment	2.6%	97.4%	100.0%

Tabel 10 shows that the majority had not been fined for not using the seat belt. However, slightly more in the control group compared with the rest had received a fine.

Inferential statistics

A number of non-parametric independent sample t-tests were carried out in order to compare the mean scores on each concept between the different groups. Table 15 presents results for pre-attentive vs. control group comparison and shows that no significant differences could be established between these two groups. Since no significant differences could be detected, it was decided not to compute Cohen's d. Interestingly however, coefficients for the means (M) indicate that values obtained for the pre-attentive group were in all but three cases (i.e., normative beliefs, control beliefs and PBC2) higher, thus more favourable/more likely, than those for the control group. This can be seen as a possible indication that the campaign under study does produce a (very limited) effect, albeit that the effect remains statistically insignificant.

Table 11. t-test at the factor level (pre-attentive group vs. control group).

Variables	Groups	M	SD	t(p)
Behavioural beliefs (BB)	Control	15.87	6.36	1.22 (.227)
	Pre-attentive	16.54	4.69	
Normative beliefs (NB)	Control	28.07	9.91	-1.57
	Pre-attentive	26.65	8.33	(.119)
Control beliefs (CB)	Control	31.18	11.67	-.52 (.604)
	Pre-attentive	30.64	8.88	
Attitude (ATT)	Control	2.56	0.87	1.06 (.294)
	Pre-attentive	2.64	0.66	
Subjective norm (SN)	Control	5.82	1.23	1.00 (.320)
	Pre-attentive	5.94	1.14	
PBC1 (confidence)	Control	6.32	1.24	.87 (.388)
	Pre-attentive	6.42	1.03	
PBC2 (motivation)	Control	5.71	1.55	-.17 (.865)
	Pre-attentive	5.69	1.57	
Behavioural intentions (BI)	Control	6.50	1.18	1.31 (.183)
	Pre-attentive	6.64	0.89	
Habits (HAB)	Control	5.89	1.59	1.34 (.194)
	Pre-attentive	6.08	1.32	
Past behaviour (PB)	Control	6.42	1.18	.99 (.323)
	Pre-attentive	6.53	1.01	
Behaviour (Bscenario)	Control	6.33	1.44	1.15 (.253)
	Pre-attentive	6.48	1.12	

Note. A high mean indicate that they are in favour of using the belt.

Table 12 presents the results comparing the means between attentive and pre-attentive groups. Significant differences are printed in bold.

Table 12. t-test at the factor level (attentive group vs. pre-attentive group).

Variables	Groups	M	SD	t(p)	Cohen's d*
Behavioural beliefs (BB)	Pre-attentive	16.54	4.69	-.09	-
	attentive	16.50	4.87	(.931)	
Normative beliefs (NB)	Pre-attentive	26.65	8.33	.46 (.647)	-
	attentive	27.09	9.77		
Control beliefs (CB)	Pre-attentive	30.64	8.88	2.35	0.25
	attentive	32.80	8.63	(.019)	(small)
Attitude (ATT)	Pre-attentive	2.64	0.66	.54 (.588)	-
	attentive	2.67	0.63		
Subjective norm (SN)	Pre-attentive	5.94	1.14	1.52	-
	attentive	6.10	0.88	(.128)	
PBC1 (confidence)	Pre-attentive	6.42	1.03	2.56	0.27
	attentive	6.66	0.76	(.011)	(small)
PBC2 (motivation)	Pre-attentive	5.69	1.57	3.83	0.41
	attentive	6.24	1.19	(.000)	(small)
Behavioural intentions (BI)	Pre-attentive	6.64	0.89	1.49	-
	attentive	6.77	0.70	(.138)	
Habits (HAB)	Pre-attentive	6.08	1.32	2.59	0.27
	attentive	6.40	1.03	(.010)	(small)
Past behaviour (PB)	Pre-attentive	6.53	1.01	2.62	0.28
	attentive	6.76	0.68	(.009)	(small)
Behaviour (Bscenario)	Pre-attentive	6.48	1.12	2.53	0.27
	attentive	6.73	0.80	(.012)	(small)

Note. A high mean indicate that they are in favour of using the belt. Cohen's d was calculated as proposed by Rosenthal & Rosnow (1991).

The results show us that significant mean differences could be found between pre-attentive and attentive groups for control beliefs, PBC1 (confidence), PBC2 (motivation), habits, past behaviour and behaviour. However, as indicated by the coefficient for Cohen's d, differences were rather small (for the interpretation of values for Cohen's d, see Cohen 1988). Interestingly, mean values for the attentive group were systematically higher than those for the pre-attentive group. This seems to suggest that the conditions under which a campaign stimulus is being processed (i.e., the subject being fully aware or unaware of the fact that s/he is exposed to a stimulus), influences the size of the effect that stimulus might have on certain target variables. Table 13 contains the results for comparison of means between attentive and control groups. Significant differences are again in bold.

Table 13. t-test at the factor level (attentive group vs. control group).

Variables	Groups	M	SD	t(p)	Cohen's d*
Behavioural beliefs (BB)	control	15.87	6.36	1.06 (.290)	-
	attentive	16.50	4.87		
Normative beliefs (NB)	control	28.07	9.91	-.96 (336)	-
	attentive	27.09	9.77		
Control beliefs (CB)	control	31.18	11.67	1.51 (.133)	-
	attentive	32.80	8.63		
Attitude (ATT)	control	2.56	0.87	1.47 (.141)	-
	attentive	2.67	0.63		
Subjective norm (SN)	control	5.82	1.23	2.56 (.011)	0.26
	attentive	6.10	0.88		(small)
PBC1 (confidence)	control	6.32	1.24	**3.10**	0.32
	attentive	6.66	0.76	**(.002)**	(small)
PBC2 (motivation)	control	5.71	1.55	**3.64**	0.38
	attentive	6.24	1.19	**(.000)**	(small)
Behavioural intentions (BI)	control	6.50	1.18	**2.55**	0.26
	attentive	6.77	0.70	**(.011)**	(small)
Habits (HAB)	control	5.89	1.59	**3.59**	0.37
	attentive	6.40	1.04	**(.000)**	(small)
Past behaviour (PB)	control	6.42	1.18	**3.33**	0.34
	attentive	6.76	0.68	**(.001)**	(small)
Behaviour (Bscenario)	control	6.33	1.44	**3.24**	0.33
	attentive	6.73	0.80	**(.001)**	(small)

Note. A high mean indicate that they are in favour of using the belt. Cohen's d was calculated as proposed by Rosenthal & Rosnow (1991).

The outcome for this analysis is comparable to the one obtained for the previous t-test, except for three differences. Firstly, while a small but significant difference could be detected for control beliefs between pre-attentive and attentive groups, no such difference could be retrieved when comparing mean scores on this variable between control and attentive groups. Secondly, while there was no significant difference for the mean value for behavioural intentions and subjective norm between pre-attentive and attentive groups, such a difference could be assessed when comparing control and attentive groups. Finally, although Cohen's d indicates that all the significant mean differences between control and attentive groups were also small, the scores for Cohen's d are on the average larger when the attentive group is compared with the control group than when compared with the pre-attentive group.

To summarise, it was shown students being exposed to the campaign stimulus while being aware of this exposure (i.e., attentive group subjects), had significantly higher mean scores on variables measuring perceived behavioural control, intention, scenario related behaviour and past behaviour when being compared with members of the pre-attentive and the control group. This would then indicate that the attentive group was more likely to have used the belt in the past and more likely to also use it in the future. Furthermore, they perceived using the belt as fairly easy and would use it even if they were in a hurry. However, differences were somewhat larger when the attentive group was compared with the control group (which was not exposed to the campaign at all) than when being compared with the pre-attentive group (which was exposed to the campaign while being unaware of it during exposure). Mean scores on the variables for the pre-attentive group were higher than those obtained for the control group, but these differences remained statistically insignificant.

Throughout the following, we will turn our focus on the basic structural relationships underlying the TPB framework. More in detail, for each group, a multiple (stepwise) linear regression analysis will verify whether these structural assumptions can be supported or not. The main purpose behind these analyses is to find out whether the TPB can be considered as a valuable theoretical framework for the evaluation of mass media campaigns.

Regression analyses

For each group, the analyses were carried out following the same procedure. First, behavioural intentions were used as the dependent variable. Next, the variable 'Bscenario' (behaviour) was used as the outcome variable. For both models, regressions were performed in a stepwise manner with for each step, a series of predictors being added to the model. Table 14 gives a schematic and more detailed overview of the procedure followed for each of the three groups in our study. Printed in italic are the predictors added in each step.

Table 14. Regression analyses – an overview of the stepwise procedure.

MODEL A -> BEHAVIOURAL INTENTIONS as outcome variable		
Step 1	Predictors:	Behavioural beliefs (BB) Normative beliefs (NB) Control beliefs (CB)
Step 2	Predictors:	Behavioural beliefs (BB) Normative beliefs (NB) Control beliefs (CB) *Attitude (ATT)* *Subjective norm (SN)* *PBC1 (confidence)* *PBC2 (motivation)*
Step 3	Predictors:	Behavioural beliefs (BB) Normative beliefs (NB) Control beliefs (CB) Attitude (ATT) Subjective norm (SN) PBC1 (confidence) PBC2 (motivation) *Habits (HAB)*
Step 4	Predictors:	Behavioural beliefs (BB) Normative beliefs (NB) Control beliefs (CB) Attitude (ATT) Subjective norm (SN) PBC1 (confidence) PBC2 (motivation) Habits (HAB) *Past Behaviour (PB)*

MODEL B -> Bscenario as outcome variable		
Step 1	Predictors:	Behavioural beliefs (BB) Normative beliefs (NB) Control beliefs (CB)
Step 2	Predictors:	Behavioural beliefs (BB) Normative beliefs (NB) Control beliefs (CB) *Attitude (ATT)* *Subjective norm (SN)* *PBC1 (confidence)* *PBC2 (motivation)*
Step 3	Predictors:	Behavioural beliefs (BB) Normative beliefs (NB) Control beliefs (CB) Attitude (ATT) Subjective norm (SN) PBC1 (confidence) PBC2 (motivation) *Behavioural intentions (BI)*

Table 14. Regression analyses – an overview of the stepwise procedure (continued).

Step 4	Predictors:	Behavioural beliefs (BB) Normative beliefs (NB) Control beliefs (CB) Attitude (ATT) Subjective norm (SN) PBC1 (confidence) PBC2 (motivation) Behavioural intentions (BI) *Habits (HAB)*
Step 5:	Predictors:	Behavioural beliefs (BB) Normative beliefs (NB) Control beliefs (CB) Attitude (ATT) Subjective norm (SN) PBC1 (confidence) PBC2 (motivation) Behavioural intentions (BI) Habits (HAB) *Past Behaviour (PB)*

Results for control group

Table 15 presents a general summary of the two models and Table 16 presents a more detailed input on the predictors and how they perform within each of the models being estimated.

Table 15. Model summaries for control group.

MODEL A -> BEHAVIOURAL INTENTIONS as outcome variable			
	R2	**Adjusted R2**	**F(p)**
Step 1	.446	.438	55.297 (.000)
Step 2	.650	.638	53.575 (.000)
Step 3	.688	.676	55.513 (.000)
Step 4	.722	.710	57.769 (.000)
MODEL B -> Bscenario as outcome variable			
	R2	**Adjusted R2**	**F(p)**
Step 1	.508	.501	70.886 (.000)
Step 2	.686	.675	63.147 (.000)
Step 3	.720	.709	64.692 (.000)
Step 4	.731	.719	60.453 (.000)
Step 5	.760	.748	63.012 (.000)

Table 16. Coefficients for control group.

MODEL A -> BEHAVIOURAL INTENTIONS as outcome variable				
		Standardized coefficients Beta	t	p
Step 1	**BB**	**.280**	4.68	**.000**
	NB	**.185**	3.39	**.001**
	CB	**.420**	7.28	**.000**
Step 2	BB	-.037	-.634	.527
	NB	.034	.720	.472
	CB	**.114**	2.09	**.038**
	ATT	**.340**	4.81	**.000**
	SN	-.013	-.255	.799
	PBC1	**.474**	7.09	**.000**
	PBC2	-.052	-1.21	.229
Step 3	BB	-.053	-.969	.334
	NB	.041	.904	.367
	CB	.034	.620	.536
	ATT	**.301**	4.47	**.000**
	SN	-.037	-.764	.446
	PBC1	**.315**	4.46	**.000**
	PBC2	-.060	-1.47	.143
	HAB	**.334**	4.98	**.000**
Step 4	BB	-.071	-1.36	.174
	NB	.034	.791	.430
	CB	-.005	-.089	.930
	ATT	**.221**	3.35	**.001**
	SN	-.020	-.445	.657
	PBC1	**.178**	2.46	**.015**
	PBC2	-.058	-1.49	.137
	HAB	.117	1.52	.131
	PB	**.465**	4.93	**.000**

Table 16. Coefficients for control group (continued).

MODEL B -> Bscenario as outcome variable				
		Standardized coefficients Beta	t	P
Step 1	**BB**	**.287**	5.08	**.000**
	NB	**.199**	3.88	**.000**
	CB	**.458**	8.43	**.000**
Step 2	BB	-.003	-.051	.960
	NB	.053	1.18	.238
	CB	**.181**	3.49	**.001**
	ATT	**.237**	3.54	**.001**
	SN	**.096**	2.00	**.047**
	PBC1	**.446**	7.05	**.000**
	PBC2	-.066	-1.61	.109
Step 3	BB	.009	.166	.868
	NB	.043	.999	.319
	CB	**.145**	2.93	**.004**
	ATT	**.131**	1.96	**.052**
	SN	**.100**	2.20	**.029**
	PBC1	**.299**	4.64	**.000**
	PBC2	-.050	-1.28	.203
	BI	**.311**	4.94	**.000**
Step 4	BB	-.003	-.058	.954
	NB	.048	1.15	.250
	CB	**.107**	2.11	**.036**
	ATT	**.130**	1.98	**.049**
	SN	**.086**	1.91	**.058**
	PBC1	**.239**	3.46	**.001**
	PBC2	-.058	-1.50	.135
	BI	**.249**	3.79	**.000**
	HAB	**.189**	2.85	**.005**
Step 5	BB	-.026	-.533	.594
	NB	.046	1.15	.250
	CB	.073	1.51	.134
	ATT	.083	1.33	.187
	SN	**.098**	2.30	**.023**
	PBC1	**.138**	2.01	**.046**
	PBC2	-.062	-1.70	.092
	BI	**.143**	2.17	**.031**
	HAB	.012	.167	.868
	PB	**.455**	4.89	**.000**

Note. significant effects printed in bold.

These analyses illustrate three things. First of all, the r^2--values for the models where scenario-specific behaviour was the outcome variable were higher than the ones obtained for models with behavioural intentions as the final outcome variable. Although the compared models are different, the r^2-values seem to indicate that the predictive power of the model with the scenario-specific behaviour as outcome variable is higher than the predictive power of the model with behavioural intentions.

Secondly, the stepwise procedure clearly demonstrates that the explanatory power of 'indirect' variables within the TPB (i.e., variables being further away from behaviour) are less important if also direct ones are included. This can be interpreted as a support for the basic causal structure that underlies the TPB-framework. As such, the TPB reveals itself as a potentially very interesting theory for the evaluation of mass media campaigns. Finally, the results of the regression analyses show that, the main determinants of people's self-reported scenario-specific behaviour are past behaviour (PB), behavioural intentions (BI), PBC1 (confidence) and subjective norm (SN) with past behaviour being the most powerful predictor. As such, our study mainly identifies the same determinants as the ones advanced by prior studies (e.g., Cunill et al. 2004; Simsekoglu & Lajunen 2008).

However, a clear distinction between these studies and ours is that the outcome of our analysis pleads in favour of adding variables such as habits and past behaviour to the basic TPB-framework because they appear to increase the overall predictive power of the TPB-model. This is in line with findings from more fundamental (empirical) research on the TPB (e.g., Fishbein et al. 1997; Sutton 1998; Conner & Armitage 1998; Armitage & Conner 2000; Ajzen 2002; Rhodes & Courneya 2003).

Results for pre-attentive group

Table 17 presents a general summary of the two models using intention or behaviour as the dependent variable and Table 18 presents a more detailed description of the results.

Table 17. Model summaries for pre-attentive group.

MODEL A -> BEHAVIOURAL INTENTIONS as outcome variable			
	r^2	**Adjusted r^2**	**F(p)**
Step 1	.452	.444	53.098 (.000)
Step 2	.656	.643	51.463 (.000)
Step 3	.668	.654	47.273 (.000)
Step 4	.710	.696	50.907 (.000)
MODEL B -> Bscenario as outcome variable			
	r^2	**Adjusted r^2**	**F(p)**
Step 1	.351	.341	34.775 (.000)
Step 2	.574	.559	36.433 (.000)
Step 3	.613	.597	37.286 (.000)
Step 4	.644	.627	37.594 (.000)
Step 5	.656	.637	35.440 (.000)

Table 18. Coefficients for pre-attentive group.

MODEL A -> BEHAVIOURAL INTENTIONS as outcome variable				
		Standardized coefficients		
		Beta	t	p
Step 1	**BB**	**.338**	5.52	**.000**
	NB	.059	1.08	.280
	CB	**.432**	7.14	**.000**
Step 2	**BB**	**.107**	1.95	**.053**
	NB	-.024	-.532	.595
	CB	**.172**	3.09	**.002**
	ATT	**.103**	1.85	**.066**
	SN	.048	1.00	.318
	PBC1	**.551**	9.19	**.000**
	PBC2	-.037	-.841	.402
Step 3	BB	.091	1.66	.098
	NB	-.005	-.121	.904
	CB	**.129**	2.24	**.026**
	ATT	.083	1.50	.136
	SN	.041	.864	.389
	PBC1	**.450**	6.37	**.000**
	PBC2	-.042	-.981	.328
	HAB	**.190**	2.61	**.010**
Step 4	BB	.036	.695	.488
	NB	-.004	-.100	.921
	CB	**.110**	2.05	**.042**
	ATT	**.128**	2.44	**.016**
	SN	.033	.728	.468
	PBC1	**.192**	2.33	**.021**
	PBC2	-.006	-.137	.891
	HAB	-.080	-.936	.350
	PB	**.553**	5.22	**.000**

Table 18. Coefficients for pre-attentive group (continued).

MODEL B -> Bscenario as outcome variable				
		Standardized coefficients		
		Beta	t	p
Step 1	**BB**	**.277**	4.15	**.000**
	NB	.050	.853	.395
	CB	**.400**	6.08	**.000**
Step 2	BB	.063	1.03	.306
	NB	-.024	-.471	.638
	CB	**.144**	2.33	**.021**
	ATT	.012	.197	.844
	SN	.004	.069	.945
	PBC1	**.625**	9.37	**.000**
	PBC2	-.018	-.362	.717
Step 3	BB	.027	.454	.651
	NB	-.016	-.324	.746
	CB	.087	1.43	.155
	ATT	-.022	-.376	.707
	SN	-.013	-.244	.808
	PBC1	**.440**	5.73	**.000**
	PBC2	-.005	-.113	.910
	BI	**.337**	4.36	**.000**
Step 4	BB	.006	.114	.910
	NB	.013	.283	.777
	CB	.026	.433	.665
	ATT	-.049	-.850	.397
	SN	-.021	-.432	.666
	PBC1	**.307**	3.79	**.000**
	PBC2	-.016	-.364	.716
	BI	**.280**	3.70	**.000**
	HAB	**.309**	4.01	**.000**
Step 5	BB	-.018	-.312	.755
	NB	.014	.294	.769
	CB	.025	.420	.675
	ATT	-.017	-.299	.765
	SN	-.023	-.478	.634
	PBC1	**.193**	2.11	**.036**
	PBC2	.001	.030	.976
	BI	**.208**	2.61	**.010**
	HAB	**.170**	1.81	**.072**
	PB	**.313**	2.52	**.013**

The analysis for the pre-attentive groups shows us how, contrary to the control group, r^2 values were higher for the models with behavioural intentions as outcome variable, compared to those where scenario-specific behaviour was the final target variable. In addition to that, for the pre-group, attitude and subjective norm were less important as predictors of behavioural intentions and scenario-specific behaviour, compared to the control group.

However, in line with the control group, the stepwise procedure showed how steadily, the explanatory power shifts from indirect to the direct ones. Otherwise the most important predictors were again PBC1 (confidence), habits, behavioural intentions and past behaviour.

Results for attentive group

Table 19 summaries the two models using either intention or behaviour as the dependent variable. Table 20 presents a more detailed description of the results.

Table 19. Model summaries for attentive group.

MODEL A -> BEHAVIOURAL INTENTIONS as outcome variable			
	r^2	**Adjusted r^2**	**F(p)**
Step 1	.231	.217	16.402 (.000)
Step 2	.549	.526	24.202 (.000)
Step 3	.602	.579	26.570 (.000)
Step 4	.672	.651	32.127 (.000)

MODEL B -> Bscenario as outcome variable			
	r^2	**Adjusted r^2**	**F(p)**
Step 1	.251	.237	18.307 (.000)
Step 2	.528	.505	22.261 (.000)
Step 3	.620	.599	28.690 (.000)
Step 4	.748	.732	46.562 (.000)
Step 5	.859	.849	86.125 (.000)

Table 20. Coefficients for attentive group.

MODEL A -> BEHAVIOURAL INTENTIONS as outcome variable				
		Standardized coefficients		
		Beta	**t**	**p**
Step 1	**BB**	**.273**	3.72	**.000**
	NB	-.015	-.203	.840
	CB	**.374**	5.44	**.000**
Step 2	BB	-.077	-1.04	.301
	NB	-.003	-.043	.966
	CB	**.161**	2.81	**.006**
	ATT	**.316**	4.12	**.000**
	*SN1**	.075	1.32	.191
	*SN2**	.009	.141	.888
	PBC1	**.443**	6.54	**.000**
	PBC2	.028	.512	.610
Step 3	BB	-.064	-.923	.358
	NB	.031	.549	.583
	CB	**.112**	2.04	**.043**
	ATT	**.266**	3.64	**.000**
	SN1	.063	1.17	.244
	SN2	.003	.050	.960
	PBC1	**.283**	3.88	**.000**
	PBC2	.055	1.07	.288
	HAB	**.312**	4.59	**.000**

Table 20. Coefficients for attentive group (continued).

Step 4	BB	-.051	-.798	.426
	NB	.033	.634	.527
	CB	.065	1.27	.205
	ATT	**.162**	2.35	**.020**
	SN1	**.091**	1.86	**.065**
	SN2	.036	.695	.488
	PBC1	**.165**	2.38	**.019**
	PBC2	.053	1.12	.263
	HAB	-.015	-.179	.858
	PB	**.549**	5.77	**.000**

MODEL B -> Bscenario as outcome variable				
		Standardized coefficients		
		Beta	**t**	**p**
Step 1	**BB**	.254	**3.50**	**.000**
	NB	-.054	-.743	.459
	CB	.418	**6.15**	**.000**
Step 2	BB	.013	.173	.863
	NB	-.042	-.697	.487
	CB	**.225**	3.83	**.000**
	ATT	**.207**	2.65	**.009**
	SN1	-.054	-.932	.353
	SN2	-.055	-.879	.381
	PBC1	**.490**	7.07	**.000**
	PBC2	.032	.582	.561
Step 3	BB	.048	.700	.485
	NB	-.041	-.754	.452
	CB	**.152**	2.81	**.006**
	ATT	.065	.869	.386
	SN1	-.088	-1.67	.097
	SN2	-.058	-1.05	.297
	PBC1	**.290**	4.13	**.000**
	PBC2	.020	.395	.693
	BI	**.452**	6.19	**.000**
Step 4	BB	.053	.955	.341
	NB	.014	.302	.763
	CB	**.103**	2.31	**.022**
	ATT	.043	.713	.477
	SN1	**-.093**	-2.17	**.032**
	SN2	-.066	-1.45	.149
	PBC1	**.112**	1.83	**.069**
	PBC2	.070	1.69	.093
	BI	**.258**	4.06	**.000**
	HAB	**.516**	8.91	**.000**
Step 5	BB	.057	1.35	.179
	NB	.023	.690	.491
	CB	**.064**	1.91	**.058**
	ATT	-.037	-.795	.428
	SN1	-.038	-1.17	.245
	SN2	-.019	-.545	.587
	PBC1	.017	.363	.717
	PBC2	**.080**	2.58	**.011**
	BI	.015	.281	.779
	HAB	**.137**	2.47	**.015**
	PB	**.763**	11.06	**.000**

Overall, results for the attentive group are in line with the outcome for the previous two groups. r^2 values for the model with scenario-specific behaviour are higher than those obtained for the models with behavioural intentions as target variable (except for models in step 1 and 2). Next to that, the stepwise procedure again shows how the explanatory power within the TPB-framework shifts gradually from indirect to direct variables. In general, the most important predictor variables for the attentive group are the same as those for the other two groups (i.e., past behaviour, habits and behavioural intentions). There is however, one difference, namely, the fact that for the attentive group, the effect emanating from PBC1 in the final step was not significant when past behaviour was added to the model.

Throughout the following section, the results of this study will be brought together and we will come to some final conclusions.

Discussion and conclusions

The aims of this campaign evaluation were twofold. First, we wanted to find out whether a seat belt campaign would exert a (significant) effect on some variables known to be crucial determinants of behaviour. Secondly, we wished to verify whether the basic assumptions underlying the TPB-framework could be supported (or not).

As for the first objective, results indicated that indeed, being exposed (or not) to the campaign, generated significant differences for some important determinants of behaviour. However, this study clearly shows that the type of exposure (i.e., under full awareness or under complete unawareness) should be taken into account as well. Interestingly, subjects being exposed to the campaign stimulus, while being unaware of this, do not differ significantly from subjects under control conditions.

Thus, being exposed to a campaign stimulus as such does not guarantee that the stimulus will cause an effect in the subject. In addition, the subject's awareness should be considered as well. Consequently, in striving for a maximum of effectiveness, campaign planners and designers would do best in paying attention more explicitly to the fact that the stimulus per se doesn't pass unnoticed. The fact that subjects were unaware of the stimulus exposure can be related to both characteristics of the stimulus itself (the stimulus doesn't trigger attention for instance because the colours or the images used do not stand out sufficiently) as to characteristics of the environment that take people's attention away from the stimulus (the stimulus doesn't trigger attention for instance because the driver is manoeuvring and therefore focuses more narrowly on the road, not on the scene surrounding the road, or attention goes rather to a traffic sign or an exit lane located nearby a safety billboard than to the billboard itself).

Thus, in order to raise this exposure-awareness several stimulus-related aspects could be taken into account. For instance, in the case of billboards aside the road, special attention should go to their exact positioning (do they really fall within the visional scope of the driver, are they located at places where there is not too much interference with or hindering from other road and infrastructural elements, etc.) as well as to their style and design characteristics (do the colours attract attention, is the picture which is shown not too complicated, is the link between text and image easy to process, etc.). In case of TV- or radio-spots, broadcasting should be carefully planned in order to avoid that the message gets lost in the information-clutter surrounding it.

s for the second objective, the results of the regression analyses in general supported the basic assumptions underlying the TPB-framework. That is, behaviour is formed by means of a multi-stage process with indirect factors (i.e., behavioural, normative and control beliefs) exerting an effect on behaviour which is mediated to a large extent by the direct determinants such as attitude, subjective norm, perceived behavioural control and behavioural intentions.

A closer investigation of the results revealed that the model explained 62% of the variance with regard to seat belt usage for the attentive group and 61% for the pre-attentive group. The most important factors within the model were perceived behavioural control indicating that those who regarded seat belt usage as easy was more likely to use the same. When past behaviour and habit were added to the model the variance increased by 5% to 24% (attentive group and pre-attentive group respectively). It would therefore be advisable to extend the original TPB-framework with some additional variables such as habits and past behaviour. The reason for perceived behavioural control being more important than the others could perhaps be related to the campaign slogan which focused on that it is easy to use the seat belt and that it only will take one second.

To summarise, the results of this study seem to suggest that wearing seat belts is clearly not related to the potential consequences associated with wearing the seat belt, nor with what subjects believe people important to them think about wearing seat belts (or not). Therefore, it would be unwise to approach the target sample questioned here with messages informing the respondent about potential risks or benefits of wearing seat belts. Stressing group norms would not be an advisable solution either. Rather, the emphasize should perhaps be on control-related aspects, and more in particular on the confidence one has in his/her own wearing a seat belt or not. Besides this self-confidence, the intentions to wear a seat belt, together with habits and past behaviour are of crucial importance in explaining (and predicting) seat belt use.

In light of these findings, we think it would be a fruitful approach, for instance to demonstrate that wearing seat belts is in fact a very simple, effortless and easy action, thereby potentially increasing one's confidence in being able to do so. Another promising avenue might be to make people more aware of the fact that external conditions (such as time pressure, being busy in mind while driving, driving outside the city centre on a quite rural road, being away for only a short distance, etc.) that might make people forget to wear seat belts or make them believe they do not really need to wear a seat belt, should not refrain them from using the seat belt. Put differently, one should always wear a seat belt.

Besides that, since habits and past behaviour are among the most important determinants of behaviour, it might also be a useful approach to try and create a so-called 'behavioural script' that is automatically activated each time one has the intention to drive. Studies focussing on 'planning' and 'behavioural implementation' or 'behavioural willingness' argue that, besides creating such an intention, people should be encouraged and trained in 'planning' future actions. Indeed, empirical research shows that people planning future actions are significantly higher in performing the behaviour compared to people who only form a behavioural intention, without planning the behaviour (e.g., Gibbons et al. 1998; Armitage & Conner 2000).

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5 Evaluation of the Dutch seat belt campaign 2008

Koos Tamis[1]

Abstract

This report contains the results of the Dutch seat belt campaign 2008 which ran from 13 March till 13 June 2008. It was an integrated combination of national mass media communication, supporting local and regional communication (mass media and personal communication) and enforcement on seat belt use. The national campaign was funded and coordinated by the Netherlands Ministry of Transport. In the development and execution the Ministry worked together with several public and private stakeholders.

The target group of the campaign consisted of all car occupants: car drivers, front passengers and rear passengers. The general policy aim of the campaign was to contribute to compliance with the legal obligation to use the seat belt on all positions in person cars.

The main result of an observation study was that the stated objectives for the improvement of seat belt use had been realised for all car occupants. The objectives for drivers, front passengers and rear passengers were respectively at least 92.89 and 68%; after the campaign use by drivers was 96.2%, by front passengers 94.9% and by rear passengers 82.7%. The observation study also showed that there is a strong relationship between the use of the seat belt by the driver and the passengers, that is, when the drives have the belt on, the passengers tend to follow that good example.

Furthermore, 2440 persons filled in a web based questionnaire. The results showed that non-users believed that seat belt use is less important than those who wear the seat belt. The effects are significant for all trip lengths and for all positions in the car. 'Own safety' was the most mentioned reason for using the seat belt. Furthermore, non-users were more likely to disagree with the obligation. Although the seat belt for drivers and front passengers is compulsory since 1975, there still appears to be a lack of acceptance among non-users towards this legislation. The chance of being fined for not wearing the seat belt in the back seat was estimated much lower than for non-use by driver and front passenger.

1 Ministry of Transport/Passenger Transport Division, The Hague, The Netherlands.

Executive summary

This report contains the results of the evaluation research on the effects of the Dutch seat belt campaign 2008. This campaign ran from 13 March till 13 June 2008. The campaign was an integrated combination of national mass media communication, supporting local and regional communication (mass media and personal communication) and enforcement on seat belt use. The national campaign was funded and coordinated by the Ministry of Transport. In the development and execution of the campaign the Ministry worked together with regional authorities, police forces, the Road Safety Association VVN and the Road Users Association ANWB.

The target group of the campaign consisted of all car occupants: car drivers, front passengers and rear passengers. Because belt use in the back seats was still lagging behind belt use by drivers and front passengers, special attention was paid to rear passengers. The message focuses on habit formation and habit consolidation. The slogan was: '*Simply put on your seat belt, also in the back seats*'. This thematic slogan was followed by the general pay-off which is operated in all Dutch road safety communication: '*The way to get home safely*'.

The general policy aim of the campaign was to contribute to compliance with the legal obligation to use the seat belt on all positions in person cars. Specific campaign objectives were based on the results of the roadside survey held in the second quarter of 2007. This survey showed that observed seat belt use by drivers and front passengers was already at a relatively high level: 92% for drivers and 89% for front passengers. For rear passengers there seemed to be room for improvement. The observed behaviour in 2007 for this group was 65%.

For the 2008 campaign the following objectives have been stated:

- At least maintenance of the 2007 level of observed seat belt use by drivers (92%) and front passengers (89%).
- Significant improvement - at least with 3% - of observed seat belt use by rear passengers, compared to 2007 (65%).

The main purpose of the evaluation research was to establish whether the stated objectives of the 2008 campaign have been realised. This was measured by observing actual behaviour in a nationwide roadside survey, which is representative for the population of car occupants. Observations were done at 76 locations, well spread over all 12 Dutch provinces and covering local and provincial roads (38 inside built-up areas and 38 outside built-up areas). 26 locations were used only for the pre-measurement and 25 only for the after-measurement. 25 locations were used in the pre- and the after-measurement period. This means that the pre-measurement was held at totally 51 locations and the after-measurement at totally 50 locations.

The total number of observations realised was 31.555, of which half before the campaign and half after the campaign. The majority of those observed were drivers (81%); 15% were front passengers and 4% rear passengers.

The main result of the observation study is that the stated objectives for the improvement of seat belt use have been realised for all car occupants.

The objectives for drivers, front passengers and rear passengers were respectively at least 92.89 and 68%; after the campaign use by drivers was 96.2%, by front passengers 94.9% and by rear passengers 82.7%. It is remarkable that the observed use in the pre-measurement was already higher than in the 2007 measurement, on which the objectives were based. This can be the result of permanent attention paid to seat belt use in communication and enforcement.

In 2008 seat belt use reached the highest level since monitoring by roadside surveys started in 1991. While belt use by drivers and front passengers showed a steady improvement from the early nineties onwards (+15 percent points), the recent increase of use in the back seats is quite remarkable: from 52% in 2002 to 81% in 2008. Since 2003 rear passengers (adults and children) are a major target group in the yearly campaigns. These communication efforts appear to have had effect on actual use in the back seats.

The observation study shows there is a strong relation between the use of the seat belt by the driver and the passengers. When the driver does not wear the belt this has a negative influence on the behaviour of passengers. When the drives have the belt on, the passengers tend to follow that good example. After the 2008 campaign both front and rear passengers appear to have become more independent in their behaviour. After the campaign they wear seat belts more often, when the driver is not having the seat belt on.

The results showed that observed seat belt use by all car occupants was higher after the campaign than before the campaign. For drivers and front passengers the increase was significant (+1.5% and +2.3%), for rear passengers the increase was almost significant (+4.2%). Taking all car occupants together the difference between the pre- and after-measurement is 1.8%. Because 1% more seat belt use is equal to 3 lives saved, this could mean the campaign has contributed to saving the lives of 6 car occupants.

The improvement of seat belt use between the pre- and after-measurement indicates the 2008 campaign had an effect on actual behaviour. To which extent there was a causal relationship between the campaign efforts and the increase of seat belt use is difficult to determine. The observation study itself does not provide information which factors explain the behavioural choices of car occupants and which influence the campaign activities have had on their behaviour and attitudes. To get more insight in these aspects the observation study was combined with a questionnaire inquiry among the observed car occupants. In the analysis a direct link could be made between actually observed behaviour of an individual in the roadside survey (use or non-use) and his/her answers in the questionnaire. The inquiry contained questions on attitudes, risk perception and self-reported behaviour. Also the reach and likeability of the campaign were measured.

2440 persons filled in the internet questionnaire. The total number of respondents was divided as follows between the two measurements: before the campaign 935 (38.3%) and after 1505 (61.7%). Almost all (97.6%) of the 2440 respondents had the seat belt on during the observation. 87.6% of the belt users were driver and 10.0% were passengers. Of the 2.3% non-using respondents 2.0% were drivers and 0,3% passengers.

The reach and appreciation of the campaign were high. After the campaign 77% of the respondents said they had seen the campaign (aided recall).

Evaluation research of the National Communication Service showed an average reach of 86% during the whole campaign; near the end of the mass media activities 93% indicated to have seen at least one of the campaign materials. The large majority of the respondents (80%) considered the campaign appealing; only 16% did not feel appealed by the campaign. The relatively high level of appreciation was reflected in the report mark given by the respondents. On a scale from 1 to 10 the average report mark was 7.1.

Looking at beliefs, attitudes and self reported behaviour the analysis showed no significant differences between the pre- and after-measurement. The only exception was that seat belt for passengers in the back seat were seen as more important after the campaign. The reason for this could be that the scores in the pre-measurement were already on a relatively high level. Regarding this it is not realistic to expect major improvement during a campaign period of about three months. Indeed the campaign appears to have contributed to the consolidation of the existing high levels for beliefs, attitudes and self reported behaviour. Another reason could be that one of the billboards displayed a woman in the back seat emphasising that seat belts also has to be used in the back.

The analysis then concentrated on the differences between people who had been observed to either use or not use the seat belt. With regard to observed usage both drivers and passengers were included but since too few passengers did not use the belt this group had to be excluded. The results can be summarised as follows:

- *Risk perception*: Regarding short trips and the back seats drivers without seat belt (during observation) rate non-use of the seat belt as less dangerous than drivers and passengers who had the seat belt on during observation.
- *Self reported behaviour*: Non-users report they wear the seat belt less often than drivers and passengers who had the seat belt on during observation. This effect is significant for all trip lengths and for all positions in the car.
- *Perceived importance of seat belt use*: Non-users believe that seat belt use is less important than those who wear the seat belt. The effects are significant for all trip lengths and for all positions in the car.
- *Reasons for using the seat belt*: 'Own safety' is the most mentioned reason for using the seat belt. Six to eight respondents rank this reason first. Other reasons (obligation, risk of penalty and habit) come far behind the reason 'own safety'. Non-users less often mention 'my own safety' as reason for wearing the seat belt on the front and the back seat. The difference between users and non-users is about 10-15%. For non-users not getting fined is more important than for users.
- *Attitude towards the obligation to use the seat belt*: Non-users are more likely to disagree with the obligation. Although the seat belt for drivers and front passengers is compulsory since 1975, there still appears to be a lack of acceptance among non-users towards this legislation. However it should be considered that the group of non-users is rather small. Both users and non-users are less likely to agree with compulsory seat belt use in the back seat. This proves consistent with the lower level of risk perception and perceived importance towards seat belt use by rear passengers.
- *Self-estimated chance of being fined*: The chance of being fined for not wearing the seat belt in the back seat is estimated much lower than for non-use by driver and front passenger. This is equally for users and non-users.
- *Opinion on enforcement of seat belt use*: Non-users perceive police controls targeting drivers' seat belt use as less meaningful than users. All car occupants consider enforcement of seat belt use in the back seats less meaningful than enforcement of seat belt use by drivers and front passengers. This seems consistent with the results on risk perception and perceived importance regarding seat belt use in the back seats.

Introduction

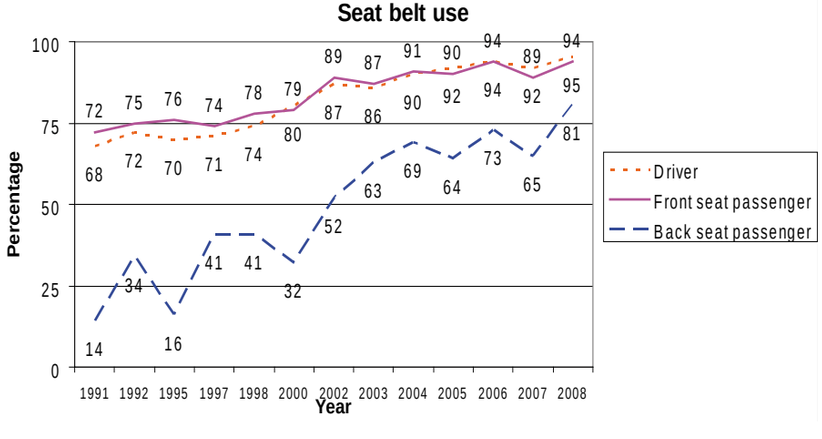
Proper use of seat belts can prevent serious injury of car occupants in case of an accident. For this reason in The Netherlands seat belt use by drivers and front passengers is compulsory since 1975; for rear passengers it is compulsory since 1990. Compliance with the standing regulation concerning seat belt use is one of the longer priorities of Dutch road safety policy and of police enforcement. Since the mid-nineties mass media campaigns have been an important instrument to enhance seat belt use and to make road users aware of the risks of not wearing the seat belt. Communication is very often accompanied by enforcement.

In 2007 791 road users died in Dutch traffic and about 17.000 had to be taken to hospital because of severe injuries. Of those killed 353 were car occupants and of those severely injured about 4500. Because of insufficient registration procedures it is impossible to account for how many of the road casualties were due to not wearing the seat belt.

Based on the proven effectiveness for injury prevention experts of SWOV and the Ministry's Transport Research Institute have made an estimate of the effect of improved belt use on the number of yearly victims in Dutch traffic. They estimate that 1% increase of belt use by drivers and front passengers saves 3 deaths and about 20 severely injured each year. 6% increase of belt use in the back seats means a reduction of 1 person killed and about 10 persons severely injured. When belt use decreases, the number of victims is expected to rise equally.

Starting in 1991 seat belt use has been monitored by means of regular road side surveys. This research shows use has increased considerately in the last decennia. In 2000 80% of drivers, 79% of front passengers and 32% of rear passengers had the seat belt on. In 2006 this had risen to 94% for drivers and front passengers and to 73% for rear passengers. In 2007 however there was a setback in seat belt use: 92% for drivers, 89% for front passengers and 65% for rear passengers. Figure 1 shows the development from 1991 to 2008.

Figure 1. Seat belt use by drivers, front passengers and rear passengers of person cars 1991-2008.



Although there is no consistent explanation for the decrease in 2007, it proved the need for continuous promotion of seat belt use in nationwide campaigns integrating mass media communication, local action and enforcement.

Campaign description

Stakeholders

The following stakeholders were involved in the 2008 campaign:

- Ministry of Transport (funding and execution of the national mass media activities; contacts with national press; evaluation research).
- Regional authorities/12 provinces (funding and coordination of regional and local promotional activities and regional media contacts.
- Police authorities/25 corps (enforcement on seat belt use).
- Road Safety Association VVN (supportive activities in national media and on the local level).
- Road Users Association ANWB (supportive activities in national media and towards its members).

Theme, slogan and strategic approach

The campaign theme is seat belt use by all car occupants. Because belt use in the back seats is still lagging behind belt use by drivers and front passengers, special attention is now being paid to rear passengers. The slogan is: 'Simply put on your seat belt, also in the back seats'. This thematic slogan is followed by the general pay-off which is operated in all Dutch road safety communication: 'The way to get home safely'.

The message focuses on habit formation and habit consolidation. Seat belt use is presented as a simple and easy-to-do thing (low effort) with a high personal benefit (safety gain). It should be done automatically, without considering the possible advantages and disadvantages each time somebody gets into the car. All campaign materials have attempted to use a friendly and positive appeal. Because risk awareness is already at a relatively high level, the campaign does not show shocking images of accidents and victims in order to warn people about the effects of not wearing the seat belt. By communicating seat belt use as 'normal' behaviour the campaign gives a positive confirmation to the large majority of car occupants who already wear the seat belt.

Pre-testing of the campaign concept and materials

The creative concept and selected materials (TV-spot and billboard) have been pre-tested by means of qualitative research. This was done in 25 individual in-depth interviews. The concept and materials were mainly tested on comprehension and likeability. The results were satisfactory. The concept was well understood and accepted. The TV-spot and the billboard only needed slight adaptation.

Target group

The campaign targets at car drivers, front passengers and rear passengers. Specific attention is paid to passengers in the back seats. No difference is made between male and female car occupants.

Scope of the campaign
The campaign has a national scope. It is implemented in the entire country, which implies that the whole population (i.e. car occupants) is targeted by the campaign activities.

Following the national concept the campaign materials are also implemented on the regional and local level. For example the TV-spot is broadcasted on regional channels. The billboard which has been developed for being displayed alongside the highways, is also made available in a smaller format for use alongside provincial roads.

Timing and duration of the campaign
The campaign was held from 13 March till 13 June 2008 (week 11 till week 24). During the whole period billboards alongside the highways and local roads showed the campaign message. TV- and radio-spots were broadcasted on national public and commercial channels during the first month of the campaign (17 March till 11 April).

The campaign is part of the long term communication strategy of the Ministry of Transport, which is operated since 2003. Seat belt use is one of the key issues in that strategy. Each year a nationwide seat belt campaign is held in cooperation with the enforcement agencies, regional authorities and private organisations.

Objectives of the campaign
Because the campaign focuses on habit formation and consolidation, the objectives concentrate on actual behaviour and are measured by observation in a roadside survey. The objectives for 2008 are:

- At least maintenance of the 2007 level of seat belt use by drivers and front passengers. The observed behaviour in 2007 was 92% for drivers and 89% for front passengers.
- Significant improvement (at least with 3%) of seat belt use by rear passengers, compared to the level in 2007. The observed behaviour in 2007 for rear passengers was 65%.

In 2008 no specific objectives have been formulated concerning knowledge, awareness, risk perception, attitudes and self-reported behaviour. The reason is that the existent levels on these variables are already so high that further improvement is hard to realise. Although they are not objectives, these variables are measured in the evaluation (inquiry by questionnaire) in order to monitor the development compared to the years before.

Media plan
For the execution of the campaign the following set of media was used:

- TV-spot (30 seconds): Broadcasted on national public and commercial channels from 17 March till 11 April 2008, inside and outside prime time. The exact number of emissions is not available. The TV-spot is also broadcasted on regional and local channels in 8 of the 12 provinces. The regional authorities are responsible for funding and contracts with these channels. The number of emissions is not known.
- Radio-spot (20 seconds): Broadcasted on national public and commercial channels from 17 March till 11 April 2008, inside and outside prime time. The exact number of emissions is not available. The radio-spot is also broadcasted on regional and local channels in 10 of the 12 provinces. The regional authorities are responsible for funding and contracts with these channels. The number of emissions is not known.
- 255 billboards (3.50 x 2.50 meter) alongside the highways during the entire campaign period. The Ministry of Transport is responsible for development, production and placement of these billboards.

The text on the billboard with the young woman in the back seat (used alongside the highways in 2008) states: 'Just put on your seat belt. It addresses to all car occupants, but gives extra attention to rear passengers. In the TV-commercial shown during the campaign (first shown in 2007 and rehearsed in 2008; see the stills above) an allegory is made with seat belt use in an airplane. At the end of the commercial the airplane proves to be moving a banner, stating 'Has everybody in the car the seat belt on'. Again it addresses to all car occupants. The picture of the banner with this text was first used in 2007, but also used during the 2008 campaign on billboards along regional and local roads.

- Billboards (1.20 x 0.80 meter and 0.75 x 0.50 meter) alongside regional and local roads, showing the same image as on the billboards alongside the highways. The regional authorities are responsible for development, production and placement of these billboards. The exact number is unknown. Estimate: 4000.
- Poster (paper version of the billboard, 1.20 x 0.80 meter and 0.75 x 0.50 meter). About 23.000 of these posters were distributed to regional authorities who disseminated them to their local network partners (schools, police force's, libraries, health centres, etc.).
- Internet site www.gordelsom.nl (in English: Seat belt on). The number of unique visitors during the campaign period was 42.000. Online advertising was used to make the site known to the public and to stimulate people to visit the site.
- Ready-made article for local newspapers. This article was placed in 45 local papers, with a total circulation of 1.1 million.

Accompanying activities (integrated campaign approach)
The campaign was prepared and executed in close cooperation with the 25 police force's and the12 provinces (regional authorities). During the campaign period the police intensified the regular enforcement on seat belt use, referring to the campaign message and materials. The number of cars controlled, fines and surveillance hours are not known yet.

The provinces disseminated campaign materials within their region and made efforts for press coverage in regional and local media. They contacted primary and secondary schools to pay attention to seat belt use during the lessons and other educational activities. Also they were responsible for disseminating campaign materials to schools.

Production costs
The total costs of the campaign amounted to € 490.000. This included concept development (advertising agency), production (TV and radio spots, billboards, posters, website), dissemination (broadcasting and placement) and research (pre-testing, effect measurement). The number of person hours are not available; the person costs are included in the above mentioned campaign costs.

Stakeholders relevant for the evaluation
The evaluation is relevant for all participants in the campaign:

- Ministry of Transport
- Regional authorities/12 provinces
- Police authorities/25 corps regional police forces
- Road Safety Association VVN
- Road Users Association ANWB

After consent of the participants the evaluation results will be communicated to the Dutch parliament and to the media for use in free publicity. In this way the spending of tax money for the campaign can be accounted for.

Evaluation budget
The total budget for the evaluation study is 72.500 Euro. The costs for additional analysis for CAST WP4 are 4000 Euro.

Use of a-priori knowledge
The roadside survey is held each year. The results are used in the development of the seat belt campaign.
The National Communication Service evaluates the communicative and behavioural effects of all nationwide campaigns. This is done through standardized public inquiries with pre-, intermediate and after-measurement. The available evaluation results concerning the seat belt campaign are used as input for the next campaign.

Objectives of the evaluation study

Purpose of the evaluation study is to establish whether the objectives of the campaign have been realised and to give an indication of the factors influencing the campaign process and the campaign effects. As previously mentioned the campaign focuses on habit formation and consolidation in seat belt use. This is measured through observation of actual behaviour by means of a roadside survey, held directly before and after the campaign period.

The results of the observation study do not explain the behavioural choices of car occupants (use or non-use of the seat belt) and which influence the campaign activities have had on their behaviour and attitudes. To get more insight in these aspects the observation study was combined with a questionnaire inquiry among the observed car occupants. In the analysis a direct link could be made between actually observed behaviour of an individual in the roadside survey and his/her answers in the questionnaire.

The present evaluation study did not contain a cost-benefit or a cost-effectiveness analysis.

Method

The evaluation has been set up as a quasi-experimental design with pre- and after measurement. Because the campaign is held nationwide and reaches nearly all Dutch citizens, it is not possible to make a comparison with a representative control region (i.e. a region in The Netherlands where the campaign is not executed) or control group (a group of Dutch citizens that has not been confronted with the campaign).

Material

The evaluation study consisted of a combination of observations (roadside survey) and an inquiry by means of an internet questionnaire (self-report). The inquiry contained questions on attitudes, risk perception, habits and self-reported behaviour (see Annex A). Seven questions were used to measure *behavioural beliefs* and combined into one index (Cronbach alpha= 0.77):

1. There is a lower probability of injury with the seat belt on
2. I feel that something is missing when I do not use the seat belt
3. I feel save with the seat belt on
4. I feel uncomfortable without seat belt on
5. No need for seat belt when you drive carefully
6. It is uncomfortable without seat belt
7. Short trips can be done without seat belt

Descriptive norm was measured by one question: 'I use the seat belt because all my relatives do so.' *Personal norm* was measured by three items and then combined into one index (Cronbach alpha = 0.72):

1. I feel annoyed when others do not use the belt
2. I am supposed to use my seat belt always
3. Seat belt use is self-evident for me

Risk perception was measured by the perception of risk in several situations (different trip lengths and different positions in the car). Cronbach alpha = 0.78. This score is appropriate to take all categories together and use the mean value of them.

Past behaviour was measured by two items, one about self-reported seat belt use in the front seat and the other about the back seat. These items were used separately.

Perceived importance regarding the use of seat belts was measured by one item, one during a short trip, another on a long trip and then as drivers, front seat passenger and rear seat passenger.

All the items were measured on a five item Likert scale. Behavioural beliefs, descriptive norm and risk perception (1=strongly agree; 2=I agree; 3=Neutral; 4=I disagree and 5= I strongly disagree), past behaviour (1=always; 2=nearly always; 3=mostly;4=sometimes;5=never).

Procedure

The inquiry by questionnaire was held among the car occupants (drivers, front passengers and rear passengers) observed in the roadside survey. At the observation locations they were given a card with the internet address on which they could fill in the online questionnaire. Seat belt users and non-users got cards with a different code. The same for drivers, front passengers and rear passengers. For the analysis this offered challenging possibilities:

- to make a direct link between observed behaviour of an individual in the road side survey and his/her answers in the questionnaire
- to discriminate between seat belt users and non-users and between different groups of car occupants, i.e. drivers, front passengers and rear passengers.

The measurements were planned in coordination with the campaign timing. The campaign ran from mid March till mid June 2008. The fieldwork of the before measurement was held in week 10 and 11 (3 to 14 March). The after measurement was held in week 25 and 26 (16 to 27 June).

Observations were done at 76 locations, well spread over all 12 Dutch provinces and covering both local and provincial roads (38 inside built-up areas and 38 outside built-up areas). 26 locations were used only for the pre-measurement and 25 only for the after-measurement. 25 locations were used in the pre- and the after-measurement period. This means that the pre-measurement was held at totally 51 locations and the after-measurement at totally 50 locations.

Participants

Roadside survey (observed behaviour)

The total number of observations realised was 31555. The next table shows the division between car occupants and between the pre- and after-measurement. The margin shows the deviation of the sample (% higher or lower) towards the total population of Dutch car occupants.

Table 1. Number of observations before and after the campaign (drivers and passengers).

	Measurement	Number of observations	Margin
Driver	Before campaign	12930	0.4
	After campaign	12708	0.3
	Total	25638	0.3
Front seat passenger	Before campaign	2418	1.0
	After campaign	2407	0.9
	Total	4825	0.7
Back seat passenger	Before campaign	544	3.5
	After campaign	548	3.2
	Total	1092	2.3
All car occupants	Before campaign	15892	0.4
	After campaign	15663	0.3
	Total	31555	0.2

Internet inquiry (self reported behaviour)

It has not been registered exactly how many of the 31556 observed car occupants received the card with the invitation to fill in the internet questionnaire. It is assumed at least 25000 received the card. 2440 persons have filled in the internet questionnaire. The total number of respondents was divided as follows between the two measurements:

- before: 935 (38.3%)
- after: 1505 (61.7%)

The next table shows the division among the respondents between drivers and passengers in the pre- and after-measurement.

Table 2. Number of respondents before and after the campaign.

	Measurement	Number of respondents
Drivers	Before campaign	822
	After campaign	1366
	Total	2188
Passengers	Before campaign	113
	After campaign	139
	Total	252
All car occupants	Before campaign	935
	After campaign	1505
	Total	2440

Gender
Of the 2440 respondents 1420 were men (58,2%) and 1020 were women (41,8%). Because in the sample there were only 6 passengers not using the seat belt they were excluded from the table.

Looking at drivers using the seat belt the difference between men and women is stable in the pre- and after-measurement. Looking at non-using drivers and passengers with the seat belt on there are more differences between men and women in the pre- and after-measurement. This can be due to the relatively low numbers.

Age
The average age of the respondents was around 45 years. There is little difference between users and non-users and between the two measurements.

Looking at the drivers and the passengers with the seat belt on, the respondents are equally spread over the age groups and there is little difference between the two measurements. Looking at non-using drivers there are more differences between the age groups between the pre- and after-measurement. This can be due to the relatively low numbers.

Yearly mileage
Yearly mileage presented hardly any difference between the drivers using and not using the seat belt. Also there is only little difference between the two measurements.

Possession of the driving license
Most respondents have their driving license for more than 5 years. There is little difference between drivers using and not using the seat belt and between the two measurements.

Sample bias

The choice for an internet inquiry may have produced a selection bias, because a part of the Dutch population does not have access to the internet. The size of this possible bias cannot be established.
A non-response bias can be probable. It is estimated that about 10% of the people who received the card filled in the internet inquiry. It is possible that the respondents were more motivated and more interested in the subject than those who refused to fill in the inquiry.

Results

The results are presented in two parts. In the first part the observed behaviour based on observations of seat belt use by occupants of person cars (drivers, front passengers and rear passengers) are presented and in the second part the results from an questionnaire inquiry among the car occupants observed in the road side survey.

Part I - Observational data

Table 3 shows the difference between seat belt use by drivers and passengers before and after the campaign period.

Table 3. Percentage of seat belt use before- and after-measurement.

	Moment	Inside built-up area (%)	Outside built-up area (%)	Total (%)	Number of observations
Driver	Before campaign	94.2	95.3	94.7	12930
	After campaign	95.5*	96.9*	96.2*	12708
Front seat passenger	Before campaign	92.0	93.2	92.6	2418
	After campaign	93.4^{ns}	96.0*	94.9*	2407
Back seat passenger	Before campaign	82.7	74.3	78.5	544
	After campaign	80.5^{ns}	84.2*	82.7^{ns}	548
Total	Before campaign	93.5	94.2	93.8	15892
	After campaign	94.7*	96.3*	95.6*	15663

Note. *=significant difference between the two occasions (chi-square test); ns=not significant.

The results presented in Table 3 show that the overall effect of the campaign was significant both outside and inside built up areas with more people using the seat belt after the campaign than before. However, inside built up areas this only applied to drivers whilst outside built up areas it applied to all groups. The results also show that drivers and front seat passengers in general use the belt more than back seat passengers.

Relation of seat belt use by the driver and passengers

There is a clear relation between the use of the seat belt by the driver and the passengers. When the driver does not wear the belt this has a negative influence on the behaviour of passengers. When the driver have the belt on, the passengers tend to follow that good example.

Table 4. Distribution of seat belt use driver vs. front passengers before and after the campaign.

		Front seat passenger	
		Seat belt (%)	No seatbelt (%)
Driver - Before	Seat belt	95	5
	No seat belt	32	68
Driver - After	Seat belt	96	4
	No seat belt	45	55

Table 5. Distribution of seat belt use driver vs. back seat passengers before and after the campaign (percentage).

		Back seat passenger	
		Seat belt	No seatbelt
Driver - before	Seat belt	81	19
	No seat belt	12	88
Driver - after	Seat belt	84	16
	No seat belt	50	50

Tables 4 and 5 show a strong relationship between seat belt use for both drivers and passengers. After the campaign both front and rear passengers appear to have become more independent in their behaviour. After the campaign they wear seat belts more often even when the driver is not having the seat belt on. Before the campaign only 32% of the front passengers used the seat belt, when the driver was not doing it. After the campaign this was improved: now 45% of front passengers put the belt on, though the driver did not use it. The same pattern appeared for rear passengers. Before the campaign 12% was wearing the seat belt even if the driver was not using his/her. After the campaign 50% of the rear passengers used the belt, even when the driver did not.

Part II -Self-reported behaviour

Reach of the campaign

In the after-measurement the respondents were asked whether they could remember to have seen a media campaign about seat belt use during the past three months. 55% of the respondents said they have seen the campaign (spontaneous recall). Those who answered they could not remember such a campaign, were shown pictures of the TV-commercial and the billboard. After this 77% of the respondents said they had seen the campaign (aided recall).

The National Communication Service also measured the reach of the campaign by means of aided recall, using pictures of the campaign materials. This was done from week 12 till week 15 (four intermediate measurements). Although a different research method was used, the result can be considered as a reference point. In the campaign evaluation of the National Communication Service the average reach was 86%; in week 15 93% indicated to have seen at least one of the campaign materials. The TV-spot had an average reach of 58% and 71% at the highest level (in week 14). The average reach of the billboard was 56% and 66% at the highest level (in week 15).

Table 6. Spontaneous recall of the campaign, percentage of respondents that indicate to remember the campaign.

	Yes	No	Don't know
Driver without seat belt	51	30	19
Driver with seat belt	56	32	13
Passenger with seat belt	53	31	16

Table 6 shows the difference in campaign recall between the respondents that wore the seat belt during observation and those who did not have the belt on. Further analysis also showed that the difference between the two groups was not significant.

Perception of the campaign

To get insight in the appreciation the respondents were asked to assess the campaign by giving a report mark, on a scale from 1 to 10. The average mark was 7.1. This is comparable with the result of a similar question in the campaign evaluation of the National Communication Service. In that study the average report mark was 6.9.

The appreciation was also measured by asking the respondents to indicate how appealing the campaign was for them. 80% of the respondents considered the campaign appealing for themselves (29% very appealing and 51% rather appealing). 16% did not feel appealed by the campaign. Table 7 shows the difference in the level of appreciation between the respondents who wore the seat belt during observation and those who did not have the belt on.

Table 7. Appreciation of the campaign (percentage).

	Very appealing	Rather appealing	Not appealing	Don't know
Driver without seat belt	23	50	22	5
Driver with seat belt	28	53	16	4
Passenger with seat belt	41	45	9	5

The results show that non-users appreciated the campaign less than users. The remarkably high percentage of 'passengers with seat belt' who considered the campaign to be very appealing may be due to the small number of this group (50 respondents). Further analysis also showed that the difference between the groups was not significant.

Campaign effect analyses

The data of the internet inquiry were analysed for differences between the pre- and after-measurement, held before and after the campaign period. We analysed the differences before and after the campaign for each variable by means of the t-statistic. No differences have been between the before and after situation. Only the perceived importance of using a seat belt for passengers in the back seats showed a significant effect (t=-2,193, p<0,05). This indicates that rear seat passengers perceived it to be more important to use the belt after the campaign than before.

Comparison between seat belt users and non-users

As previously described the majority of respondents (97.6%) had the seat belt on during observation. 2138 of them were drivers and 246 were passengers. Only 56 car occupants (50 drivers and 6 passengers) who were not wearing the seat belt during the observation responded to the internet questionnaire. This is relatively low, but the number is high enough to give some indications about their attitudes and habits compared to those who used the seat belt during the observation.

To get a consistent picture of the non-user group among those who returned the inquiry the 6 non-using passengers have been excluded from the analysis. Thus, with respect to non-users only the results from drivers, i.e. 50 respondents are presented in the following tables.

Risk perception

Table 8 shows the perception of risk with respect to not wearing a seat belt for drivers and passengers who had been observed to either using or not using their seat belts.

Table 8. Risk perception of seat belt users and non-users regarding to different trip length, position in the car and age group (adults and children).

	Observed behaviour	Dangerous (%)	Somewhat dangerous (%)	Safe (%)	Don't know (%)
Risk short trip	Driver-No seat belt	71	23	6	0
	Driver-Seat belt	87	11	2	0
	Passenger-Seat belt	86	12	2	0
Risk long trip	Driver-No seat belt	93	3	4	0
	Driver-Seat belt	96	4	0	0
	Passenger-Seat belt	97	3	0	0
Risk adult front seat	Driver-No seat belt	86	9	5	0
	Driver-Seat belt	95	5	1	0
	Passenger-Seat belt	95	5	0	0
Risk adult back seat	Driver-No seat belt	69	25	5	0
	Driver-Seat belt	73	23	4	0
	Passenger-Seat belt	78	18	4	0
Risk child front seat	Driver-No seat belt	98	2	0	0
	Driver-Seat belt	99	1	0	0
	Passenger-Seat belt	99	1	0	0
Risk child back seat	Driver-No seat belt	92	6	2	0
	Driver-Seat belt	94	5	1	0
	Passenger-Seat belt	96	4	0	0

Table 8 shows that the most dangerous situation was if a child was not wearing the belt in the front seat. This was then followed by if the trip was longer than 10 minutes. Drivers who were observed not to wear their seat belt perceived slightly less risk than those who were wearing the same. Table 9 shows the mean differences between drivers (with and without seatbelt during observation).

Table 9. Risk perception not using seat belt, differences between drivers with seat belt and drivers without seat belt.

Variable	Observed behaviour	M	SD	t(p)	(d)
Risk short trip	Driver-No seat belt	1.35	0.599	2.418*	0.7
	Driver-Seat belt	1.15	0.41		
Risk long trip	Driver-No seat belt	1.11	0.411	0.997	0.9
	Driver-Seat belt	1.05	0.232		
Risk adult front seat	Driver-No seat belt	1.19	0.514	1.847	1.7
	Driver-Seat belt	1.06	0.256		
Risk adult back seat	Driver-No seat belt	1.36	0.585	0.606	0.1
	Driver-Seat belt	1.31	0.43		
Risk child front seat	Driver-No seat belt	1.03	0.26	0.966	0.1
	Driver-Seat belt	1.02	0.131		
Risk child back seat	Driver-No seat belt	1.10	0.351	0.923	0.1
	Driver-Seat belt	1.06	0.262		

Note. Mean values: 1= dangerous; 2= a little dangerous; 3= not dangerous. *= p<.05.

Table 9 shows that with regard to short trips drivers without seat belt (during observation) rate non-use of the seat belt as significantly less dangerous than drivers who had the seat belt on during observation.

Self-reported use of the seat belt

In the questionnaire past behaviour was measured by asking how often respondents used the seat belt. In table 10 the results are shown for drivers and passengers who had been observed to either use or not use the seat belt.

Table 10. Self-reported use of the seat belt regarding to different trip length and if they are the driver or a passenger.

	Observed behaviour	Always (%)	Nearly always (%)	Usually (%)	Sometimes (%)	Never (%)
Short trip	Driver-No seat belt	59	19	2	10	11
	Driver-Seat belt	88	8	2	1	0
	Passenger-Seat belt	90	7	2	0	0
Long trip	Driver-No seat belt	84	7	0	7	3
	Driver-Seat belt	98	1	0	0	0
	Passenger-Seat belt	97	2	0	0	0
Driver	Driver-No seat belt	79	7	2	9	3
	Driver-Seat belt	96	3	1	0	0
	Passenger-Seat belt	96	4	0	0	0
Front seat	Driver-No seat belt	76	7	3	8	6
	Driver-Seat belt	95	4	1	0	0
	Passenger-Seat belt	95	4	0	0	0
Back seat	Driver-No seat belt	37	20	15	2	25
	Driver-Seat belt	58	16	8	12	8
	Passenger-Seat belt	71	13	4	10	3

Table 10 shows that some of the driver who were observed not to wear the seat belt indicated that they always used it and amongst those who did use it there was some, albeit few, who indicated that they never used the belt.

Table 11 shows drivers self-reported behaviour.

Table 11. Self-reported use of the seat belt, differences between drivers with seat belt and drivers without seat belt during observation.

Variable	Observed behaviour	M	SD	t(p)	(d)
Short trip	Driver-No seat belt	1.2	0.5	-3.915**	-1.09959
	Driver-Seat belt	2.0	1.4		
Long trip	Driver-No seat belt	1.0	0.3	-2.489*	-0.70025
	Driver-Seat belt	1.4	1.0		
Driver	Driver-No seat belt	1.1	0.3	-2.785**	-0.7883
	Driver-Seat belt	1.5	1.1		
Front seat	Driver-No seat belt	1.1	0.4	-3.066**	-0.87411
	Driver-Seat belt	1.6	1.2		
Back seat	Driver-No seat belt	2.0	1.3	-2.693**	-0.75125
	Driver-Seat belt	2.6	1.6		

Note. 1=always, 5=never; ** p<.001; * p<.05.

Table 11 shows that drivers spotted without a seat belt report they use the seat belt less often than drivers and passengers who had the seat belt on during observation. This effect is significant for each situation. Effects tend to be larger for short trips and in the back seats.

Perceived importance of seat belt use

To get insight into the perception towards seat belt use the respondents were asked how important they think seat belt use is for themselves. The results are shown in the following tables.

Table 12. Perceived importance of seat belt use regarding different trip length and if they are the driver or a passenger.

	Observed behaviour	Very important (%)	Important (%)	Neutral (%)	Unimportant (%)	Very unimportant (%)
Short trip	Driver-No seat belt	44	33	14	8	0
	Driver-Seat belt	78	17	3	1	0
	Passenger-Seat belt	77	19	3	1	0
Long trip	Driver-No seat belt	70	18	10	2	0
	Driver-Seat belt	90	9	1	0	0
	Passenger-Seat belt	91	8	1	0	0
Driver	Driver-No seat belt	70	15	13	2	0
	Driver-Seat belt	90	8	1	0	0
	Passenger-Seat belt	91	8	0	1	0
Front seat	Driver-No seat belt	66	22	10	2	0
	Driver-Seat belt	89	9	1	0	0
	Passenger-Seat belt	88	10	1	1	0
Back seat	Driver-No seat belt	43	32	17	6	2
	Driver-Seat belt	57	24	14	4	1
	Passenger-Seat belt	65	21	11	2	1

Table 12 shows that all groups perceived that it was most important to use the seat belt on long trips and that that it was most important for the driver.

Table 13. Perceived importance of seat belt use, differences between drivers with seat belt and drivers without seat belt during observation.

Variable	Observed behaviour	M	SD	t(p)	(d)
Short trip	Driver without seat belt	1.87	0.957	4.255**	1.2
	Driver with seat belt	1.29	0.626		
Long trip	Driver without seat belt	1.44	0.751	2.916**	0.8
	Driver with seat belt	1.12	0.426		
Driver	Driver without seat belt	1.46	0.788	3.026**	0.9
	Driver with seat belt	1.12	0.435		
Front seat	Driver without seat belt	1.48	0.754	3.244**	0.9
	Driver with seat belt	1.13	0.425		
Back seat	Driver without seat belt	1.93	1.023	1.949	0.1
	Driver with seat belt	1.67	0.917		

Note. Mean value= 1=very important, 5=very unimportant. ** p<.001.

The results show that people not using the seat belt really think seat belt use is less important than those who wear the seat belt. The effects are significant for all trips and all positions in the car.

Reasons for using the seat belt

The respondents were given several reasons for using the seat belt. For each reason they were asked to indicate how important it is for themselves. The scores are shown in table 14.

Table 14. Perception of reasons for using the seat belt (percentages).

	Obs. behaviour	Own safety	Risk of penalty	Obli-gatory	Social Norm	In car warning sign	Habit	Other
Front seat	Driver-No seat belt	63	15	11	2	0	7	2
	Driver-Seat belt	80	3	4	0	1	11	1
	Passenger-Seat belt	80	7	3	1	1	9	0
Back seat	Driver-No seat belt	66	4	16	3	0	8	2
	Driver-Seat belt	75	9	9	1	0	5	1
	Passenger-Seat belt	73	12	5	1	1	7	1

Table 14 shows that own safety' is the most mentioned reason for using the seat belt, 6 to 8 respondents rank this reason first. Other reasons (obligation, risk of penalty and habit) are not a very frequently mentioned reason. The table also shows that non-users less often mention 'my own safety' as reason for wearing the seat belt in the front and the back seat. The difference between users and non-users is about 10-15%. For users the fact that seat belt wearing is obligatory is a much more important reason when compared with non-users.

Opinions about seat belt use

The questionnaire contained questions measuring their attitudes, norms and own behaviour concerning seat belt usage.

Table 15. Opinions about seat belt use: mean values.

	Driver without seatbelt	Driver with seatbelt	Passenger with seatbelt
Lower probability of injury with seat belt on	1.6	1.3	1.3
I feel that something is missing when I do not use the seat belt	2.3	1.7	1.7
I feel safe with the seat belt on	2.0	1.5	1.6
I feel uncomfortable without the seat belt on	3.6	3.9	3.7
I feel annoyed when others do not use the belt	3.0	2.7	2.5
I put the seat belt on without thinking about it	2.2	1.5	1.5
I always check whether all passengers use seat belt	2.2	1.8	1.8

Note. Mean values - 1=strongly agree, 5=strongly disagree.

The statements presented in Table 15 represent those which are favourable towards the use of seat belt. The mean values show that driver who were observed not using the seatbelt would not agree with the statements as much as the other. In all groups it was the statement about injury which they agreed most with and the one about comfort they agreed the least with.

Table 16. Opinions on seat belt use, differences between drivers with seat belt and drivers without seat belt during observation.

Variable	Observed behaviour	M	SD	t(p)	(d)
Lower probability of injury with seat belt on	Driver-No seat belt	1.64	0.946	2.736**	0,8
	Driver-Seat belt	1.28	0.537		
I feel a miss something when I do not use the seat belt	Driver-No seat belt	2.33	1.194	3.632**	1,0
	Driver-Seat belt	1.71	0.958		
I always check whether all passengers use belt	Driver-No seat belt	2.19	1.093	3.288**	0,1
	Driver-Seat belt	1.76	0.928		
I feel save with the seat belt on	Driver-No seat belt	2.04	1.252	3.068**	0,9
	Driver-Seat belt	1.5	0.807		
I put the belt on without thinking (automatic)	Driver-No seat belt	2.21	1.22	4.289**	1,2
	Driver-Seat belt	1.48	0.836		
I feel uncomfortable without seat belt on	Driver-No seat belt	3.59	1.216	-1.801	-0,1
	Driver-Seat belt	3.89	1.154		
I feel annoyed when others do not use the belt	Driver-No seat belt	2.99	1.176	1.862	0,1
	Driver-Seat belt	2.68	1.151		

Note. Mean values - 1=strongly agree, 5=strongly disagree; ** p<.001.

Table 16 shows that the differences between the groups are significant in all cases except two. Drivers who were observed with and without seat belt feel equal about comfort and their feelings about others if they do not use the belt.

Table 17. Opinions on seat belt use, differences between drivers with seat belt and drivers without seat belt during observation.

	Observed behaviour	M	SD	t(p)	(d)
It is my duty to wear the seat belt	Driver-No seat belt	2.2	1.2	2.359*	0.7
	Driver-Seat belt	1.8	1.0		
No need for seat belt when you drive carefully	Driver-No seat belt	4.3	0.9	-1.565	-0.1
	Driver-Seat belt	4.5	0.8		
I am supposed to use my seat belt always	Driver-No seat belt	1.8	0.9	3.298**	0.9
	Driver-Seat belt	1.4	0.7		
It is uncomfortable without seat belt	Driver-No seat belt	2.9	1.3	5.184**	1.4
	Driver-Seat belt	1.9	1.1		
I use the seat belt because all my relatives do so	Driver-No seat belt	4.1	0.9	0.262	0.0
	Driver-Seat belt	4.0	1.0		
Seat belt use is self-evident for me	Driver-No seat belt	2.2	1.2	4.417**	1.2
	Driver-Seat belt	1.4	0.8		
Short trips can be done without seat belt	Driver-No seat belt	3.9	1.1	-3.929**	-1.1
	Driver-Seat belt	4.5	0.8		

Note. Mean values - strongly agree=1, strongly disagree=5; ** p<.001; * p<.05.

The results show that on 5 out of the 7 statements the differences are significant between users and non-users. It is also remarkable that most respondents disagree with the statement that short trips can be done without wearing the seat belt. Paragraph 3.3.2 (risk perception) showed that many respondents think non-use is less dangerous on short trips than on long distance trips. Non-users appear to feel less peer pressure than users.

Attitude towards the obligation to use the seat belt

In The Netherlands seat belt use by drivers and front passengers is compulsory since 1975; for rear passengers it is compulsory since 1990. Compliance with the standing regulation concerning seat belt use is one of the priorities of Dutch road safety policy and of police enforcement.

To get insight in the level of acceptance the respondents have been asked for their opinion about the obligation to use the seat belt and if this is the same regardless if it refers to the front seat or the back seat. The results are shown in the following tables.

Table 18. Opinion about the obligation to use the seat belt by the driver, front and rear passengers (percentages).

	Observed behaviour	Completely agree	Agree	Neutral	Disagree	Completely disagree
Driver	Driver - No seat belt	63	23	8	7	0
	Driver - Seat belt	79	15	3	2	1
	Passenger - Seat belt	80	15	2	2	1
Front seat	Driver - No seat belt	61	24	11	5	0
	Driver - Seat belt	78	16	3	2	1
	Passenger - Seat belt	78	17	3	2	1
Back seat	Driver - No seat belt	39	37	15	10	0
	Driver - Seat belt	54	23	15	6	2
	Passenger - Seat belt	56	23	13	5	2

Table 18 shows that most of the respondent, regardless if they themselves was observed to use the belt or not, strongly agreed that driver's should be obliged to wear the seat belt. This is then followed by the front seat and then the back seat. Amongst drivers who were not wearing their own seat belt only 39% argued that passengers in back seat should have to wear the belt.

Table 19. Opinions on the obligation of seat belt use, differences between drivers with seat belt and drivers without seat belt during observation.

Variable	Observed behaviour	M	SD	t(p)	(d)
Obligation for driver	Driver without seat belt	1.6	0.9	2.154*	-0.6
	Driver with seat belt	1.3	0.7		
Obligation for front passenger	Driver without seat belt	1.6	0.9	2.164*	-0.6
	Driver with seat belt	1.3	0.7		
Obligation for back passenger	Driver without seat belt	1.9	1.0	1.098	0.0
	Driver with seat belt	1.8	1.0		

** p<.001; * p<.05; 1=strongly agree, 5=strongly disagree.

The results show that there is a significant difference between users and non-users regarding their views about the obligation for drivers and front passengers to wear seat belt. When compared with users non-users are less in favour of that seat belt usage should be obligatory. Although the usage of seat belt for drivers and front seat passengers is compulsory since 1975, there still appears to be a lack of acceptance among non-users towards this legislation. However, it must be acknowledged that the group of non-users are relatively small (about 5% of drivers and front passengers and some 20% of rear passengers).

Most of these non-users seem to be not susceptible to arguments used in public communication about the importance of seat belt use. The expected effect of communication efforts to convince this small minority is low. More effect can be expected of enforcement and severe sanctions. With regard to the same rule for passengers in the back seat no difference between the two groups was found.

Self-estimated chance of being fined by the police

The seat belt campaign is a so-called integrated campaign, operated with the 'stick and carrot'-principle. During the campaign period enforcement on seat belt use was combined with mass media communication on the subject, on the national and regional level. The campaign was prepared and executed in close cooperation with the 25 different regional police authorities. During the campaign period the police intensified their regular enforcement on seat belt use, referring to the campaign message and materials. The public has been broadly informed about the intensified enforcement of seat belt usage and the fines for violation of the existing seat belt regulation.

Because enforcement is an important element in the campaign, its influence on the inclination of car occupants to use the seat belt was measured. This was done by asking the respondents to estimate the chance of being caught and fined by the police for non-use of the seat belt. The results are shown in the next tables.

Table 20. Attitudes towards police enforcement of seat belt use (percentages).

	Observed behaviour	M	Meaningful	Not very meaningful	Absolutely not meaningful
Driver	Driver - No seat belt	30	54	14	2
	Driver - Seat belt	46	40	10	4
	Passenger - Seat belt	53	40	6	2
Front seat	Driver - No seat belt	32	53	14	2
	Driver - Seat belt	44	42	10	4
	Passenger - Seat belt	49	42	6	2
Back seat	Driver - No seat belt	17	51	28	4
	Driver - Seat belt	30	41	22	7
	Passenger - Seat belt	35	44	18	4

Table 20 shows that about half of the passengers who were wearing the seat belt themselves regarded police enforcement to be very meaningful if it applied to front seat passengers and drivers. The results also show that relatively few would argue that it was absolutely not meaningful.

Table 21. Self-reported probability of getting a fine for non-use of the seat belt, differences between drivers with seat belt and drivers without seat belt during observation.

Variable	Observed behaviour	M	SD	t(p)	(d)
Driver	Driver without seat belt	2.6	1.1	0.014	0.0
	Driver with seat belt	2.6	1.1		
Front passenger	Driver without seat belt	2.9	1.1	0.462	0.0
	Driver with seat belt	2.8	1.1		
Back passenger	Driver without seat belt	3.7	1.0	0.632	0.0
	Driver with seat belt	3.7	1.0		

Note. Mean values - 1= very high probability; 5= very small probability.

Table 21 shows that with regard to the estimated chance of being fined for not using the seat belt, there are no significant differences between seat belt users and non-users. The chance of being fined for not wearing the seat belt in the back seat is estimated as less likely when compared with the front seat.

Table 22. Attitudes towards police enforcement of seat belt use, differences between driver with seat belt and driver without seat belt.

Variable	Observed behaviour	M	SD	t(p)	(d)
Driver	Driver without seat belt	1.9	0.7	1.706	0.5
	Driver with seat belt	1.7	0.8		
Front passenger	Driver without seat belt	1.9	0.7	1.169	0.1
	Driver with seat belt	1.7	0.8		
Back passenger	Driver without seat belt	2.2	0.8	1.144	0.0
	Driver with seat belt	2.1	0.9		

Note. Mean values - 1= very meaningful; 4= absolutely not meaningful.

The results presented in Table 22 show that the differences between the two groups were not significant.

Table 23. Attitudes towards police enforcement of seat belt use, differences between driver with seat belt and passenger with seat belt.

Variable	Observed behaviour	M	SD	t(p)	(D)
Driver	Driver with seat belt	1.7	0.783	2.406*	0.1
	Passenger with seat belt	1.58	0.706		
Front passenger	Driver with seat belt	1.73	0.781	2.137*	0.1
	Passenger with seat belt	1.62	0.71		
Back passenger	Driver with seat belt	2.05	0.887	2.631**	0.1
	Passenger with seat belt	1.89	0.812		

Note. Mean values - 1= very meaningful; 4= absolutely not meaningful; ** p<.001; * p<.05.

The results show that the differences between users and non-users were significant with regard to how meaningful enforcement of seat belt usage was. Non-users argued that enforcement targeting drivers were less meaningful than users. All car occupants consider enforcement of seat belt use in the back seats as less meaningful than enforcement of seat belt use by drivers and front seat passengers.

Discussion

This report contains the results of the evaluation research on the effects of the Dutch seat belt campaign 2008. This campaign ran from 13 March till 13 June 2008. The campaign was an integrated combination of national mass media communication, supporting local and regional communication (mass media and personal communication) and enforcement on seat belt use. The national campaign was funded and coordinated by the Ministry of Transport. In the development and execution of the campaign the Ministry worked together with regional authorities, police forces, the Road Safety Association VVN and the Road Users Association ANWB.

The target group of the campaign consisted of all car occupants: car drivers, front passengers and rear passengers. Because belt use in the back seats was still lagging behind belt use by drivers and front passengers, special attention was paid to rear passengers. The message focuses on habit formation and habit consolidation. The slogan was: 'Simply put on your seat belt, also in the back seats'. This thematic slogan was followed by the general pay-off which is operated in all Dutch road safety communication: 'The way to get home safely'.

The general policy aim of the campaign was to contribute to compliance with the legal obligation to use the seat belt on all positions in person cars. Specific campaign objectives were based on the results of the roadside survey held in the second quarter of 2007. This survey showed that observed seat belt use by drivers and front passengers were already at a relatively high level: 92% for drivers and 89% for front passengers. For rear passengers there seemed to be room for improvement. The observed behaviour in 2007 for this group was 65%.

For the 2008 campaign the following objectives have been stated:

- At least maintenance of the 2007 level of observed seat belt use by drivers (92%) and front passengers (89%).
- Significant improvement - at least with 3% - of observed seat belt use by rear passengers, compared to 2007 (65%).

The main purpose of the evaluation research was to establish whether the stated objectives of the 2008 campaign have been realised. This was measured by observing actual behaviour in a nationwide roadside survey, which is representative for the population of car occupants. The total number of observations realised was 31.555, of which half before the campaign and half after the campaign. The majority of those observed were drivers (81%); 15% were front passengers and 4% rear passengers.

The main result of the observation study is that the stated objectives for the improvement of seat belt use have been realised for all car occupants. It is remarkable that the observed use in the pre-measurement was already higher than in the 2007 measurement, on which the objectives were based. This can be the result of permanent attention paid to seat belt use in communication and enforcement.

The results showed that the observed seat belt usage by all car occupants was higher after the campaign than before the campaign. For drivers and front passengers the increase was significant (+1.5% and +2.3%), for rear passengers the increase was nearly significant (+4.2%). Taking all car occupants together the difference between the pre- and after-measurement was 1.8%. Because 1% more seat belt use is equal to 3 lives saved, this could mean the campaign has contributed to saving the lives of 6 car occupants.

The improvement of seat belt use between the pre- and after-measurement indicates the 2008 campaign had an effect on actual behaviour. To which extent there was a causal relationship between the campaign efforts and the increase of seat belt use is difficult to determine. The observation study itself does not provide information which factors explain the behavioural choices of car occupants and which influence the campaign activities have had on their behaviour and attitudes. To get more insight in these aspects the observation study was combined with a questionnaire inquiry among the observed car occupants. In the analysis a direct link could be made between actually observed behaviour of an individual in the roadside survey (use or non-use) and his/her answers in the questionnaire. The inquiry contained questions on attitudes, risk perception and self-reported behaviour. Also reach and likeability of the campaign were measured.

2440 persons filled in the internet questionnaire. The total number of respondents was divided as follows between the two measurements: before the campaign 935 (38.3%) and after 1505 (61.7%). Almost all (97,6%) of the 2440 respondents had the seat belt on during the observation. 87.6% of the belt users were driver and 10.0% were passengers. Of the 2.3% non-using respondents 2.0% were drivers and 0.3% passengers.

On the data of the inquiry the following analyses have been executed:

- Reach and appreciation of the campaign
- Differences between the pre- and after-measurement
- Differences between seat belt users and non-users

The reach and appreciation of the campaign were high. After the campaign 77% of the respondents said they had seen the campaign (aided recall). Evaluation research of the National Communication Service showed an average reach of 86% during the whole campaign; near the end of the mass media activities 93% indicated to have seen at least one of the campaign materials. The large majority of the respondents (80%) considered the campaign appealing; only 16% did not feel appealed by the campaign. The relatively high level of appreciation was reflected in the report mark given by the respondents. On a scale from 1 to 10 the average report mark was 7.1.

Looking at beliefs, attitudes and self reported behaviour the analysis showed no significant differences between the pre- and after-measurement except for the importance of using the belt when they sit in the back seat. After the campaign this was regarded as more important than before. It could therefore be argued that the campaign was more successful in changing attitudes towards rear seat usage than front seat usage. This could be because one of the posters displayed a women sitting in the back seat or that the respondents even before the campaign regarded front seat usage as very important.

The analysis then concentrated on the differences between people who had been observed to either use or not use the seat belt. With regard to observed usage both drivers and passengers were included but since too few passengers did not use the belt this group had to be excluded. The results can be summarised as follows:

- *Risk perception*: Regarding short trips and the back seats drivers without seat belt (during observation) rate non-use of the seat belt as less dangerous than drivers and passengers who had the seat belt on during observation.
- *Self reported behaviour*: Non-users report that they wear the seat belt less often than drivers and passengers who had the seat belt on during observation. This effect is significant for all trip lengths and for all positions in the car.
- *Perceived importance of seat belt use*: Non-users believe that seat belt use is less important than those who wear the seat belt. The effects are significant for all trip lengths and for all positions in the car.
- *Reasons for using the seat belt*: 'Own safety' is the most mentioned reason for using the seat belt. 6 to 8 respondents rank this reason first. Other reasons (obligation, risk of penalty and habit) come far behind the reason 'own safety'. Non-users less often mention 'my own safety' as reason for wearing the seat belt on the front and the back seat. For non-users not getting fined is more important than for users.
- *Attitude towards the obligation to use the seat belt*: Non-users are more likely to disagree with the obligation than users. Although the seat belt for drivers and front passengers is compulsory since 1975, there still appears to be a lack of acceptance among non-users towards this legislation. However it should be considered that the group of non-users is rather small. Both users and non-users are less likely to agree with compulsory seat belt use in the back seat. This proves consistent with the lower level of risk perception and the perceived importance towards seat belt use by rear passengers.
- *Self-estimated chance of being fined*: The chance of being fined for not wearing the seat belt in the back seat is estimated much lower than for non-use by driver and front passenger. This is equal for users and non-users.
- *Opinion on enforcement of seat belt use*: Non-users think police controls targeting seat belt use by drivers less meaningful than those who use the seat belt. All car occupants consider enforcement of seat belt use in the back seats less meaningful than enforcement of seat belt use by drivers and front passengers. This seems consistent with the results on risk perception and the perceived importance regarding seat belt use in the back seats.

Recommendations

Based on the outcome of this evaluation report the following recommendations can be made:

- Because seat belt use is directly connected to the number of victims - 1% less or more use makes a difference of 3 deaths and 20 severely injured each year - it is advisable to continue seat belt campaigns. The current approach integrating mass media communication and enforcement is recommended.
- For the next years the main objective can be maintenance of the existing high level of behaviour and attitudes regarding seat belt use. By keeping the subject on the agenda of road users a setback can be prevented.
- The innovative evaluation design linking observed and self-reported behaviour produced promising results. It is recommended to improve this evaluation method and apply it to forthcoming road safety campaigns.

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6 Evaluation of a child restraint campaign in Austria

Karin Ausserer, Juliane Haupt and Ralf Risser in cooperation with Matthias Beggiato and Isabella Braguti [1]

Abstract

This report includes the evaluation results of a child restraint campaign in Austria. The campaign consisted of interactive school lessons for pupils aged between 7 and 12 years. This was done in the frame of the Austrian national traffic safety campaign Euchires – *European public awareness campaign on the use of seat belts and child restraint systems*. The aim of the evaluation was to study if children can be influenced by an interactive lesson with respect to their attitudes towards, and behaviour with respect to the use of child restraint seats and seat belts. In addition it was assessed if information materials which were forwarded by the children to the parents have an effect on the parents` attitudes and behaviour with respect to seat belt use and the use of child restraint seats. The evaluation was designed as a before and after study with two experiment groups and one control group. 375 pupils (186 before, 189 after) and 225 adults (127 before, 98 after) were involved. As a method for evaluation semi-standardised questionnaires were used. The evaluation showed that the awareness of the necessity to wear seat belts viz. to use restraint systems in cars is widespread among pupils and parents. 23% of the children who are smaller than 150 cm, however, stated that they are not always buckled-up in the car. Taking part in an interactive lesson seemed to have positive effects on the behaviour of the children. They showed more awareness of the topic after the lesson. Furthermore, fewer excuses for not buckling up, like short distances driven, being in a hurry, etc. were presented by the parents for not buckling up their children, after receiving our information materials. The results of the evaluation indicate that the campaign had positive intended effects on attitudes and behaviour of the target groups. But, most importantly, the evaluation tool that we applied can be considered to yield useful information about the effects of campaigns and related measures.

1 Factum, Austria.

Executive Summary

This report contains the results of an evaluation of one special campaign activity – interactive lessons for pupils aged between 7 and 12 years- in the frame of the Austrian national traffic safety campaign Euchires – European public awareness campaign on the use of seat belts and child restraint systems. The campaign was carried out from March 2006 up until October 2008. The evaluated interactive lessons held in the frame of the campaign took place in April 2008.

The main aim of the evaluation was to test an evaluation tool for traffic safety campaigns which was elaborated in the frame of the European Project CAST – *Campaigns and Awareness Raising Strategies in Traffic Safety*.

The Euchires action in general but also the interactive lessons for pupils were targeted on children aged between 7 and 12 years, as noted above. Parents were indirectly addressed in the campaign. They received information material, which was mainly forwarded by the children. The main aim of the interactive lesson was to make children "safety belt – experts", so that they would be able to correctly use the seat belt, to point out to their parents that they themselves still need a child restraint seat in case they are smaller than 150 cm or to remind parents to fasten their seat belt, also on short trips.

The aim of this evaluation was to explore whether children can be influenced by an interactive lesson with respect to their attitudes towards, and behaviour with respect to the use of child restraint seats and seat belts. In addition, it was assessed if information materials which were forwarded by the children to the parents have an effect on the parents` attitudes and behaviour with respect to seat belt use and the use of child restraint seats.

The evaluation was designed as a 'before and after' study with two quasi-experimental groups and one control group. One quasi-experimental group of the children took part in an interactive school lesson about child restraint seats and seat belts in general. The other quasi-experimental group consisted of pupils of school classes where only information materials were distributed. The control group consisted of pupils who did not receive any additional information but merely filled out the questionnaires. The quasi-experimental groups received information materials which were forwarded to the parents by the children. As method for the evaluation semi-standardised questionnaires were used. The 'before' study took place at the end of March and at the beginning of April 2008 and involved 186 pupils and 127 adults. The 'after' study was carried out in the middle of June 2008 and involved 189 pupils and 98 adults. The participants were asked about the Euchires campaign and about their attitudes and behaviour concerning seat belts and child restraint seats. The samples of the children were paired, whereas the samples of the parents were independent of each other. The average age of the parents was 39 years. The interviewed pupils were between 8 and 12 years old. The gender ratio of the pupils was about fifty-fifty. In the parents survey the female outbalanced the male respondents (72% and 28%).

Results pupils

The results showed that the awareness of wearing seat belts in cars is widespread amongst the pupils. Nearly all pupils thought that it is important to use seat belts in cars and more than 90% stated that they are always "buckled-up" in a car. On short car trips, however, the percentages of those children who say they are always "buckled-up" is only 77%. Approximately the same percentage of pupils stated that their parents never forget to buckle them up correctly, even if they are in a hurry. No significant changes could be found with respect to the different groups.

77% of all pupils smaller than 150cm stated that they always sit in a child restraint seat or on a booster seat, when travelling in a car. This means that 23% of the questioned children are not always safely transported, when travelling by car. There were no significant differences between the different groups or the point in time of questioning. When children travel in other peoples' cars the percentage of those children who are not appropriately secured in the car is even higher. More than 40% are not always sitting in a child restraint seat or on a booster seat. Taking part in an interactive lesson seemed to have a generally positive effect on the behaviour of the children.

The interactive lesson had also an effect on reminding other car passengers of wearing a seat belt, when travelling by car. In the before study 69% of the pupils who took part in an interactive lesson always reminded car passengers when they were not buckled-up to use the seat belt. In the 'after' study the share increased to 87%. More than 50% of the pupils appreciate wearing seat belts or sitting in a child restraint seat. About 10%, however, consider seat belts as inconvenient. The majority of the children were well informed about the minimum size when they are allowed to use ordinary seat belts. Taking part in an interactive lesson increased the knowledge of this legislation.

Results parents

The use of seat belts seems also quite common among parents` respondents. Between 80% and 90% always fasten their seat belt if they sit in the front seats. The seat belt wearing rate in the back seats is lower as only 50% of the parents stated that they always are buckled-up in the rear seats. More than 10% of the respondents are even not aware of the fact that the use of seat belts is obligatory in the back of a car. Receiving information material had no significant effect on the seat belt use, however, respondents of the quasi experimental group tended to show better results in the after study than in the before study, whereas the self reported behaviour of the control group did not change. A high percentage of parents (on average 90%) also indicated that it is important to transport children in appropriate child restraint seats if travelling by car and that children who are correctly secured in cars are much safer in case of an accident.

Short distance car trips, stress and fatigue influenced the seat belt wearing rate and child restraint seat use in a negative way was also the result of the pupils study have shown. Receiving information material seems to influence the parents in a positive way, to be reminded that it is also important that children are sitting on booster seat e.g. on short car trips. Future traffic safety campaign on seat belt use should focus on these issues.

It could therefore be concluded that only a few significant results were received in this study. This might be due to the so called “ceiling effect”. Quite a lot of adults and pupils showed already the wished for behaviour, with respect to wearing seat belts and child restraint seat. There are, however, tendencies which indicate that those parents and children who received information materials or participated in an interactive school lesson showed more awareness of the topic than parents and children who did not receive any information.

Description of the Euchires campaign

In the first part of this report the original traffic safety campaign Euchires will be described in more detail. This is followed by evaluation design and the results of the evaluation.
The European Project Euchires is based on the “Armadillo” campaign launched in 2003 in the Netherlands. This successful campaign inspired organisations from other countries to implement the same kind of approach to promote the use of seat belts. The first Euchires campaigns took place in 2005. Austria joined the Euchires project in 2006. Euchires 1 took place from March 2006 till September 2007 and Euchires 2 from October 2007 till July 2008. The reason for taking part in the project was that in a statistical accident analysis it was pointed out that the predominant of children who were killed as car passengers did not wear any seat belt or were not appropriately buckled-up. In addition traffic observations in 2005 showed that 9% of the children did not sit in child restrain seats in the front of the car, 17% in the back of the car and 21% of those who were buckled-up, did not use the seat belts correctly (KFV, 2005).

Stakeholders
The Austrian Project Euchires was financed by the European Union and the Austrian Ministry of Transport, Innovation and Technology (BMVIT). It was supported by the Ministry of the Interior and by the Austrian City League. INFAR-Wien – Institute for driver-training and driver-rehabilitation in co-operation with FACTUM Chaloupka & Risser OHG - were responsible for setting up and conducting the campaign. The Viennese nursery organisation Friends of Children, different schools in Austria, and ‘Integration Vienna Fund’ collaborated with the campaign team.

Objectives of the EUCHIRES campaign
The main aims of the EUCHIRES campaign were:

- to increase the knowledge of how to use child-restraint seats correctly;
- to encourage children to “make themselves safe” when going by car
- to change behaviour with respect to the use of seat belts; wearing seat belt and the use of child restraint seats should become a routine from early childhood on;
- to reduce the number of traffic fatalities due to lacking or incorrect seat-belt use.

Campaign Activities
Euchires is an integrated campaign which was based on three main activities:

1. Awareness and information campaign through various media

- Posters
- Billboards
- Leaflets
- Newspapers, articles
- Internet (www.gordy.at)

Leaflets and the internet performance were offered in five different languages (German, Turkish, Bosnian, Croatian, Serbian) in order not to address only German speaking people.

2. Various activities

- Direct communication
- Interactive school lessons
- Activities together with car retailers
- Activities in parks
- Activities at special events for children

3. Enforcement
Police enforcement with regard to the usage of seat belts and child restraints was increased. Car drivers were in principle not fined for infringements but only forewarned. They received campaign information materials.

Theme and slogan
The theme of the Euchires campaign was the use of seat belts with special focus on child restraint seats. In Austria the campaign team decided after several pre-tests for the slogan “Angeschnallt statt durchgeknallt.” (buckled-up instead of being foolish). The children were addressed in a positive and joyful way. Negative emotions in the messages were avoided. The mascot of the campaign was the armadillo “Gordy”. In case of danger the armadillo rolls himself together in his shell and is safe. The message is that children are also able to make themselves safer, when going by car, by buckling up correctly.

Figure 1. The Armadillo.

Pre-testing of the campaign message
The campaign message was not specially pre-tested in Austria. As noted above the campaign is based on a Dutch campaign from 2003. In 2008 the EUCHIRES campaign was carried out in 13 different European countries.

1. Initiator: Ministry of Transport (the Netherlands) 2003
2. Transport Research Centre (Czech Republic)
3. Slovene Road Safety Council (Slovenia)
4. Prévention Routière Portugaise, PRP (Portugal)
5. Finnish Central organization for Traffic Safety Liikenneturva (Finland)
6. Deutscher Verkehrssicherheitsrat DVR (Germany)
7. Swedish National Road and Transport Research Institute VTI (Sweden)
8. Fundacio Catalana de Seguretat Viaria (FCSV, Race) (Spain)
9. Motor Transport Institute (Poland)
10. Belgian Road Safety Institute (Belgium)
11. Societá Italiana di Psicologia della Sicurezza Viaria (SipSivi, Italia)
12. INFAR Wien & FACTUM Chaloupka & Risser OHG (Austria)
13. Latvia

Target group
The main target group of the campaign was to be the child aged between 7 and 12 years. In this age group there is usually still no strong negative peer group influence, so that it is more likely that they rather easily perceive and accept information and messages of campaigns.

Parents received information materials at special events, but were mainly addressed indirectly.

Children were encouraged to remind adults to fasten their seat belts, to buckle them up correctly and to make themselves sit in appropriate child restraint seats.

In order to get relevant information of the target group the following analyses were carried out:

- *Talks with experts in the field of child restraint seat*
  Peter Jahn, a specialist for restraint systems in Austria, was not only interviewed but also involved in the project at various occasions. From the “Gordy” web page there is a link to Peter Jahn`s web page (www.autokinder¬sitz.at) and vice versa.
- *Talks with experts in the field of migration*
  The special needs of children with migration background were explored.
- *Secondary analysis of official demographic data*
  The analysis helped to identify districts with a high share of migrants. This in-formation was necessary in order to carry out targeted actions for migrants.

Scope of the campaign
Euchires Austria is a national campaign, which was implemented in the entire country. The majority of the direct communication measures, however, were carried out in Vienna, the capital of Austria.

Timing and duration of the campaign
The Euchires campaign can be seen as part of a long term strategy of the Austrian Ministry of Transport, Technology and Innovation in order to increase the share of people who use seat belts. In contrast to previous seat belt campaigns, where negative consequences of non-seat-belt use were shown, Euchires concentrated on positive emotions. The Euchires campaign was split into two parts: Euchires 1 took place from March 2006 to September 2007. In this first period campaign materials were developed, a lot of media work was done, work with the police authority was carried out and some major events were arranged. Euchires 2, which took place from October 2007 till July 2008, concentrated on pupils and teachers.

Table 1. Media channels.

Media channel	Quantity
Internet site	9244 visits (01/2007-06/2008)
TV/radio spots	No official TV and Radio spot, but the campaign was mentioned several times in radio news and in two television broadcasts (“Wien heute”)
Written media channels	130 articles about the project in various Austrian newspapers
Posters	Rolling boards for two weeks in Vienna, Salzburg and Graz Eight Posters in Linz and Salzburg
Distribution of brochures, stickers, gadgets	Approximately 90 000 gordy-gadgets and brochures throughout Austria
Local Events **Vehicle inspection by police** **Lessons in schools** ***Information desks at*:** **Children carnevals** **Fair “Senior aktuell”** **Three day danube-festival in September** **Turklook (“Turkey-Week) in a Viennese Shopping Centre** **“Action days” at car companies** **Events in different Viennese parks**	Appr. 100 throughout Austria Appr. 300 throughout Austria

Production costs

The costs of Euchires 1+2 added up to 462.000 Euro, see Table 2.

Table 2. Campaign Costs.

Cost category	costs
Personnel costs (FACTUM + INFAR, Evaluation + Audit)	225.000 €
Travel costs	12.000 €
Campaign materials (gadgets, posters, etc.)	156.000 €
Subcontracting: song producer, web design, layout folder and posters	36.000 €
Indirect costs	33.000 €
Total	**462.000 €**

Objective of the evaluation study

The main purpose of the present evaluation was to test the evaluation tool which was elaborated in the frame of the CAST-Project. Due to time and budget restrictions it was not possible to evaluate the whole Euchires campaign. In agreement with the campaign manager one special campaign activity – a set of lessons in schools – was chosen for the evaluation, as this was one main activity in Euchires 2.

The interventions in school included a one hour interactive lesson for pupils and the distribution of information materials which should be forwarded to the parents. The aim of the evaluation was to check whether children can be influenced by an interactive lesson[1] with respect to their attitudes and behaviour as regards the use of child restraint seats and seat belts in general. In addition it was assessed if information materials which were forwarded by the children to the parents have an effect on the parents` attitudes and behaviour with respect to seat belt use and the use of child restraint seats.

Stakeholders relevant for the evaluation

The evaluation of the pupils took place in school. For that reason it was necessary to ask for several allowances.

- The city school board Vienna confirmed that FACTUM OHG was allowed to carry out an evaluation in three schools of Vienna. The head of the city school board was not directly involved in developing questions, but the questionnaire had to be accepted by the city school board. A requirement for the confirmation was to affirm that at the end of the project a short summary of the evaluation results were provided.
- The heads of three Viennese schools and three teachers in each school had to confirm that they were willing to carry out the evaluation in their school.
- The parents of the participating pupils had to confirm that their child was allowed to take part in the evaluation.

Evaluation budget

The budget for the evaluation is divided into travel costs and overhead costs, see Table 3.

Table 3. Evaluation Costs.

Cost category	Costs
Personnel costs	21.500 €
Travel costs	4.000 €
Overhead cost	18 200 €
Total	**43.700 €**

Use of a-priori knowledge

The Euchires campaign was carried out over several years. The Austrian campaign was based on the knowledge gained in the previous campaigns. Every Euchires campaign has to be evaluated. A standardised questionnaire, which has to be translated into the language of the mother tongue is provided for the evaluation from the co-ordinator of the Euchires -Project. As already pointed out the present evaluation is an external evaluation of one single campaign activity.

1 See appendix for the ”procedures ”.

Method

Design

The evaluation was designed as a before and after study with two experiment groups and one control group. It had a quasi-experimental design. The subjects were not randomly allocated to different groups. Pupils of three different classes and schools had to fill in a standardised questionnaire one week before the intervention. The questionnaire was filled in the frame of a school lesson under the supervision of a competent person. The semi-standardised questionnaires for the parents were forwarded by the pupils. The after study took place two months later. One experimental group consisted of pupils and parents of three school classes where an interactive lesson took place and information material was distributed. The second experimental group received only information materials. The control group did not receive any additional information but merely filled out the questionnaires (see table 4).

The samples of the children were paired, whereas the samples of the parents were different. The before study took place at the end of March and at the beginning of April 2008. The after study was carried out in the middle of June 2008.

Table 4. Evaluation Design.

Group	Target Group	Description of Activities	Data collection technique	Design	Subject	Sample Size
Quasi-Experimental Group I	pupils	Direct communication by an interactive one hour lesson in April 2008 Distribution of information materials	Standardised questionnaire to be filled in independently. The questionnaires was filled in under the supervision of a competent person in the frame of a lesson	One week before the intervention in April 2008 2 months after the intervention in June 2008	Before: to measure the current knowledge of the campaign, attitudes and self reported behaviour with respect to seat belt use After: to measure changes in attitudes and self reported behaviour	Pupils of three school classes
	parents	Parents receive information materials through the pupils	Standardised questionnaire to be filled in independently. The questionnaires were forwarded to the parents by the children. The parents returned the questionnaires to the teachers.	One week before the intervention 2 months after the intervention	Before: to measure the current knowledge of the campaign, attitudes and self reported behaviour with respect to seat belt use After: to measure if attitudes and self reported behaviour had changed	Parents of three school classes
Group	**Target Group**	**Description of Activities**	**Data collection technique**	**Design**	**Subject**	**Sample Size**
Quasi-Experimental Group II	pupils	Distribution of information materials in April 2008	Standardised questionnaire to be filled in independently. The questionnaires was filled in under the supervision of a competent person in the frame of a lesson	Distribution of materials in April 2008	Before: to measure knowledge of the campaign, attitudes and self-reported behaviour with respect to seat belt use After: to measure if attitudes and self-reported behaviour had changed	Pupils of three school classes
	parents	Parents receive information materials through the pupils	Standardised questionnaire to be filled in independently. The questionnaires were forwarded to the parents by the children. The parents returned the questionnaires to the teachers.	One week before the intervention 2 months after the intervention	Before: to measure the current knowledge of the campaign, attitudes and self reported behaviour with respect to seat belt use After: to measure if attitudes and self reported behaviour had changed	Parents of three school classes
Control Group	pupils	No intervention	Standardised questionnaire to be filled in independently. The questionnaires was filled in under the supervision of a competent person in the frame of a lesson	Before questionnaire in March 2008 After questionnaire in June 2008	Before: knowledge of the campaign, attitudes and behaviour After: to compare the results with the results of the experimental group	Pupils of three school classes
	parents	No intervention	Standardised questionnaire to be filled in independently. The children forwarded the questionnaire to the parents. The parents returned the questionnaire to the teachers	Before questionnaire in March 2008 After questionnaire in June 2008	Before: knowledge of the campaign, attitudes and behaviour After: to compare the results with the results of the experimental group	Parents of three school classes

Participants

Pupils

Altogether 187 pupils filled in the questionnaire in the before study and 189 pupils in the after study. The following table 5 illustrates how these pupils are distributed to the different groups in the before and after study. The gender ratio of the pupils was about fifty-fifty.

Table 5. Distribution of the sample across the groups and across genders– before and after.

Group	Before Study						After Study					
	Frequency			Percent			Frequency			Percent		
	Girls	*Boys*	*Total*	*Girls*	*Boys*	*Total*	*Girls*	*Boys*	*Total*	*Girls*	*Boys*	*Total*
Control group: *Pupils without materials*	30	34	**64**	32,7	35,8	34,2	27	34	**61**	29,3	35,5	32,3
Quasi-experimental group I *Pupils who received information materials*	29	34	**63**	31,5	35,8	33,7	28	32	**60**	30,4	33,5	31,7
Quasi-experimental group II *Pupils who took part in an interactive lesson*	33	27	**60**	35,8	28,4	32,1	37	31	**68**	40,3	32	36
Total	**92**	**95**	**187**	**100**	**100**	**100**	**92**	**97**	**189**	**100**	**100**	**100**

The interviewed pupils were between 8 and 12 years old.

Table 6. Age statistics across the groups.

Group	Before Study					After Study				
	N	*Min*	*Max*	*Mean*	*SD**	*N*	*Min*	*Max*	*Mean*	*SD*
Control group	64	8	12	9,05	,950	57	8	12	9,26	,856
Quasi-experimental group I	63	8	11	9,40	,685	50	8	11	9,62	,602
Quasi-experimental group II	60	8	10	9,13	,566	55	8	11	9,35	,673

*SD = Standard Deviation.

The children were asked how they usually come to school. About half of the pupils walk to school, one fifth use public transport and slightly more than one quarter of the children are brought to school by car. Other transport modes like the bike, scooter etc. play a minor role. Figure 2 illustrates the modal split of all pupils of the before study There were hardly any differences between the before and after data. Somewhat fewer pupils were brought by car and more children walked to school in the after study.

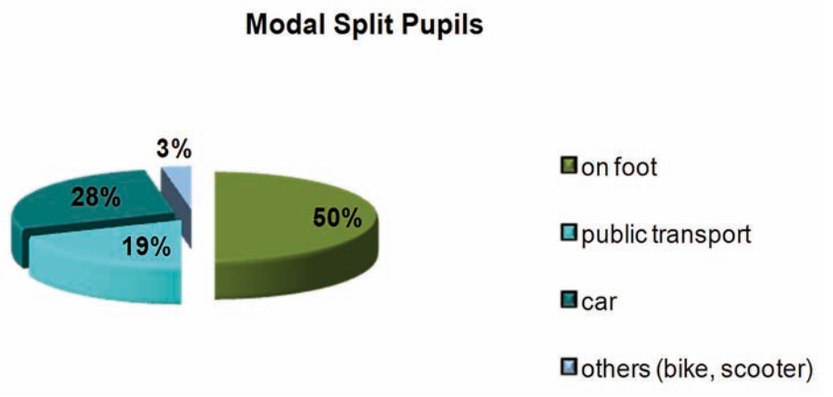

Figure 2. Modal Split Pupils.

Parents

Around 360 questionnaires (180 in the before and 180 in the after study) were forwarded to the parents by the pupils. 225 parents returned the filled in questionnaires, 127 in the before and 98 in the after study. Table 7 describes the parents' *gender* across the four groups. The female outbalanced the male respondents in the quasi experimental and in the control group.

Table 7. Participants gender across the four groups.

Group		Frequency	Percent
Quasi experiment before	Female	31	69
	Male	14	31
Control before	Female	56	72
	Male	22	28
Quasi experiment after	Female	22	67
	Male	11	33
Control after	Female	46	77
	Male	14	33

The parents were between 25 and 54 years old. Table 8 illustrates the age statistics across the four groups.

Table 8. Age Distribution.

Group	N	Min	Max	Mean	SD*
Quasi experiment before	76	28	51	38,66	4,955
Control before	43	26	53	38,81	6,185
Quasi experiment after	57	31	53	29,42	4,939
Control after	30	25	54	40,17	6,232

*SD = Standard Deviation.

The majority of the participants have a driving licence, whereas the share of those without driving licence is higher in the control group.

Table 9. Driving licence ownership.

Group	Yes		No	
	F	P**	F	P
Quasi experiment before	59	94	4	6
Control before	25	78	7	23
Quasi experiment after	73	92	6	8
Control after	39	87	6	13

Note. F=frequency; **p <=.001.

The yearly number of car kilometres driven by the participants shows a small difference between the two groups. On average 40% of the participants drive around 10000 km per year.

Table 10. Yearly mileage.

Group	Before Study				After Study			
	Up to 10000 km	*Up to 20000 km*	*Over 20000 km*	*Do not drive myself*	*Up to 10000 km*	*Up to 20000 km*	*Over 20000 km*	*Do not drive myself*
Quasi-experimental group	49%	28%	16%	8%	53%	26%	16%	5%
Control group	39%	28%	20%	13%	33%	26%	22%	19%

Procedure

The method used for the evaluation was a semi-standardised questionnaire. The questionnaire of the pupils and parents was based on the evaluation tool which was elaborated in the frame of the CAST-project. The theoretical model behind the questionnaire is the model by Ajzen and Fishbein (1980) the Theory of planned behaviour. The questionnaires of the pupils and parents consisted of four parts:

- Demographic questions (gender, age, modal split)
- Knowledge questions
- Questions referring to the campaign
- Questions referring to self-reported behaviour, beliefs, norms, intentions

In case of scaled questions it was recommended by the CAST-team to use a uni-polar scale from 1-7. Pre-tests, however, had shown that the children were confused by the amount of answer categories. After the consultation of a teacher who shared the opinion that children in that age group are able to cope with four answer categories only, the answer scales in the pupils' questionnaires were reduced to four. The questionnaire presented to parents and children were not identical and will therefore be dealt with separately.

Questionnaire – Parents
As indicator for the reliability of the different constructs in terms of internal consistency the coefficient Cronbach alpha was calculated. The Cronbach alpha coefficient of a scale has to be 0.70 and above to be acceptable.

Self-reported behaviour
The construct "Self Reported Behaviour" (SRB) contained seven items. These items were:

"I wear a seat belt, if I sit in front of a car"

"I wear a seat belt, if I sit in the back of a car"

"Children are buckled-up, when travelling in my car"

"Before I start the car I check if the children are buckled-up correctly"

"If a co-driver in the front of the car does not use the seat belt, I remind him/her to buckle-up"

"If a passenger in the back of the car does not use the seat belt, I remind him/her to buckle-up"

"Even if some passengers are not buckled-up, I use a seat belt"

All the answers were measured on a 7 point scale, 1 (=never) to 7 (= always). The analysis of reliability resulted in a Cronbach`s Alpha of .72. Thus, the various items were combined to form an index of SRB.

Behavioural Beliefs:
Behavioural beliefs (BB) describe the respondents` positive or negative evaluation of the behaviour. This construct is represented by the following items:

"If I drive a car without wearing a seat belt, I feel unsafe"

"I do not only wear the seat belt to avoid being fined"

"Using a seat belt is not uncomfortable"

"When driving in a car a child is not safe enough if held in someone's arms"

All the answers were measured on a 7 point scale, 1 (=less likely) to 7 (=very likely). A Cronbach`s Alpha of .69 indicated that all four items were representative for the BB-construct. Thus, the BB-index was calculated.

Control Beliefs:
Control beliefs (CB) refer to a persons` perception about their own capability to perform an act which can be based on past experience with behaviour or the experiences of others. In general it captures if the respondent feels confident about the ability to perform the behaviour. Seven items was used to measure the CB construct:

"Would it be more or less likely to use a seat belt if:

I only travel a short distance

I`m in a hurry

I`m tired"

"Wou*ld it be more or less likely to transport children in child restraint seats or booster seats if:*

I only travel a short distance

I`m in a hurry

I`m tired

I transport friend of my child in my car"

All the answers were measured on a 7 point scale, 1 (=less likely) to 7 (=very likely). The Cronbach`s Alpha of 0.88 indicated that the seven items could be combined into one index.

Normative Beliefs (NB):
The Normative Beliefs (NB) deals with the impact of the social environment on behaviour. It is described as the individuals` perception about other people's reaction to them performing or not performing a certain behaviour. The two items of the questionnaire which belong to the construct were:

"My partner thinks that I should wear a seat belt when driving the car"
"My partner thinks I should buckle-up the children when I'm driving the car"

All the answers were measured on a 7 point scale, 1 (=strongly disagree) to 7 (=strongly agree). The results from the Cronbach`s Alpha (.41) indicated that the items should not be combined and they were therefore analyzed separately.

Habits
A habit is a behaviour which has been repeated frequently and gradually receded from consciousness and become increasingly automatic. Habits are represented by two items:

"I always buckle-up when I get into the car"
"My children are used to sit in child restraint seats or on booster seats when driving in a car"

All the answers were measured on a 7 point scale, 1 (=strongly disagree) to 7 (=strongly agree). Due to the low Cronbach`s Alpha (.30) the items were analysed separately.

Perception of risk:
This construct refers to a persons` opinion of how serious or dangerous a condition and its consequences are. Three of the items belong to the "Perception of risk"-construct. These were:

"In the case of an accident child restraint seats or booster seats mitigate the accident consequences for the child"

"It is dangerous not to restrain a child when travelling in a car"

"If I did not wear a seat belt and if an accident happened, the probability of being seriously injured would be very high"

Perception of risk was measured on a scale from 1 (strongly disagree) to 7 (strongly agree). The results from the Cronbach`s Alpha test showed that the items did not measure the same thing (.371). Thus the items were analysed separately.

Questionnaire – Pupils

The questionnaire presented to the pupils was much shorter than the one presented to parents and included statements referring to both themselves and others. A test measuring Cronbach`s Alpha was not conducted since the items were dealt individually and not combined.

Self-reported behaviour
The construct "Self Reported Behaviour" (SRB) contained six items. These items were:

"In a car I'm buckled-up"

"If someone does not wear a seat belt in the car, I remind them"

"If I do not buckle-up my parents will remind me"

"When travelling a short distance I'm buckled-up"

"When I'm travelling in a car with my parents I sit in a child restrain seat or on a booster seat"

"When I'm travelling in a car with other people (e.g. relatives, friends) my parents I sit in a child restrain seat or on a booster seat"

"If my parents do not remind me to buckle-up, then I do not wear a seat belt in the car"

The first six items were measured on a 4 point scale, (1=always; 2=sometimes; 3=rarely; 4=never). The last on a scale from 1 to 3(1=yes; 2=no; 3=I do not know).

Behavioural Beliefs:
Behavioural beliefs were measured by one item:

"Wearing a seat belt is inconvenient"

Behavioural beliefs was measured on a scale from 1 to 4 (1=always; 2=sometimes; 3=rarely; 4=never).

Control Belief:
Control belief was measured by one item:

"If my parents are in a hurry then they tend to forget to buckle me up correctly"

The item was measured on a scale from 1 to 4 (1=always; 2=sometimes; 3=rarely; 4=never).

Risk perception
Risk perception was measured by two items:

> "I only feel safe in a car when I wear a seat belt"
>
> "If I'm not buckled-up and an accident happens, I might be hurt severely"

The two items were measured on a scale from 1 to 3(1=yes; 2=no; 3=I do not know).

Habits
A habit was measured by one item dealing with their friends' behaviour:

> *"My friends always buckle-up when travelling by car"*

The item was measured on a scale from 1 to 4 (1=always; 2=sometimes; 3=rarely; 4=never).

Other questions
Two items were included to measure the opinions of themselves and their parents:

> *"I think it is important to always wear a seat belt when travelling in a car"*
>
> *"My parents believe that I always should wear a seat belt, when travelling by car"*

The items were measured on a scale from 1 to 3 (1=yes; 2=No; 3=I do not know).

Data collection

During the whole Euchires campaign about 300 school classes were visited throughout Austria. In the time of the evaluation only three interactive lessons took place in three different Viennese schools. The sample for the evaluation was defined by the time-frame of the CAST-project. As noted in chapter 2.3.4. in each school three classes of the third and fourth level of education were chosen for the evaluation. The headmasters of the schools decided which classes could take part in the evaluation, by applying the age-group definition formulated by the evaluation team.

Data analysis

The data were analysed in a descriptive (frequencies) and in an inferential way (significant tests, t-tests).

Statistical data analysis - pupils
The sample of the pupils was dependent in the sense that the same pupils were questioned in the before and after study.
The questionnaire consisted of four-step Likert-scale-items ("always", "sometimes", "rarely" and "never"). According to Bortz and Döring (2003) Likert-scale can be treated metrically scaled. Questions with answering-formats which were not scaled in a metric way were analysed in a descriptive way. In order to compare the data at the two points of time a t-test for dependent samples was used. To find any differences between the three groups at the two different moments a MANOVA was calculated. For statistical reasons one item had to be reversed with respect to the polarity: "*If my parents are in a hurry they tend to forget to buckle me up correctly*" changed into "*if my parents are in a hurry they don`t forget to buckle me up correctly*".

Statistical data analysis of the parents
The parents were asked twice to fill in a questionnaire. The sample of the pupils was paired, the parents sample was independent, as different parents filled in the questionnaire at two points in time. This means the data of the parents` questionnaires could not be treated as dependent samples. The Likert-scale that was used for the parents consisted of a continuum from "never" (=1) to "always" (=7) or "strongly disagree" (=1) to "strongly agree" (=7).
Five of the analysed items had to be reversed in their polarity. The following items were reversed leading to a new denotation:

> *Original item: "I only wear the seat belt to avoid being fined"*
>
> *Reversed: "I do not only wear the seat belt to avoid being fined"*
>
> *Original item: "Using a seat belt is not comfortable"*
>
> *Reversed: "Using a seat belt is not uncomfortable"*
>
> *Original item: "When driving in a car a child is safe enough if held in someone's arms"*
>
> *Reversed: "When driving in a car a child is not safe enough if held in someone's arms"*
>
> *Original item: "Sometimes I'm just too lazy to wear my seat belt"*
>
> *Reversed: "I'm never too lazy to wear my seat belt"*
>
> *Original item: "If some passengers are not buckled-up, I also do not use a seat belt"*
>
> *Reverse: "Even if some passengers are not buckled-up, I use a seat belt"*

In contrast to the pupils the parents were not divided into three but into two groups. The quasi-experimental group was the group of parents who received information materials forwarded by the children. The control group did not receive any campaign materials. Several items were allocated to one of the constructs according to Ajzen`s "Theory of planned behaviour". The factors of the theory that should be represented by the several items were "Behavioural Beliefs"; "Control Beliefs"; "Normative Beliefs"; "Perception of risk".

Further constructs were “Self Reported Behaviour” and “Habits”. Thus, following this idea, the results can be divided into buckling-up-behaviour (reported) and several beliefs about wearing seat belts. In order to analyse whether the items measured the same dimension a reliability analysis was carried out. The criterion for allocating the several items to the particular construct was fixed by a Cronbachs Alpha of .6 and higher.

Afterwards the items were analysed separately by viewing rates and by calculating independent t-tests and ANOVA`s. From those items which could be allocated to the construct a particular index was calculated by establishing the mean of the allocated items. For those items where an index was established a box-plot was made. This index was analysed afterwards in the same way as the separate items.

In order to be able to make a statement about the effect, apart from the arranged significance tests, Cohen`s d was calculated.

Results

Pupils

Knowledge of the campaign

The Euchires campaign was known by less than a fifth of the pupils (18%) before the intervention took place. In the after study 61% of all pupils stated that they had heard about “Gordy the armadillo” (see figure 3). Radio, posters, internet and television were mentioned as main information source. In the after study 32% of the pupils also referred to the interactive lesson. 34% could recall the message of the campaign in the before study and 67% in the after study.

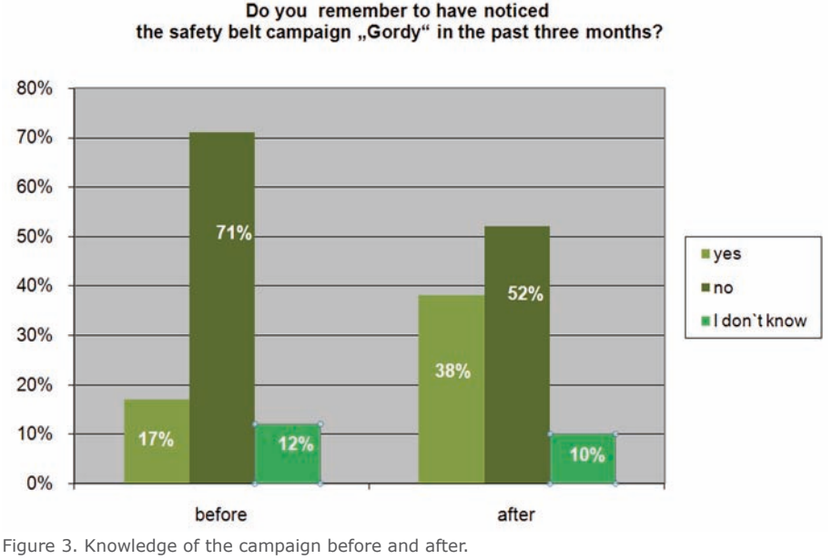

Figure 3. Knowledge of the campaign before and after.

Knowledge about legislation with respect to seat belts and child restraint seats

The majority of the pupils were well informed about the mini¬mum body length when children are allowed to use ordinary seat belts. Figure 4 illustrates that in those classes where lessons were held, more children ticked the correct box (1,50m) already in the before study. Pupils, who took part in the interactive lesson, however, showed a stronger improvement of knowledge than those who did neither receive a lesson nor information materials.

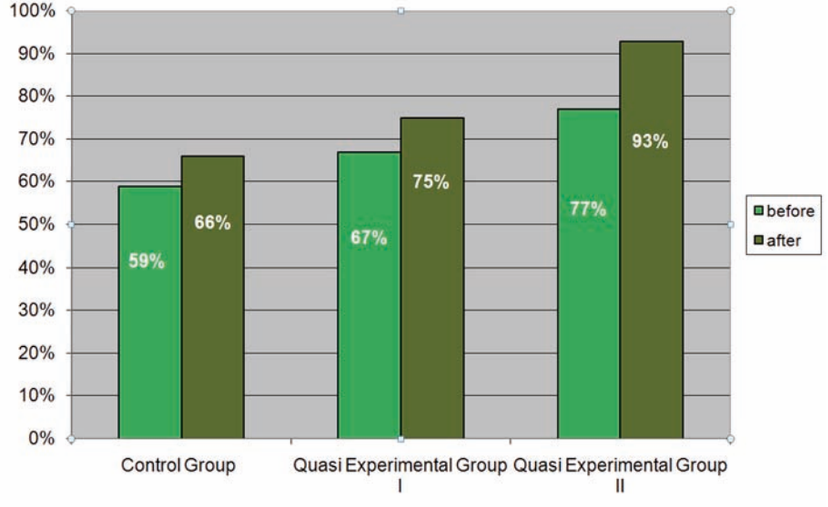

Figure 4. Knowledge of critical size (1,50m) before and after.

Attitudes with respect to wearing seat belts

The results of the evaluation indicate that “buckling up in the car” is something very common for the children. Nearly all pupils in the before (100%) and after study (98%) believed that it is important to use seat belts in cars.

Perception of risk

The majority of the children believe that wearing a seat-belt gives a feeling of security. This feeling slightly increases in the intervention groups, but there are no changes in the group where no intervention has taken place (see table 11).

Most of the children perceive travelling without seat-belt as risky. The perception of risk is higher in all groups in the after study than in the before study. Pupils who took part in the interactive lesson showed the strongest changes, though the differences between the groups were not significant.

Table 11. Risk Perception.

Items[a]	Before study			After study		
	C	*QEI*	*QEII*	*C*	*QEI*	*QEII*
I only feel safe in the car, when I wear a seat-belt	88%	86%	85%	88%	92%	88%
If I`m not buckled-up and an accident happens, I might be hurt severely	89%	89%	90%	96%	94%	99%

[a]Answer categories: yes, no and I don`t know. Percentages indicate the number of yes answers
C = Control Group; QEI = Quasi Experimental Group I; QE II = Quasi Experimental Group II.

Behavioural Beliefs, habits and self-reported behaviour with respect to wearing seat belts

In the following items of the questionnaires which were scaled as a four-step Likert-scale ("always", "sometimes", "rarely" and "never") are discussed in more detail.

"Wearing a seat belt is inconvenient"

There are no significant changes between before and after with respect to the convenience of seat belts. The majority of the pupils appreciate wearing seat belts. About 10 %, however, think that wearing seat belts is "always" inconvenient (see figure 5).

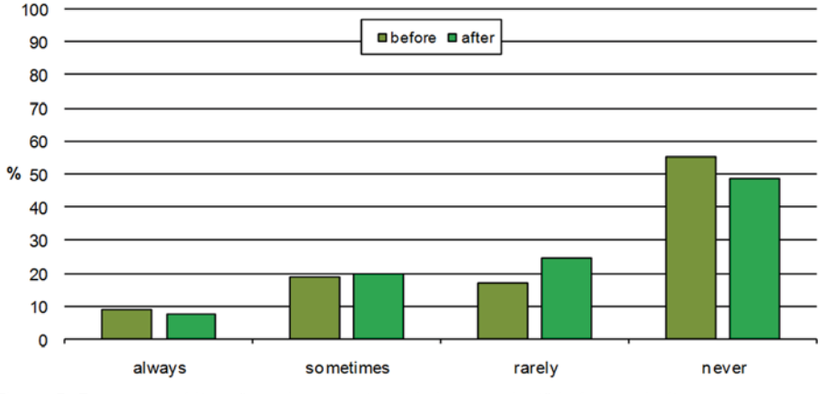

Figure 5. Frequency of item "wearing a seat belt is inconvenient" before and after.

The control group, those without intervention, tended to feel more inconvenient in the after study than in the before study (p = .075, two-tailed). The feeling of inconvenience did not change at all in quasi-experimental group I (p = .811 two tailed) and in the quasi experimental group II (p = .65) between the two different points in time.
Receiving information material or taking part in an interactive lesson does not seem to have an effect on the feeling of inconvenience in context with wearing seat belts.

"If I do not buckle-up my parents remind me"

Most pupils are reminded by their parents when they have forgotten to fasten the seat belt (before: 74.8%, after: 71.1%; see figure 6). There are no significant differences between the two times of questioning (p = .56).

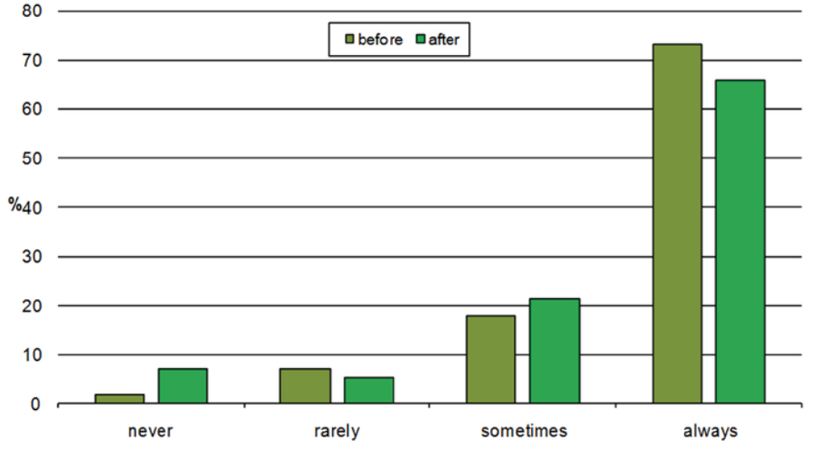

Figure 6. Frequency of item "If I do not buckle-up my parents remind me" before and after.

If you compare the different groups there are again no significant results with respect to this item (control group p = .78; quasi-experimental group I p = .84; quasi-experimental group II p = .13).

"In a car I`m buckled-up"
Wearing the seat belt, when travelling in a car, seems to be a habit for the vast majority of the pupils. 96% in the before study and 92% in the after study are always buckled-up in a car. The slight difference in the percentages is not significant. Also the various groups did not differ in their buckling up-behaviour and showed similar results to those of all other pupils.

"Also on short distance car rides I'm buckled-up"
If you ask for short distance car rides, you get a slightly different picture of the buckling up behaviour. In figure 6 the data of the general buckling up behaviour is compared with short distance car rides. It illustrates that only 77 % of the children always fasten their seat belts on short trips whereas 92% agreed if you ask in a more general way. Pupils are significantly (p=.00) less often buckled-up when driving short distances than in general. No significant changes were found between the different groups.

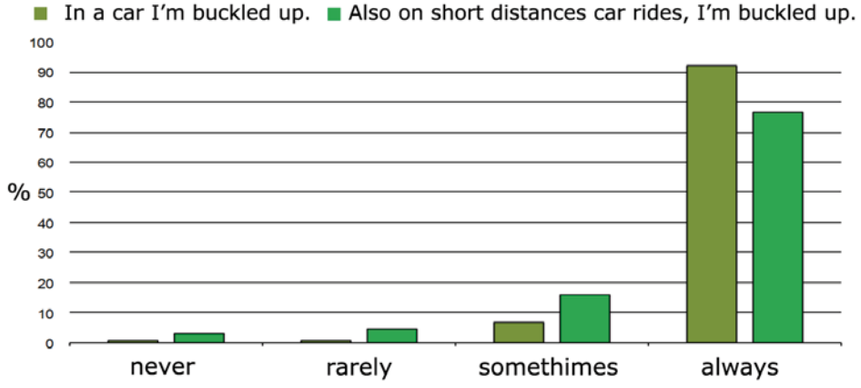

Figure 7. Buckling behaviour, after study.

"When I`m travelling in a car with my parents I sit in a child restraint seat or on a booster seat"
When analysing the item above it was necessary to select all children who were smaller than 150cm at both points in time. In the control group and in the quasi-experimental group I 16 children each were smaller than 150cm, in the quasi-experimental group II 29 children fulfilled this criteria.
In the before and after study 77% of all pupils smaller than 150 cm stated that they are always sitting in a child restraint seat or on a booster seat, when travelling in a car. 15% are not always correctly buckled-up. In the after study this share dropped to 10%. This result, however, is not significant, nor could any significant changes be found with respect to the different groups.

"If my parents are in a hurry they do not forget to buckle me up correctly"
Also the rate of parents who remember to buckle-up their children when they are in hurry is quite low. 77% of the pupils` parents in the before study and 73% in the after study buckle their children up even when they are in hurry. There were no significant changes between the three groups. In the quasi-experimental I group the share of those parents who never forget to buckle-up their children even when they were in a hurry according to the pupils` opinions increased in the after study from 76% to 82%. The difference was not significant, though (p =.59; d = 0.16).

"If someone does not wear a seat belt in the car, I remind them. "
Comparing the data of the two points in time there is a slight increase of pupils who remind car passengers of wearing a seat belt. (75% before; 79% after). In the group of pupils that got no information materials the share of those who remind car-passengers to buckle-up decreased - not significantly - from 80% to 69%. The share of those pupils in quasi-experimental group who always reminds passengers to wear a seat belt slightly increased from 76 % to 80% after they got the material. Indeed, the interactive lesson had the biggest positive effect on this item (d=0.69). The effect was significant (p = .014).

In the before study 69 % of the pupils of the quasi experimental group reminded car-passengers when they were not buckled-up to use the seat belt. After the intervention this share increased to 87%. The following figure illustrates the proportion of pupils who remind passengers if they are not buckled-up before and after.

The group of pupils that got no information differed significantly (p = .01) from the pupils who had undergone an interactive lesson.

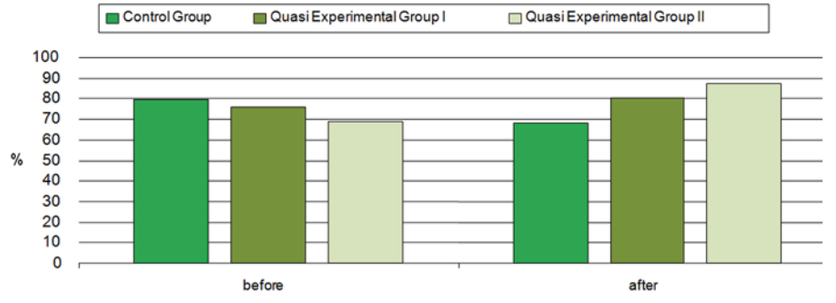

Figure 8. Share of pupils who remind passengers if they are not buckled-up before and after.

"When I`m travelling in a car with other people (e.g. relatives, friends) I sit in a child restraint seat or on a booster seat"
Less than 60% of the pupils smaller than 150 cm sit on a booster seat or in a child restrain seat, when travelling in a car with other people. This result does not significantly change in the after study (before: 57%; after: 58%). In the control group the share of those pupils who were appropriately secured in other people's car was higher than in the other groups (before: 75%; after: 69%). The difference is not significant.

The results from the quasi-experiment showed that the percentage of pupils that never used a booster seat when travelling with other people was alarming. At both points in time 25% of the pupils, smaller than 150cm, never sit on a booster seat when they are travelling with other people. And only 38% at both points in time always used one when they were transported by other people.

The interactive lesson had a small positive effect (d=0.25) in changing the unsafe behaviour of travelling in a car without sitting in an appropriate child seat. In the after study the share of the pupils who used a booster seat slightly increased from 57% to 64%. The effect was not significant which might be due to the group of pupils being smaller than 150 cm at both times being quite small (n = 28).

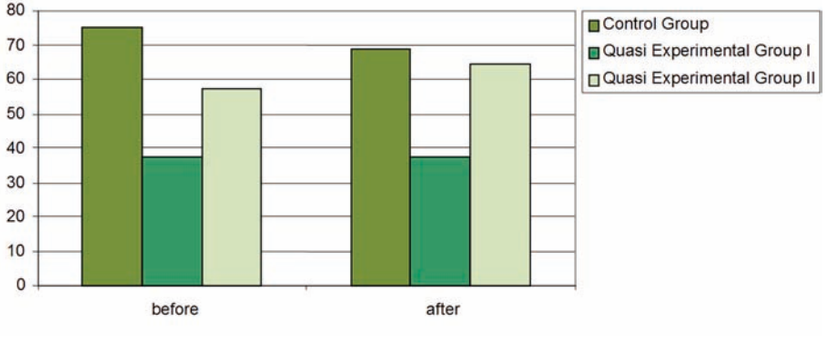

Figure 9. Share of pupils that use a booster seat, before and after.

Parents

Knowledge of the campaign

The Euchires campaign was known by 17% of the questioned adults in the before study. After the intervention 38% stated that they had heard about the campaign. The main information sources were radio, bill boards and internet. In the after study 17% mentioned the campaign materials distributed in school as the reason for their knowledge of the campaign.

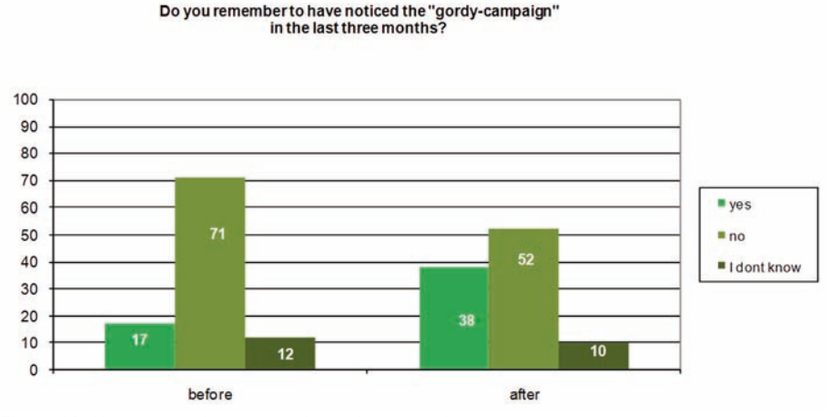

Figure 10. Knowledge of the campaign before and after.

The majority of those who noticed the campaign appraised it positively. The respondents of the after study are slightly more critical about the campaign than the respondents of the before study. The difference is not significant (see figure 11).

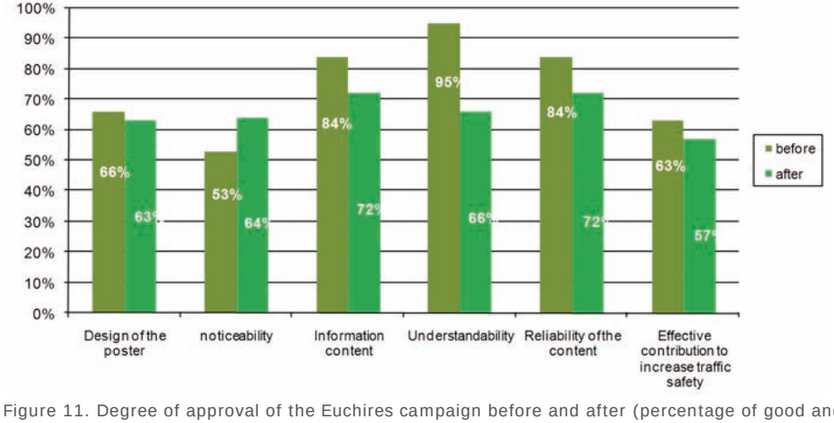

Figure 11. Degree of approval of the Euchires campaign before and after (percentage of good and very good).

More than 60% argue that the design of the poster is good/very good. Less than 60% in the before study and more than 60% in the after study noticed the campaign. About three quarters of the respondents' believe that the campaign is informative, understandable and credible. For about 60% of the respondents the Euchires campaign is a useful contribution to increase traffic safety.

Knowledge about legislation with respect to seat belts and child restraint seats

The law concerning wearing seat-belts on front seats is well-known by the questioned people. 98 % of the control group (97% in the after study) and 100% of the quasi experimental group are sure that they have to be buckled-up on the front seats. The obligation to wear seat belts in the back of the car is not as well known (see table 12).

Table 12. Do you think it is obligatory to wear a seat belt in the back of the car?

Answer category	Before study		After study	
	Control Group	*Quasi-Experimental*	*Control Group*	*Quasi-Experimental*
Yes, sure	82%	90%	82%	86%
Yes, but I`m not absolutely sure	13%	5%	15%	11%
No	2%	-	3%	3%
I don´t know	2%	5%	-	-

The share of people who have a lack of knowledge with respect to the size, when children are allowed to use ordinary seat belts is even higher. On average 32%[1] did not know the legal regulation. There are no significant changes between the groups and the different points of time.

Attitudes – a descriptive and inference statistical analysis

In the following the results of the survey are analysed in a descriptive and inference statistical way. Significant differences are pointed out.

Use of seat belts and child restraint seats in the front and in the back of the car

The majority of the respondents automatically fasten their seat belt when they get into the car. Between 80 and 90% of all respondents "always" wear a seat belt if they sit in the front seats of the car. In the after study in the control group the share of respondents who "always" use a seat belt dropped from 87% to 78%; in the quasi-experimental group the share increased from 89% to 92% (see table 13). The results are not significant, though. The results reflect a lack of knowledge about the legal obligation of wearing seat belts in the rear seats. On average only 50% of the respondents "always" wear a seat belt in the back. There is a slight increase in the after study in both groups, which is again not significant. Whilst on average 73% of the questioned parents remind passengers to fasten their seat belts in the front of the car only about 45% insist on using the seat belts in the rear seats. The quasi-experimental group differs significantly from the control group with respect to reminding people to wear seat belts in the front (see table 13).

1 Both the before and after study.

Table 13. Control group versus quasi experimental group: "If a co-driver in the front of the car does not use the seat belt, I remind him/her to buckle-up".

Group	Mean	SD	t	d	p
Control Group (after)	**6,19**	**1,35**	**-1,70**	**0,49**	**0,48**
Quasi Experimental (after)	**6,65**	**1,01**			

20% of the parents in the quasi-experimental group stated in the before study that they "never" remind passengers to use seat belts in the back of the car. This share dropped to 16% in the after study although the difference is not significant.

On average more than 90% of the respondents always see to it that children are buckled-up in the car. In the after study in the experimental group the share of parents who state that children are "always" buckled-up in their car even increases from 97,5% to 100%. But again the changes are not significant.

Table 14. Percentage of "always" answers – use of seat belts and child restraint seats in the front and in the back before and after.

Items	Before study		After study	
	Control Group	***Quasi-Experimental***	***Control Group***	***Quasi-Experimental***
I wear a seat belt, if I sit in the front of the car	87%	89%	78%	92%
I wear a seat belt if I sit in the back of a car	44%	53%	47%	57%
Children are buckled-up when travelling in my car.	95,5%	97,5%	93,9%	100%
If a co-driver in the front of the car does not use the seat belt, I remind him/her to buckle-up	73%	74%	63%*	83%*
If a co-driver in the back of the car does not use the seat belt, I remind him/her to buckle-up	33%	45%	47%	52%

* = p <=.05.

As table 14 illustrates there is a tendency that parents who received information materials are more worried about seat belt use in the after study, but as noted above hardly any differences are significant.

Seat belt use- positive and negative consequences

The use of seat belts is connected with positive and negative consequences. 55% to 74% of the respondents feel unsafe if they are not buckled-up when travelling by car. Between 82% and 92% are convinced that travelling without seat belt increases the probability of being injured seriously in the case of an accident. 5% to 18% of the respondents agreed with the statement that wearing a seat belt is inconvenient. On average 3% are just too lazy to fasten their seat belt. 2% to 18% just wear seat belts because they do not want to get fined (see table 15). There were no significant differences between the two groups and between the before and after study.

Table 15. Percentage of "strongly agree" answers – positive and negative "consequences" of seat belt use.

Items	Before study		After study	
	Control Group	***Quasi-Experimantal***	***Control Group***	***Quasi-Experimantal***
If I drive a car without wearing a seat belt, I feel unsafe	69%	65%	56%	74%
If I do not wear a seat belt and if an accident happened my chances of being seriously injured would be very great	84%	93%	82%	92%
Using a seat belt is not comfortable	9%	5%	18%	6%
Sometimes I`m just to lazy to wear my seat belt	4%	2%	3%	5%
I only wear the seat belt to avoid being fined	84%	93%	82%	92%

Use of child restraint seats and booster seats

The majority of the respondents "strongly agree" that children, who are travelling in a car without appropriate child seats are more likely to get hurt in case of an accident (82%-95%). A high percentage of parents (87%-92%) state that their children are sitting on booster seats, when travelling in their car. On average 80% are convinced that it is dangerous not to use a child restraint and on average more than 90% think that is important to insist that children are buckled-up correctly.

Table 16. Percentage of “strongly agree” answers – use of child restraint seats.

Items	Before study		After study	
	Control Group	*Quasi-Experimantal*	*Control Group*	*Quasi-Experimantal*
In the case of an accident child restraint seats or booster seats ease the accident consequences for the child.	82%	95%	88%	95%
My children sit in child restraint seats or on booster seats when travelling in my car.	89%**	89%	69%* **	92%*
It is dangerous not to restrain a child when travelling in a car.	76%	88%	82%	80%
It is important to insist that children should be buckled-up correctly when travelling in a car	96%	97%	83%	97%

* = p <=.01; ** p <=.05.

Parents in the control group were significantly less likely to let their children sit on booster seats in the after study than in the before study (p <= .01). The control group differed significantly from the quasi experimental group in the after study (p = .008, d = 0.84) but not in the before study (p = .57), see table 17).

Table 17. My children are used to sit in child restraint seats or on booster seats when travelling in my car.

Group	Mean	SD	t	d	p
Control Group (before)	**6,60**	**1,34**	**1,89**	**0.54**	**0.01**
Control Group (after)	**5,81**	**2,07**			
Control Group (after)	**5,81**	**2,07**	**-2,55**	**0,84**	**0,008**
Quasi Experimental Group (after)	**6,78**	**0,87**			

Note. Scale from 1 to 7 (1=never, 7=always).

The attitude in general of the two groups did not change significantly in the before and after study. But in general the share of those people who are aware of the importance of buckling up their children in cars correctly is quite high.

Reason for not using seat belts and child restraint seats

The respondents were asked to tell in certain situations e.g. on short distances if it is more or less likely to use the seat belt respectively to transport children in child restraint seats. 9% of the control group in the before study and 15% in the after study said that it is “very likely” that they do not use seat belts on short car journeys. In the quasi experimental group the share of those who are “very likely” not to use seat belts on short car trips dropped from 10% to 6%. The change is not significant. ‘Hurry and fatigue’ have an average of 5% of respondents who gave it is a reason not to fasten their seat belt’s.

For a very low percentage (on average 3%) transporting children without child restraint seats is “very likely”. The highest probability that children travel in the car with no appropriate child seat is if friends of the parents´ children are transported in the car. The difference between the groups was not significant.

Table 18. Percentage of “very likely” answers – reasons for not using seat belts or child restraint seats.

Item	Before study		After study	
	Control Group	*Quasi-Experimantal*	*Control Group*	*Quasi-Experimantal*
Would it be more or less likely to use no seat belt if:				
I only travel a short distance.	9%	10%	15%	6%
I´m in a hurry	7%	6%	6%	5%
I`m tired	4%	2%	9%	3%
Would it be more or less likely to transport children in no child restraint seat or booster seats if:				
I only travel a short distance.	4%	1%	6%	2%
I´m in a hurry	-	2%	3%	-
I`m tired	-	1%	3%	-
I transport friends of my child in my car	4%	7%	6%	9%

Self-reported behaviour with respect to wearing seat belts (SRB)

Figure 12 illustrates how the questioned parents describe their buckling up behaviour when driving or travelling by car.

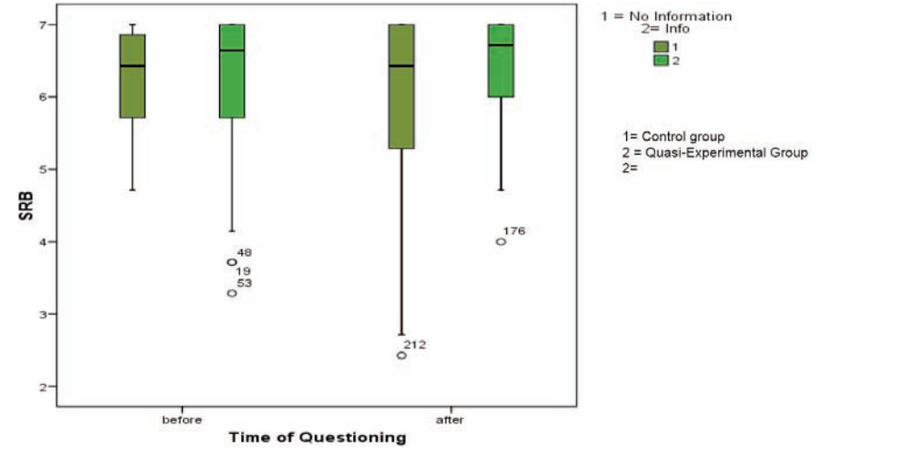

Figure 12. Self Reported Behaviour of parents (SRB scale represents a continuum from 1 = never to 7 = always).

There was no significant difference between those parents who received information material and those who did not. Furthermore, no significant changes between the before and after study could be found.

Behavioural Beliefs

Figure 13 illustrates that the control group and the quasi experimental group do not differ in their Behavioural Beliefs at both points in time of questioning.

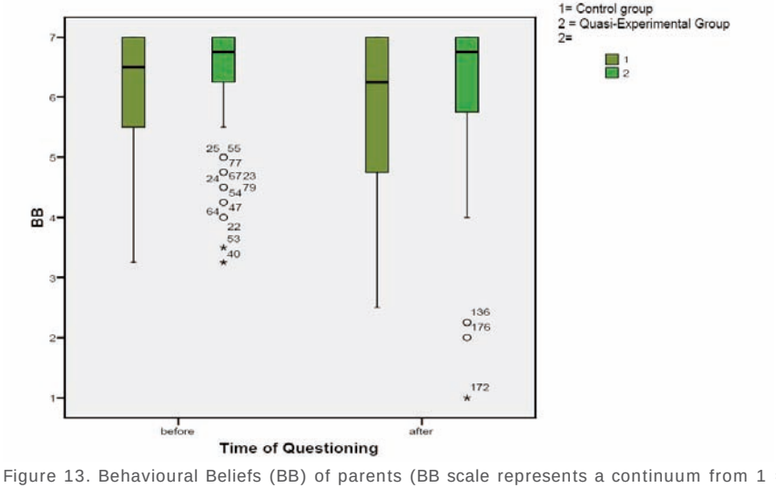

Figure 13. Behavioural Beliefs (BB) of parents (BB scale represents a continuum from 1 = never to 7 = always.

With respect to the separate items of the BB-construct there was one item which changed significantly. Compared to the before study more parents of the quasi experimental group believed in the after study that holding a child in one`s arm when travelling by car is unsafe (p = .04, one-tailed; d = 0.36).

Control Beliefs

Figure 14 illustrates the mean values of the two groups before and after with respect to the CB construct.

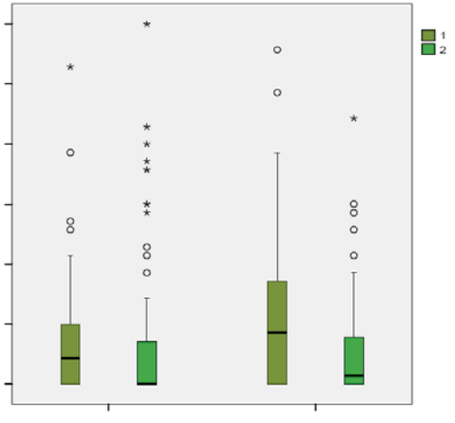

Figure 14. Control Beliefs (CB) of parents (a scale from 1 = less likely to 7 = very likely).

The two groups differ significantly (p <=.01; d = 0.77). The effect is indirect. In the after study more respondents of the control group stated that it is likely not to wear the seat belt or use child restraint seats for their children when they are in a hurry, tired or on a short trip. In the quasi experimental group there was no change. Thus, it can be concluded without getting any information-material parents are fewer likely to wear the seatbelt or use child restraint seats for their children when they are in a hurry or on a short trip. Getting information avoids this negative effect.

Perception of risk

The majority of the parents (76%-88%) are aware of the danger and the possible consequences of not being buckled-up or using no appropriate child restraint seats when travelling with children by car.

Normative Beliefs

About 80 % of the parents in each group and at each point in time stated that their partner expected them to buckle-up themselves and to fasten their children appropriately when travelling by car.

The parents of those pupils who got no information differ significantly from the quasi-experimental group in the after study (p = .013; one-tailed; d = 0.75). Fewer parents of the control group believe that the partner expects them to be buckled-up, when driving a car.

Habits

An indirect effect could be found with respect to the item "*My children are used to sit in child restraint seats or on booster seats when driving in a car*". More parents of the control group stated in the after study that that their children are not used to sit in a child restraint seat or on a booster seat ($p = .033$, one-tailed; $d = 0.54$). The share of parents in the quasi experimental group who did not agree with this statement stayed approximately the same. Thus, the two groups also differed significantly in the after study ($p = .008$, $d = 0.84$).

With respect to the other item "*I always buckle-up when I get into the car*" no significant changes were found. On average about 80 % of all respondents claim that they fasten their seat belt when driving the car.

Intention

Parents were also asked if they intended to wear a seat belt in the next two weeks. Parents of children who had got information, in the after study intended significantly more often ($p = .046$, one-tailed; $d = 0.3$) to buckle-up in the next two weeks, compared to the before study. There was no significant difference between the two groups, though. In both groups in the after study about 85% of the parents stated that they were going to buckle-up in the next two weeks after the questioning.

Correlation between the constructs in the before and in the after study

In the following presentations correlation between the several constructs (self-reported behaviour (SRB); behavioural beliefs (BB); perception of risk (PR); normative beliefs (NB); control beliefs (CB); habits (H) and intention) are presented.

In the quasi-experimental group there were nearly no changes in correlation between the before and after study. In the control group the correlations differ from the first to the second time of questioning. The correlation between all construct is in many cases stronger in the after study (see the following tables 19 – 27).

Table 19. General - Zero-order Pearson correlation between the constructs of buckling behaviour and point in time of questioning.

Variables	M	SD	SRB	BB	PR	NB	CB	H	I	PiToQ
Self-Reported Behaviour	6.25	0.90	-							
Behavioural Beliefs	6.12	1.20	0.44	-						
Perception of Risks	6.61	0.85	0.17	0.29	-					
Normative Beliefs	6.59	0.94	0.19	0.24	0.50	-				
Control Beliefs	1.76	1.21	-0.32	-0.51	-0.14*	-0.16	-			
Habits	6.54	0.97	0.47	0.47	0.40	0.33	-0.41	-		
Intention	6.49	1.48	0.25	0.18	0.22	0.12*	-0.11$^{n.s.}$	0.23	-	
Point in Time of Questioning	-	-	0.01$^{n.s.}$	-0.10$^{n.s.}$	-0.07$^{n.s.}$	-0.06$^{n.s.}$	0.03$^{n.s.}$	-0.08$^{n.s.}$	0.06$^{n.s.}$	-

Note. A high mean value in self-reported behaviour and habits indicates a high buckling behaviour. For behavioural beliefs and perception of risk a high mean indicates a safer feeling when being buckled-up. A high mean value in normative beliefs represents a high persuasion of the partner to be buckled-up while driving. A low control belief – mean value indicates a lower likelihood to buckle-up in special conditions like being in a hurry for instance. For intention a high mean value represents a high intention to buckle-up while driving in future runs by car. The scale ranged from 1 to 7.* p <=.05; n.s. = non significant; all others p <=.01.

Table 20. General - Zero-order Pearson correlation between the constructs of buckling behaviour – before study.

Variables	M	SD	SRB	BB	PR	NB	CB	H	I
Self-Reported Behaviour	6.24	0.87	-						
Behavioural Beliefs	6.24	1.00	0.30	-					
Perception of Risks	6.66	0.72	-0.04$^{n.s.}$	0.24	-				
Normative Beliefs	6.65	0.82	0.05$^{n.s.}$	0.16*	0.19*	-			
Control Beliefs	1.72	1.21	-0.27	-0.45	-0.08$^{n.s.}$	-0.14$^{n.s.}$	-		
Habits	6.61	0.87	0.35	0.43	0.31	0.19*	-0.45	-	
Intention	6.41	1.60	0.11$^{n.s.}$	0.00$^{n.s.}$	0.07$^{n.s.}$	0.02$^{n.s.}$	-0.02$^{n.s.}$	0.14$^{n.s.}$	-

Note. A high mean value in self-reported behaviour and habits indicates a high buckling behaviour. For behavioural beliefs and perception of risk a high mean indicates a safer feeling when being buckled-up. A high mean value in normative beliefs represents a high persuasion of the partner to be buckled-up while driving. A low control belief – mean value indicates a lower likelihood to buckle-up in special conditions like being in a hurry for instance. For intention a high mean value represents a high intention to buckle-up while driving in future runs by car. The scale ranged from 1 to 7. p <=.05; n.s. = non significant; all others p <=.01.

Table 21. General - Zero-order Pearson correlation between the constructs of buckling behaviour – after study.

Variables	M	SD	SRB	BB	PR	NB	CB	H	I
Self-Reported Behaviour	6.26	0.94	-						
Behavioural Beliefs	5.98	1.41	0.57	-					
Perception of Risks	6.54	0.99	0.36	0.31	-				
Normative Beliefs	6.53	1.07	0.31	0.29	0.69	-			
Control Beliefs	1.81	1.22	-0.38	-0.56	-0.19*	-0.18*	-		
Habits	6.45	1.09	0.59	0.48	0.45	0.44	-0.38	-	
Intention	6.59	1.31	0.44	0.38	0.44	0.27	-0.26	0.38	-

Note. A high mean value in self-reported behaviour and habits indicates a high buckling behaviour. For behavioural beliefs and perception of risk a high mean indicates a safer feeling when being buckled-up. A high mean value in normative beliefs represents a high persuasion of the partner to be buckled-up while driving. A low control belief – mean value indicates a lower likelihood to buckle-up in special conditions like being in a hurry for instance. For intention a high mean value represents a high intention to buckle-up while driving in future runs by car. The scale ranged from 1 to 7. * p <=.05; n.s. = non significant; all others p <=.01.

Table 22. Control Group: Zero-order Pearson correlation between the constructs of buckling behaviour and point in time of questioning.

Variables	M	SD	SRB	BB	PR	NB	CB	H	I	PiToQ
Self-Reported Behaviour	6.13	0.96	-							
Behavioural Beliefs	5.97	1.29	0.44	-						
Perception of Risks	6.43	1.12	0.26*	0.27	-					
Normative Beliefs	6.43	1.23	0.33	0.17$^{n.s.}$	0.58	-				
Control Beliefs	2.00	1.36	-0.36	-0.61	-0.16$^{n.s.}$	-0.20	-			
Habits	6.37	1.15	0.52	0.48	0.57	0.41	-0.39	-		
Intention	6.41	1.53	0.45	0.33	0.34	0.21*	-0.17$^{n.s.}$	0.49	-	
Points of Questioning in Time	-	-	-0.14$^{n.s.}$	-0.17$^{n.s.}$	-0.03$^{n.s.}$	-0.14$^{n.s.}$	0.19*	-0.22*	-0.09$^{n.s.}$	-

Note. A high mean value in self-reported behaviour and habits indicates a high buckling behaviour. For behavioural beliefs and perception of risk a high mean indicates a safer feeling when being buckled-up. A high mean value in normative beliefs represents a high persuasion of the partner to be buckled-up while driving. A low control belief – mean value indicates a lower likelihood to buckle-up in special conditions like being in a hurry for instance. For intention a high mean value represents a high intention to buckle-up while driving in future runs by car. The scale ranged from 1 to 7; * p <=.05; n.s. = non significant; all others p <= .01.

Table 23. Control Group: Zero-order Pearson correlation between the constructs of buckling behaviour – before study.

Variables	M	SD	SRB	BB	PR	NB	CB	H	I
Self-Reported Behaviour	6.24	0.70	-						
Behavioural Beliefs	6.16	1.03	0.19$^{n.s.}$	-					
Perception of Risks	6.46	0.91	-0.16$^{n.s.}$	0.17$^{n.s.}$	-				
Normative Beliefs	6.58	0.93	0.26*	0.07$^{n.s.}$	0.00$^{n.s.}$	-			
Control Beliefs	1.78	1.13	-0.29*	-0.43	-0.10$^{n.s.}$	-0.30*	-		
Habits	6.58	0.92	0.10$^{n.s.}$	0.35*	0.46	0.12$^{n.s.}$	-0.40	-	
Intention	6.52	1.50	0.13$^{n.s.}$	-0.09$^{n.s.}$	0.03$^{n.s.}$	-0.14$^{n.s.}$	0.02$^{n.s.}$	0.22$^{n.s.}$	-

Note. A high mean value in self-reported behaviour and habits indicates a high buckling behaviour. For behavioural beliefs and perception of risk a high mean indicates a safer feeling when being buckled-up. A high mean value in normative beliefs represents a high persuasion of the partner to be buckled-up while driving. A low control belief – mean value indicates a lower likelihood to buckle-up in special conditions like being in a hurry for instance. For intention a high mean value represents a high intention to buckle-up while driving in future runs by car. The scale ranged from 1 to 7; * p <=.05; n.s. = non significant; all others p <=.01.

Table 24. Control Group: Zero-order Pearson correlation between the constructs of buckling behaviour – after study.

Variables	M	SD	SRB	BB	PR	NB	CB	H	I
Self-Reported Behaviour	5.96	1.24	-						
Behavioural Beliefs	5.71	1.55	0.55	-					
Perception of Risks	6.38	1.37	0.47	0.32*	-				
Normative Beliefs	6.23	1.53	0.34*	0.18$^{n.s.}$	0.86	-			
Control Beliefs	2.30	1.59	-0.37*	-0.70	-0.19$^{n.s.}$	-0.10$^{n.s.}$	-		
Habits	6.08	1.38	0.72	0.51	0.65	0.52	-0.33*	-	
Intention	6.26	1.59	0.71	0.64	0.67	0.54	-0.32*	0.73	-

Note. A high mean value in self-reported behaviour and habits indicates a high buckling behaviour. For behavioural beliefs and perception of risk a high mean indicates a safer feeling when being buckled-up. A high mean value in normative beliefs represents a high persuasion of the partner to be buckled-up while driving. A low control belief – mean value indicates a lower likelihood to buckle-up in special conditions like being in a hurry for instance. For intention a high mean value represents a high intention to buckle-up while driving in future runs by car. The scale ranged from 1 to 7; * p <=.05; n.s. = non significant; all others p <=.01.

Table 25. Quasi-experimental Group: Zero-order Pearson correlation between the constructs of buckling behaviour and point in time of questioning.

Variables	M	SD	SRB	BB	PR	NB	CB	H	I	PiToQ
Self-Reported Behaviour	6,31	0,86	-							
Behavioural Beliefs	6,21	1,15	0,43	-						
Perception of Risks	6,70	0,64	0,06$^{n.s.}$	0,31	-					
Normative Beliefs	6,68	0,73	0,03$^{n.s.}$	0,31	0,34	-				
Control Beliefs	1,63	1,11	-0,28	-0,42	-0,07$^{n.s.}$	-0,09$^{n.s.}$	-			
Habits	6,63	0,85	0,42	0,45	0,17*	0,23	-0,41	-		
Intention	6,53	1,45	0,11$^{n.s.}$	0,07$^{n.s.}$	0,12$^{n.s.}$	0,05$^{n.s.}$	-0,07$^{n.s.}$	0,05$^{n.s.}$	-	
Points of Questioning in Time	-	-	0,09$^{n.s.}$	-0,07$^{n.s.}$	-0,11$^{n.s.}$	0,00$^{n.s.}$	-0,06$^{n.s.}$	0,01$^{n.s.}$	0,14$^{n.s.}$	-

Note. A high mean value in self-reported behaviour and habits indicates a high buckling behaviour. For behavioural beliefs and perception of risk a high mean indicates a safer feeling when being buckled-up. A high mean value in normative beliefs represents a high persuasion of the partner to be buckled-up while driving. A low control belief – mean value indicates a lower likelihood to buckle-up in special conditions like being in a hurry for instance. For intention a high mean value represents a high intention to buckle-up while driving in future runs by car. The scale ranged from 1 to 7; * p <=.05; n. s. = non significant; all others p <=.01.

Table 26. Quasi-experimental Group: Zero-order Pearson correlation between the constructs of buckling behaviour - before.

Variables	M	SD	SRB	BB	PR	NB	CB	H	I
Self-Reported Behaviour	6,24	0,95	-						
Behavioural Beliefs	6,28	1,00	0,35	-					
Perception of Risks	6,76	0,58	0,03$^{n.s.}$	0,30	-				
Normative Beliefs	6,68	0,76	-0,05$^{n.s.}$	0,22*	0,38	-			
Control Beliefs	1,69	1,26	-0,27	-0,46	-0,06$^{n.s.}$	-0,04$^{n.s.}$	-		
Habits	6,62	0,85	0,47	0,49	0,21*	0,23*	-0,48	-	
Intention	6,34	1,66	0,10$^{n.s.}$	0,05$^{n.s.}$	0,13$^{n.s.}$	0,15$^{n.s.}$	-0,04$^{n.s.}$	0,09$^{n.s.}$	-

Note. A high mean value in self-reported behaviour and habits indicates a high buckling behaviour. For behavioural beliefs and perception of risk a high mean indicates a safer feeling when being buckled-up. A high mean value in normative beliefs represents a high persuasion of the partner to be buckled-up while driving. A low control belief – mean value indicates a lower likelihood to buckle-up in special conditions like being in a hurry for instance. For intention a high mean value represents a high intention to buckle-up while driving in future runs by car. The scale ranged from 1 to 7; * p <=.05; n.s. = non significant; all others p <=.01.

Table 27. Quasi-experimental Group: Zero-order Pearson correlation between the constructs of buckling behaviour - after.

Variables	M	SD	SRB	BB	PR	NB	CB	H	I
Self-Reported Behaviour	6,40	0,72	-						
Behavioural Beliefs	6,12	1,32	0,59	-					
Perception of Risks	6,63	0,71	0,14$^{n.s.}$	0,30	-				
Normative Beliefs	6,68	0,70	0,17$^{n.s.}$	0,42	0,32	-			
Control Beliefs	1,55	0,90	-0,31	-0,41	-0,12$^{n.s.}$	-0,19$^{n.s.}$	-		
Habits	6,64	0,86	0,37	0,43	0.13$^{n.s.}$	0,23*	-0,31	-	
Intention	6,75	1,12	0,08$^{n.s.}$	0,14$^{n.s.}$	0,16$^{n.s.}$	-0,11$^{n.s.}$	-0,10$^{n.s.}$	-0,03$^{n.s.}$	-

Note. A high mean value in self-reported behaviour and habits indicates a high buckling behaviour. For behavioural beliefs and perception of risk a high mean indicates a safer feeling when being buckled-up. A high mean value in normative beliefs represents a high persuasion of the partner to be buckled-up while driving. A low control belief – mean value indicates a lower likelihood to buckle-up in special conditions like being in a hurry for instance. For intention a high mean value represents a high intention to buckle-up while driving in future runs by car. The scale ranged from 1 to 7.* p <=.05; n.s. = non significant; all others p <=.01.

Model testing
Self-Reported Behaviour (SRB), Behavioural Beliefs (BB) and Control Beliefs (CB) were ratified as constructs in this study. To investigate whether these constructs are able to predict intentional buckling behaviour it was necessary to exclude participants that ticked "always" in the intention item. Thus, a multiple regression analysis was calculated by means of data from 24 participants. Apart from the constructs that had a Cronbach`s Alpha > .6 it was calculated whether age is able to predict buckling-intention. Table 28 illustrates that best predictor for intention is behavioural beliefs (BB). The construct is able to explain 21.2% of variance with respect to the intention to buckle-up in the future. Self-reported behaviour, control belief and age only contributed marginally to the prediction of seat belt use.

Table 28. Summary of hierarchical regression analysis for variables predicting the intention to buckle-up in the near future.

Step / predictor	R^2	ΔR^2	F	β
Step 1				
Self-Reported Behaviour				-.068
	.005		.103	
Step 2				
Self-Reported Behaviour				.163
Behavioural Beliefs				-.516*
	.217	.212	2.909	
Step 3				
Self-Reported Behaviour				.192
Behavioural Beliefs				-.336
Control Beliefs				.288
	.262	.045	2.370	
Step 4				
Self-Reported Behaviour				.196
Behavioural Beliefs				-.309
Control Beliefs				.315
Age				-.082
	.269	.006	1.744	

ΔR^2=increment of change; β =standardised regression coefficients. *p <=.05. All F values are not significant.

Summary and Conclusion

Using seat belts in cars seems to be a habit for most of the children. The majority of the children were aware that buckling up might save lives. In some situations, however, the ratio of those children who are not buckled-up is still too high, like on short journeys or on trips, when parents are in hurry. However, being buckled-up does not automatically imply that the children are buckled-up correctly. This can only be evaluated in a combined empirical research work (traffic observation, qualitative and quantitative interviews).
The evaluation instrument is obviously able to measure the knowledge of the campaign and general attitudes and behaviour. The results of the evaluation indicate that the campaign has the potential to increase the knowledge of traffic laws.

With respect to attitude or behavioural change in the different groups of pupils and at the two points in time very few significant results were found. This might be due to the small sample and the few answer categories. There are however tendencies which indicate, that those pupils who took part in a lesson or have received campaign materials, in the after study show more awareness of the topic than those pupils without interventions.
The use of seat belts seems also common among the parents. In certain situations, however, some respondents still tend not to use the safety belts on rear seats, in situations when they are in a hurry, on short distances, when they are tired, despite the fact that they are aware of the danger connected to travelling by car without wearing seat belts. A similar situation has been found with respect to the use of child restraint seats. In general, parents buckle-up their child in the car with appropriate equipment, but in certain situations, some tend to be not too strict on the use of child restraint seats, e.g. in situations when they are in a hurry, on short distances, when they are tired, or when they transport friends of their children. If you consider that 15% of all car trips are shorter than 1 km, that the amount of people who are stressed and overtired is increasing it is very important to focus future traffic safety campaigns on these issues.

It could therefore be concluded that only a few significant results were found in this study. The sample, however, was too small to make general conclusions about the change of behaviour due to the campaign. Another reason could be due to the so called "ceiling effect" indicating that participants before the intervention were already concerned about their children wearing seat belts and child restraint seat. Despite this some significant changes in attitudes were presented for example with respect to using booster seats for children: Children of parents in the control group were significantly less likely to sit on booster seats in the after study than in the before study. The control group differed also significantly from the quasi experimental group in the after study but not in the before study. This means there are tendencies which indicate that those parents who received information material in the after study showed more awareness of the topic than parents who did not receive any information. The campaign activity seems to have some effect on people's seat-belt behaviour and the method seems sensitive enough to measure even small changes.

The theory of planned behaviour
In this study the Theory of planned behaviour was used as a model for developing hypotheses where changes in behaviour and attitudes could take place due to the campaign. The following table 16 summarises the results with respect to the different constructs.

Table 29. Results according to the constructs of the Theory of planned behaviour.

Construct	quasi experimental group		control group	
	before	after	before	after
Self reported behaviour	No differences			
Behavioural believes	Same as control group	Significantly better than before	Same as quasi-experimental g.	No change
Control believes	Same as control group	No change	Same as quasi-experimental g.	Significantly worse than before
Perception of risk	High; same as control group	No change	High; same as quasi-experimental group	No change (ceiling effect)
Normative believes	Same as control group	No change	Same as quasi-experimental g.	Worse than before
Habits	Same as control group	No change	Same as quasi-experimental g.	Worse than before with respect to one explicit habit
Behavioural intention	Same as control group	Significantly better than before	Same as quasi-experimental g.	No change

In this study we focussed on school children 7 to 12 years and on their parents. Questions included to test the theory (TPB) were only asked to the parents. The results revealed that the model explained 26% of the variance in intention to buckle-up. The most important factor was behavioural belief. The results comparing the individual items in the before and after study showed that those parents who had been provided with targeted information agreed to a significantly higher degree than the control group, that one is not able to protect children only with one's own physical power when travelling in the car. Thus, the information appears to have had an effect. Another change refers to *behavioural intentions*: The quasi-experimental group – provided with targeted information – in the after study expressed significantly more often that they would buckle-up during the next weeks. If one considers the fact that none of the items included in the questionnaire changed significantly in the control group, one could consider this as a success of our procedure, saying two things: First, that the chosen way to proceed in CAST was successful in the sense that a method was applied that has the potential to show effects of campaign measures on attitudes and behaviour intention; and secondly, that the measures we chose, under the given measuring preconditions, had some positive effect on the quasi-experimental group.

However, there is one weakness in the overall picture we received with the help of the instru-ment we applied; in the control group there was a deterioration in the after study with respect to *control belief* – more persons stated that they would not buckle-up their children when being in a hurry, tired, or on short trips - , with respect to *normative believes* - more people stated that their partners would not expect them to buckle-up when driving a car, - and with respect to *habits* – more persons stated that their children are not used to sit in a child restraint seat or in a booster seat. These results are difficult to interpret, especially because they are quite systematic. Something clearly has happened to this group, and what we would assume is that having to answer the questionnaire twice made the control group more aware of the problems connected to lacking seat-belt use. It could therefore be argued that the problems are recognised, but the behavioural implications are unclear. In the quasi-experimental group there is no such negative change (that probably is not as negative after all if it really refers to problem awareness) and in addition there even are positive changes of some elements. We attribute this change to information that discussed the effects of a child restrain system in a thorough and objective manner.

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Appendix

Procedure Documentation „Child Restraint Seats“ for schools

Elaborated in the frame of EU-project EUCHIRES

Target Group: Children between 7 und 12 years

Contact, more information about „Gordy“-the armadillo:

Christine Chaloupka-Risser
Tel: 01/5041546-15
E-mail: christine.chaloupka@factum.at

Ralf Risser
Tel: 01/5041546-14
E-mail: ralf.risser@factum.at
Address: FACTUM OHG und INFAR-Wien, Danhausergasse 6/4, 1040 Wien

Eva-Maria Eichinger
Tel: 01/71100-5724
E-mail: eva-maria.eichinger@bmvit.gv.at;
Address: BMVIT Österr. Verkehrssicherheitsfonds, Stubenring 1, 1011 Wien

www.factum.at
www.infar.at
www.gordy.at

Topic and Intention

Children go by car with their parents, relatives, etc. on many different occasions. Quite a lot of adults, however, have a lack of knowledge concerning the correct seat belt use for children. The aim of the lesson is to make children “safety belt – experts”, so that children are able to correctly use the seat belt, to point out to their parents, that they still need a child restraint seat in case they are smaller than 150cm or to remind parents to fasten their seat belt e.g. on short trips. The lesson is part of the European traffic safety campaign EUCHIRES (EUropean public awareness campaign on the use of seat belts and CHild REstraint Systems). The “armadillo gadget” shall remind children on the safe behaviour in the car. More information about the EUCHIRES campaign in Austria can be found under www.gordy.at.

Educational objective

- Information about the legal legislation with respect to child restraint seats and use of seat belts in cars.
- Children should understand why it is important to fasten a seat belt.
- Explaining the mechanism of those powers which act when the driver (suddenly) breaks.
- By means of the armodillo gadget it will be explained how seat belts have to be used correctly. Providing of a checklist.
- Motivation of children to take care of their safety in the car themselves.

Means for work

- quiz.
- checklist „To be safe in the car“.
- measuring tape.

A possible process of the lesson

1. Introduction
A short explanation of the topic of the lesson „To be safe in the car“ open question on the whole class what do the pupils associate with “buckling up” (emotions, thoughts, experiences).

2. Quiz
Six questions with three multiple choice answers are written on a A3 paper. The questions are distributed in the class room. The children can move around, look at the questions and tick the appropriate box.

In the following all questions are discussed with the children.
Below you find the questions, background information, possible exercises and additional suggestions marked with a red arrow.

Question 1: How tall do you have to be, if you do not need any special child restraint or booster seats any more?

Right answer: 1,50m

Background / discussion: Children below 150cm are too small for ordinary seat-belts. In case of an accident they could easily be hurt. (Possible exercise: ***-> measure the children***, children can actually see how tall they have to be).

Question 2: You are travelling with the parents of your friend on a short trip to the ice parlour. Do you have to be buckled-up?

Right answer: Yes

Background / discussion: Accidents can always happen even on short car trips. Thus you always have to be buckled-up.

Question 3: Your uncle drives the car and did not fasten his seat belt. You are sitting in the back seat. What are you doing?

Right answer: I will tell him to fasten the seat belt

Background / discussion: Adults sometimes forget to fasten the seat belt. Tell them how dangerous it is to drive without seat-belt. Children might change dangerous habits of adults. ***-> actual behaviour and verbal reactions*** can be elaborated with children may be in the frame of a ***-> role play***.

Question 4: How much heavier are you, if you are catapulted to the front in the case of an accident where the driver drove 50km / h?

Right answer: 30 times of your own weight

Background / discussion: Practical examples to illustrate what it means to be catapulted to the front with 30times more than your own weight e.g. This is like you jump out of the window from the third floor. If a child weighs 35 kg you would weigh more than a ton and are just not able to cleave to something.

-> Exercise a child can kneel down on the floor like a horse. One child after the other sits on him and simulate the additional weight as long as the child is not able to hold it anymore.

Speed and acceleration and the powers emerge could be dealt with in ***-> physic lessons*** in connection with “wearing a seat belt”.

Question 5: If you are wearing a winter jacket while you are buckled-up, is this better or worse for your own safety or does it not matter?

Right answer: Worse

Background / discussion: In case of a collision the body is thrown to the front. Due to the jacket there is a gap between the body and the seat belt. The seat belt should always be fastened so that it touch the body.

Question 6: How are baby armadillos born?

Right answer: Alive

Background / discussion: This question can be used to introduce “gordy”, which every child receives at the end of the lesson. Armadillos protect themselves for enemies by rolling into their shell.
(***-> more information about the armadillo :*** www.gordy.at).

3. Reasons why people do not use safety belts and possible strategies to avoid it:

Question for the whole class: „Why do adults not use seat belts or child restraint seats for children? What might be the reason? The answers are collected and written on the board. In the following every reason is discussed and what the children could do to prevent it.

4. Checklist for “to be safe in the car”

Children should become their own safety experts. A safety checklist can be elaborated together with the children or one can discuss the existing safety checklist with the children. . On the following car rides children should take the checklist with them and should control if they use their seat belt correctly.

Examples for the checklist:

- Did all fasten their seat belts?
- Are the seat belts in order?
- Is everyone who is smaller than 1,50m sitting in a child restraint seat or on a booster seat?
- Are the seat belts tensely fastened?

-> Optional if children return their checklist to the teacher they could receive an award.

4. Ideas how to avoid boredom during a long care ride

Long car rides can be quite tiring for children. There are, however, lots of possibilities for different kinds of entertainment. The pupils shall work in groups and think about possible games or other activities, which could be played during a long car ride without disturbing the car driver. The ideas are written down on the board.

5. End

Distribution of the gadget “gordy” and information material for the parents.

More information about the topic :

www.gordy.at
Webpage of the Austrian EUCHIRES-campaign.

www.autokindersitz.at
Comprehensive Austrian web page about child restraint seats.

www.grosse-schuetzen-kleine.at
Homepage of the Austrian Committee for child-accident prevention.

7 Evaluation of an anti-speeding campaign in Slovenia

Marko Divjak and Vlasta Zabukovec[1]

Abstract

Slovenian anti-speeding campaign was evaluated with an online questionnaire based on the Theory of planned behaviour which was filled-in before and after the campaign by two independent groups of respondents. Data analyses revealed small but positive effects of the campaign in terms of changes in normative beliefs, personal norms, behavioural intentions and self-reported speeding. In other words, respondents assessed their perceived expectations of significant others, their personal obligations towards respecting the speed limits and their intentions not to speed as more positive after the campaign, and as result they also reported on less frequent speeding. One would conclude that the campaign was effective in changing socio-cognitive determinants of speeding and self-reported speeding. However, the causal inferences need to be interpreted with caution as it might be the anti-speeding campaign itself, a competing intervention or the combination of both that have produced these results.

1 University of Ljubljana, Faculty of Arts, Slovenia.

Executive Summary

This report summarises the results of the evaluation study which measured the effects of the Slovenian anti-speeding campaign "Speeding is worth regretting!" The campaign was launched nationally between 14th and 27th of April 2008 targeting car drivers in general. The two general objectives of the campaign were to reduce the frequency of speeding (behaviour change) and the number of speed related accidents. The campaign associated speeding with negative outcomes (regret and grief) that imply about death and/or severe injury, although the campaign itself was not really shocking or highly fear-evoking. The campaign combined television, radio and outdoor advertising with the intensified police enforcement of the posted speed limits (The Ministry of Internal Affairs, 2008).

Within the framework of an outcome evaluation both the perception of the campaign and its effectiveness in changing socio-cognitive variables and self-reported speeding were assessed. Recall, message takeout and attractiveness of the campaign were evaluated by means of a telephone poll among 1013 randomly selected citizens aged between 18 and 44. The vast majority of respondents recalled the campaign and its message and considered it attractive.

Effectiveness of the campaign in changing socio-cognitive variables and self-reported speeding was evaluated by means of the one group before and group after design, with two independent groups of subjects. Evaluation data were collected within two weeks before and after campaign's running period by means of an online (internet) questionnaire. The questionnaire was based on the Theory of planned behaviour (TPB) and measured social-cognitive determinants of speeding (behavioural beliefs, attitudes, normative beliefs, perceived behavioural control, intentions, personal norms and perceived risk) and self-reported speeding. Participants in both samples were recruited among the employees of various Slovenian companies that are registered in the Chamber of Commerce and Industry of Slovenia and their acquaintances, relatives, friends, etc. (snowballing sampling technique). Altogether 1504 participants responded to the questionnaire in the before-measurement period, compared to 269 respondents in the after-measurement period. Although the samples differ in size, gender and educational structure, the two groups of respondents are on the other hand equivalent in terms of kilometres driven per year, car driving frequency, received penalties for speeding, perceived likelihood of police controls enforcing the speed limits, and in terms of driver experience – length of holding a valid driver licence.

Positive changes were observed between before and after measurement periods with respect to: normative beliefs, personal norms, behavioural intentions and self-reported speeding. Respondents in the after measurement period assessed their perceived expectations of significant others, their personal obligations towards respecting the speed limits and their intentions not to speed as more positive than in the before measurement period. Respondents also reported on less frequent speeding. Perceived risk of having an accident as a consequence of speeding was significantly diminished after campaign's running period, which is difficult to explain and might be related to strengthening defence mechanisms such as unrealistic optimism.

Regression analyses confirmed the predictive validity of the Theory of planned behaviour as perceived behavioural control, behavioural beliefs and normative beliefs together explain 68 % of the variance in intentions not to speed. Further extensions of the standard TPB model resulted in a slight increase in the proportion of explained variance in intentions with 5%.

Although the current evaluation study detected positive effects on various socio-cognitive variables as well as on self-reported speeding behaviour, the nature of these effects and their causal inferences need to be interpreted with caution for several reasons. A new law with substantially higher penalties for the major traffic safety offences including speeding accompanied by strict enforcement was introduced during the after-measurement period. It is therefore difficult to say if the observed effects were influenced by the anti-speeding campaign alone, by the new law or by the combination of both. Second, it is difficult to generalise the findings to the whole population as the samples were very discrete (composed mainly of employees) and thus unrepresentative of the general population.

Introduction

Speeding represents one of the major road safety problems in Slovenia. In 2007 126 people were killed in road accidents because of speeding which accounts for 43 % of all deaths in the road context. Besides, 473 people were severely injured as a result of speeding which accounts for 37.5 % of all severe injuries on the roads. The percent of fatalities as a result of speeding increased by 14 % compared to 2006. Speeding is frequently associated with drink driving.

It was believed that anti-speeding media campaign integrated with police enforcement may help Slovenian drivers recognise the danger associated with speeding and consequently change their risky behaviours with regard to driving speed. The campaign actually aimed at (objectives):

- increasing the percentage of drivers observing the posted speed limits (behaviour change),
- reducing the number of speed-related accidents.

The campaign was run by The Ministry of Internal Affairs which was responsible for funding, setting-up and implementing the campaign. The Police and Slovenian Road Safety Council were the two most important stakeholders involved in the campaign's process. The Police was in charge of intensively enforcing the speed limits within campaign's running period, while Slovenian Road Safety Council had more an advisory role in setting-up a campaign and at the same time it was highly interested in the evaluation results in order to improve future road safety campaigns.

Media campaigns

The anti-speeding campaign was a national campaign. It had been implemented for two weeks between 14th and 27th of April 2008. The campaign might be interpreted as being part of the long term strategy since it was June 2007 when it was launched for the first time.

The campaign was designed to address all Slovenian drivers (especially car drivers), which means the target group was very general and non-specific. Truck drivers, bus drivers and motorcyclists might be considered secondary target groups.

Campaign's slogan is about grief/regret and can be translated as "Speeding is worth regretting!" The word regret is combined with the word grief – so the slogan implies about fatal and devastating consequences of speeding which might lead to grief. The message of the campaign associates speeding with negative outcomes (regret, grief) that imply about death or severe injury (however, it is not really shocking). The video reviews the sequence of an accident backwards starting with hitting a person and ending with everything being normal/OK. The driver than says out loud **"If I could only turn back time"** followed by the campaign's slogan.

Media plan consisted of television, radio and outdoor advertising. Two versions of the radio spot and two versions of the TV spot (the one with the male and the other with the female character/speaker) were broadcasted inside prime time – 289 emissions on TV and 894 emissions on the radio. There were also 200 billboards located near state roads inside towns (in urban areas, not on highways). Besides, 20 000 (50 x 70 cm) posters with campaign's slogan "Speeding is worth regretting!" were distributed to the local road safety councils who further disseminated them to schools, kindergartens, health centres and other busy public areas.

There was no pretesting of the message, no pretesting of the media plan and no situational analysis to learn about the target group and to adapt the campaign's strategy accordingly.

The campaign was integrated with the police intensively enforcing the posted speed limits although the number of controlled cars, the number of issued tickets/fines and the surveillance intensity is unknown. In the after-measurement that is within two weeks after campaign's running period a new legislation was adopted with higher fines (and intensive police enforcement) for all the major traffic offences including speeding. This is rather unfortunate, making it difficult to ascertain the actual effect of the campaign, instead it has to be regarded as a combination of measures.

The aim of the study was to change a number of different socio-cognitive variables and self-reported speeding behaviour.

Method

Participants

1504 participants in the first sample (before period) and 269 participants in the second sample (after period) responded to the questionnaire completely (answered all questions). The "before sample" consisted of 45,8% male and 54,2% female respondents, while in the "after sample" there were 51% males and 49% females. Regardless of the slight differences the two samples are statistically equivalent in terms of their gender structure ($\chi2(1) = 2.350$; $p = 0.125$). However, there is somewhat more variability between the samples when it comes to age and educational level of participants. Respondents in the "after sample" were somewhat older (on average 36.8 years, SD = 11.3 years) and more highly educated compared to respondents in the "before sample" who were somewhat younger (on average 34.2 years, SD = 10.9 years) and slightly less educated. The two samples were significantly different in terms of both age ($t(1733) = - 3.511$; $p = 0.000$) and educational level ($\chi2(1) = 4.807$; $p = 0.028$).

Table 1. Age structure of respondents in both samples.

	Before the campaign	After the campaign
25 years and younger	25.5	18.3
From 26 to 45 years	54.3	52.9
46 years and older	20.2	28.8

Table 2. Educational structure of respondents in both samples.

	Before the campaign	After the campaign
(Un)finished elementary school	.3	.4
Finished secondary school	37.7	30.5
Higher/university education	62.0	69.1

Regardless of the differences between the samples it is evident (Table 2) that almost two thirds of respondents acquired higher/university education while the remaining one third of respondents completed secondary school. There are almost no representatives of the lower educational level (finished or unfinished elementary school) in the sample(s) which might be the consequence of the adopted sampling procedure.

Although the size of the two samples substantially differs, the two groups of respondents are on the other hand equivalent in terms of kilometres driven per year ($\chi2(3) = 1.159$; $p = 0.763$), car driving frequency ($\chi2(3) = 0.405$; $p = 0.939$), received penalties for speeding ($\chi2(2) = 2.642$; $p = 0.267$), perceived likelihood of police controls enforcing the speed limits ($t(1748) = - 1.665$; $p = 0.096$) and in terms of driver experience – length of holding a valid driver licence ($t(1731) = - 1.035$; $p = 0.301$).

The samples are not representative of the Slovenian population of car drivers (campaign's primary target group) as they mainly consist of employees from the sector of commerce and industry. Other important segments of the population such as young people, retired people, employees from other sectors (e.g. public sectors) and individuals without having access to the internet might either be highly underrepresented or even completely absent from the sample. Besides, not all Slovenian companies are members of the Chamber of Commerce and Industry of Slovenia and not all member companies have their websites with e-mail addresses available, which further contributes to the selection bias. In addition, substantial number of people who received an invitation to fill in the online questionnaire refused to respond resulting in a non-response bias. Respondents might have been to certain extent either highly compliant or highly reluctant towards existing speeding regulations.

Outcome evaluation of the anti-speeding campaign consisted of two separate parts:

- evaluating perception of the campaign,
- evaluating effectiveness of the campaign in terms of changing socio-cognitive variables and self-reported speeding.

Procedure

A telephone poll was carried out by an independent marketing agency to measure the perception (recall, message takeout, attractiveness) of the anti-speeding campaign among 1013 randomly selected citizens aged between 18 and 44. Data collection started approximately three weeks after campaign's running period.

Next, the data referring to the effectiveness of the anti-speeding campaign were collected within two weeks before and after the campaign's running period by means of an online (internet) questionnaire. A link to the questionnaire was sent to more than 1000 publicly accessible e-mails of employees of various Slovenian companies (registered in the Chamber of Commerce and Industry of Slovenia) and to some 50 private/personal e-mails with a request to forward it to one's friends, relatives, co-workers, acquaintances, etc. (snowballing sampling technique). An invitation to participate in the online survey together with a link to the questionnaire was sent to the same collection of potential participants both before and after the campaign, which means the two samples are not fully independent. In fact, almost 44 % of after-survey respondents reported that they had already filled out similar questionnaire a month ago. However, it was not possible to track responses of single participants from one survey to another so it is just the group means of the before and after surveys that will be compared.

Questionnaire

A questionnaire was constructed based on the Theory of planned behaviour (TPB) and measured social-cognitive determinants of speeding and self-reported speeding. Next to the standard TPB constructs (behavioural beliefs, attitudes, normative beliefs, perceived behavioural control, intentions and self-reported behaviour) it also included additional measures (personal norms, habits and perceived risk) that might be useful in improving the predictive validity of the standard TPB model Participants were presented with a list of items reflecting various social-cognitive constructs of speeding and they had to indicate their level of agreement with each item by means of a five-point Likert scale (1 – strongly disagree, 5 – strongly agree). The number of items that was used to measure each social-cognitive construct is summarised in Table 3.

It needs to be mentioned that behavioural beliefs are very specific perceptions of the consequences of speeding while attitudes are far more general orientations towards speeding. Both concepts (direct and indirect measures of attitudes) were included in the questionnaire.

There were seven measures of self-reported speeding in the questionnaire. First, participants were asked how often, during the last three months, they had exceeded the speed limits up to 10 % (inside towns, on regional roads and on freeways) and the frequency of exceeding the speed limits for more than 10 % (again inside towns, on regional roads and on freeways) on a five-point scale (1 – never, 5 – always). Second, they were asked to think of all their drives in the last three months and to estimate (a) the percentage of drivers who keep the speed limits, (b) the percentage of speeding up to 10 % above the speed limits and (c) the percentage of speeding for more than 10 % above the speed limits – regardless of the road type. The three estimates were to sum up to 100.

Next, there were six items in the questionnaire measuring perceived risk of having an accident if exceeding the speed limits for up to 10 % or for more than 10 % on three road types (inside towns, on regional roads and on freeways). Participants rated the likelihood of having an accident on a five-point scale (1 – very unlikely, 5 – very likely).

Data analysis

Aggregated results for all scales except for self-reported behaviour were obtained by averaging the scores of single items that comprise a particular scale. In case of self-reported speeding the first component of principal component analysis was used to (effectively) summarise the variance of single items. Next, t-test was used to compare the results between the two measurement periods. Finally regression analysis was carried out to see how well standard and extended TPB variables predict intentions not to speed.

Results

Perception of the anti-speeding campaign (telephone poll)

Altogether 77 % of respondents recalled a campaign that was about driving speed (spontaneous recall – 64 % of respondents, aided recall – 12 % of respondents). More than half of them remembered campaign's slogan (Speeding is worth regretting), while 45 % of respondents reported that a campaign was set up to warn about the problem of speeding. In general, a campaign is considered attractive. On a five-point scale (1 – did not like it at all, 5 – like it a lot) the average likeliness score accounts for 3.7.

Effectiveness of the anti-speeding campaign (online questionnaire)

Table 3. Reliability analysis and inter-scale correlations.

Scale	Number of items	α	1	2	3	4	5	6	7	8	9
1. Behavioural beliefs	5	.841		.782	.540	.620	.519	.501	.634	.499	.452
2. Attitudes	6	.851			.598	.722	.691	.509	.763	.614	.566
3. Normative beliefs	3	.749				.556	.533	.323	.590	.489	.413
4. Personal norms	2	.741					.700	.358	.772	.669	.624
5. Perceived control	5	.806						.324	.769	.702	.643
6. Perceived risk	6	.867							.390	.289	.320
7. Intentions	5	.841								.665	.616
8. Habit to respect speed limits	2	.813									.676
9. Respecting the speed limits (behavioural measure)	7	.874									

Note. All correlations are statistically significant at a level of $p < 0.01$.

All scales have high reliability coefficients – most of them even above 0,8. Besides, the scale-correlations are all positive with correlation coefficients ranging from moderate to very high sizes.

Table 4. Campaign's effects on TPB scales (standard and extended) – aggregated measures.

	Before		After			
Scale	M	SD	M	SD	t-test	Cohen's d
Behavioural beliefs	3.71	.80	3.64	.80	t(1759) = 1.140; p = .254	/
Attitudes	3.47	.85	3.47	.88	t(1759) = .051; p = .959	/
Normative beliefs	3.18	.94	3.32	.84	t(1759) = - 2.442; p = .015	0.15
Personal norms	3.01	1.04	3.16	.99	t(1759) = - 2.289; p = .022	0.15
Perceived behavioural control	3.00	.91	3.05	.96	t(1759) = - .693; p = .488	/
Perceived risk	3.08	.83	2.89	.81	t(1759) = 3.447; p = .001	0.23
Intentions	3.10	.90	3.24	.91	t(1759) = -2.157; p = .031	0.14
Habit to respect the speed limits	3.44	1.12	3.54	1.08	t(1759) = - 1.387; p = 0.166	/
Respecting the speed limits (behavioural measure)*	-.03	1.00	.16	.95	t(1759) = - 2.840; p = .005	0.19

Note. Scale 1 to 5 (1=strongly disagree; 5=strongly agree); * z-value.

The two samples differed significantly in terms of normative beliefs, personal norms, intentions, self-reported behaviour (aggregated measure) and perceived risk of having an accident because of speeding. Respondents in the after period reported less frequent speeding (higher z-value indicates higher degree of respecting the speed limits and hence less frequent speeding), more positive intentions not to speed, more positive personal obligation towards respecting the speed limits and more positive (perceived) expectations of significant others - they perceived their significant others as more attentive and less careless to their speeding. However, they also reported lower perceived risk of having an accident as a consequence of speeding, which is rather surprising. Maybe as they speed less frequently (compared to the before period) they might also estimate the perceived risk of an accident that goes along with speeding as being less probable. According to the values of Cohen's D the size of detected effects is fairly small.

Table 5. Campaign's effects on self-reported speeding – single items.

	Before		After			
Item	**M**	**SD**	**M**	**SD**	**t-test**	**Cohen's d**
Up to 10 % over the speed limit:						
inside towns	3.12	1.09	2.97	1.09	t(1759) = 2.028; p = .043	0.14
regional roads	3.06	1.05	2.80	1.07	t(1759) = 3.559; p = .000	0.24
freeways	2.81	1.25	2.71	1.17	t(1759) = 1.137; p = .256	/
More than 10 % over the speed limit:						
inside towns	2.45	1.07	2.30	1.03	t(1759) = 2.104; p = .035	0.14
regional roads	2.47	1.07	2.21	1.03	t(1759) = 3.672; p = .000	0.24
freeways	2.26	1.14	2.16	1.09	t(1759) = 1.423; p = .155	/
Percentage of drives according to the speed limit	56.82	26.14	58.58	27.16	t(1759) = - .991; p = .322	/

Note. Lower mean values indicate less frequent speeding.

It is evident that self-reported speeding decreased significantly between the two measuring periods both inside towns and on regional roads. According to the values of Cohen's D the observed effects are relatively small in size. On the other hand, no effect was detected with respect to self-reported speeding on freeways.

Table 6. Significant effects of the campaign on specific single items measuring TPB constructs (standard and extended).

	Before		After			
Item	**M**	**SD**	**M**	**SD**	**t-test**	**Cohen's d**
Intentions						
I will probably (not) obey the posted speed limits in the future.*	3.21	1.25	3.45	1.17	t(1759) = -2.874; p = .004	0.19
I will sometimes still speed in the future.*	2.70	1.18	2.93	1.14	t(1759) = -2.885; p = .004	0.19
Behavioural beliefs						
When I drive according to the speed limits I contribute to the safety of all traffic participants.	4.08	1.09	3.94	1.08	t(1759) = 1.980; p = .048	0.13
Perceived behavioural control						
I believe I am able to keep with the speed limits on every drive.	3.65	1.15	3.47	1.19	t(1759) = 2.412; p = .016	0.16
When I am really in a hurry I can absolutely (not) drive according to the speed limits.*	2.67	1.16	2.86	1.18	t(1759) = -2.435; p = .015	0.16
Normative beliefs						
My partner is not bothered at all if I drive faster than is allowed.*	3.18	1.27	3.42	1.11	t(1759) = -3.112; p = .002	0.19
My best friend does not care if I drive faster than is allowed.*	3.04	1.11	3.22	1.00	t(1759) = -2.408; p = .016	0.16
Personal norms						
I consider myself a person who never drives faster than is allowed.	2.77	1.12	2.98	1.11	t(1759) = -2.774; p = .006	0.19

Items marked with * are reversed which means the higher the scores the more positive the evaluation of particular socio-cognitive construct with regard to obeying the speed limits.

Next to the measures of intentions, personal norms and normative beliefs which have already been described as being significantly different in the two samples (see Table 4), significant differences were also observed in two single items measuring perceived behavioural control. However, one change was positive and the other was negative. After campaign's running period respondents disagreed more strongly with the statement that they absolutely can not drive according to the speed limits when they are in a hurry (positive change), while they were less convinced about their ability to keep up with the posted speed limits (negative change). Another significant negative change was observed in one specific behavioural belief as respondents were less convinced that when driving in accordance with the speed limits they contribute to the safety of all traffic participants. According to the values of Cohen's D all observed effects are relatively small in size.

Table 7. Campaign's effect on items measuring perceived risk of an accident (when speeding).

	Before		After			
Item	**M**	**SD**	**M**	**SD**	**t-test**	**Cohen's d**
Speeding up to 10 % over the limit:						
inside towns	2.36	1.03	2.21	.93	t(1759) = 2.339; p = .020	0.15
regional roads	2.62	1.00	2.38	.96	t(1759) = 3.507; p = .000	0.24
freeways	2.67	1.23	2.39	1.10	t(1759) = 3.720; p = .000	0.23
Speeding more than 10 % over the limit:						
inside towns	3.60	1.02	3.50	1.01	t(1759) = 1.433; p = .152	/
regional roads	3.65	.98	3.53	.97	t(1759) = 1.896; p = .058	/
freeways	3.59	1.19	3.33	1.13	t(1759) = 3.344; p = .001	0.22

Note. The higher the mean score the higher the perceived risk of an accident in case of speeding.

The average scores on four out of six items measuring perceived risk of an accident are significantly lower in the after-measurement period. Respondents in the second sample (after the campaign) surprisingly reported on significantly lower risk estimates than respondents in the before-measurement period, which is difficult to explain. Again the effects are fairly low in size (Cohen's d).

Model testing

As the evaluation of the campaign was based on the Theory of planned behaviour we were also interested to see how well the variables of the standard and extended TPB model predict intentions. In the first step (Model 1) only the standard predictors of intentions were entered in a regression equation (behavioural beliefs – an indirect measure of attitude, normative beliefs – an indirect measure of subjective norm and perceived behavioural control). Aggregated measures of personal norm and perceived risk of having an accident because of speeding were added to the equation in the second step (Model 2), and past behaviour was finally entered in the third step (Model 3) – it was assumed that if past behaviour was entered in a model in an earlier phase it would have probably explained most of the variance in intentions as intentions highly correlate with behaviour. Two separate regression analyses were carried out – each for one data set.

Table 8. Prediction of intentions – model summary.

	Before the campaign		After the campaign	
	R	**Adjusted R^2**	**R**	**Adjusted R^2**
Model 1	.825	.680	.829	.683
Model 2	.854	.729	.849	.716
Model 3	.855	.731	.851	.718

The results of the two analyses are almost identical. It is evident that standard TPB variables (Model 1) explain almost 70% of the variance in intentions, which means that behavioural beliefs, normative beliefs and perceived behavioural control are very good predictors of intentions. It is evident that the two extensions of the basic model only slightly improved its predictive power – the percentage of explained variance in intentions in the third model was higher by additional 5% in the before-measurement period and by additional 4% in the after-measurement period.

Table 9. Prediction of behavioural intentions – standardised coefficients.

	Before the campaign			After the campaign		
	Beta	**t**	**Sig.**	**Beta**	**t**	**Sig.**
Model 1						
Perceived control	.548	30.082	.000	.550	12.400	.000
Behavioural beliefs	.268	14.691	.000	.275	6.026	.000
Normative beliefs	.152	8.147	.000	.142	3.278	.001
Model 2						
Perceived control	.383	19.551	.000	.425	8.904	.000
Personal norms	.346	16.297	.000	.266	5.184	.000
Behavioural beliefs	.148	7.728	.000	.166	3.308	.001
Normative beliefs	.102	5.835	.000	.106	2.539	.012
Perceived risk	.036	2.346	.019	.054	1.297	.196
Model 3						
Perceived control	.360	17.405	.000	.383	7.095	.000
Personal norms	.326	14.884	.000	.245	4.660	.000
Behavioural beliefs	.146	7.670	.000	.164	3.290	.001
Normative beliefs	.103	5.906	.000	.103	2.471	.014
Past behaviour (respecting the speed limits)	.060	3.281	.001	.083	1.678	.095
Perceived risk	.031	1.987	.047	.054	1.321	.188

According to the size of the standardised coefficients in the basic TPB model (Model 1) it is evident that perceived behavioural control has substantially higher predictive power than behavioural and normative beliefs with normative beliefs being the least important of the three predictors of intentions. The low predictive power of normative beliefs is not surprising as significant others are not always present in a road context (e.g. while driving in a car) and hence their potential pressure/influence upon a driver might be substantially reduced (De Pelsmacker & Janssens, 2007). Others (e.g. Haglund & Åberg, 2000) would argue that perceived pressure of other drivers on the road could be more important than the perceived pressure of significant others.

Among the three variables of the extended TPB model (Model 3) perceived risk and past behaviour were weak and insignificant predictors of intentions not to speed. Personal norms on the other hand strongly and significantly contribute to the prediction of intentions In the extended TPB model perceived behavioural control is again the strongest predictor of intentions, which is then followed by personal norms and behavioural beliefs.

Summary and conclusions

Respondents in the after measurement period in comparison with those in the before measurement period appear to speed less frequently (especially inside towns and on rural roads but not on highways), to have more positive intentions not to speed and to have stronger personal obligation to respect the speed limits. They also have more positive results on two items measuring normative beliefs, which mean they perceive their partner and best friend as being more attentive and less careless to their speeding (compared with a before-measurement period). These are all positive changes.

As a result of the implementation of the new law it is very likely that the observed effects are the consequence of both the anti-speeding campaign and this law. But at this point it is impossible to conclude which of the two interventions had more significantly influenced particular outcomes. Regardless of the source it needs to be emphasised that the size of effects is rather small (Cohen's Ds). So neither the anti-speeding campaign nor the new law (or the combination of both) has produced large effects in any of the TPB variables. This might be related to the intensity of respondent's exposure to campaign's messages and police enforcement actions (which might have been too low) or to the fact that a disturbance in the social-cognitive constructs (e.g. intentions, attitudes) needs some time to consolidate. In this case the campaign lasted for two weeks only and was then immediately followed by the second data gathering period – there might just not be enough time for the potential effects to be reflected in the corresponding constructs and/or behaviour patterns.

However, while interpreting the changes between the samples in terms of causality (assuming they were caused by the anti-speeding campaign and/or the new law) it needs to be taken into account that the two samples substantially differ in size as well as in terms of age end educational level of respondents. The after-survey sample was much smaller in size with the respondents being significantly older and more educated in comparison with the before-survey sample. If age and education relate to maturity and social responsibility it is hence reasonable to believe that these factors might have to certain extent contributed to the more positive results of the after-survey sample and not the campaign alone.

Apart from expected positive changes also some unexpected negative changes emerged. Perceived risk of an accident while speeding was substantially lower after the campaign, which is rather surprising as the campaign's message was designed to explicitly warn about the negative consequences of speeding. In other words participants in the "after sample" were less concerned about the likelihood of an accident while speeding than participants in the "before sample". One may (intuitively) assume that media campaign and/or other intervention would increase the awareness of risks associated with speeding but apparently this is not the case and this is hard to explain. Is it possible that respondents turned on their defences and strengthened their unrealistic optimism? Unrealistic optimism is reflected in people's beliefs that they are better than average drivers and that "accidents happen to other people not to themselves" (Walton & McKeown, 2001).

When seeing/hearing campaign's message "Speeding is worth regretting!" respondents might got frustrated (anxious) and resolved the emerging dissonance between actions (speeding patterns) and feelings (afraid to injure themselves or others) in such a way that they empowered their unrealistic optimism and adjusted (lowered) their perceptions of risk of speeding accordingly.

To conclude, the current evaluation study detected positive but small effects on speeding behaviour, intentions not to speed, and on one's personal norms and normative beliefs about speeding. However, these effects need to be interpreted with caution as it is difficult to say if they were influenced by the anti-speeding campaign alone, by the new law or by the combination of both overlapping interventions. It is also not clear how much the differences between the two samples contributed to the final results.

Another important task – apart from evaluating the effectiveness of the campaign – was to assess the predictive power of the Theory of planned behaviour as all relevant data were collected during the evaluation study. Namely, the whole evaluation of the current campaign was based on that particular theoretical framework and all the central concepts were measured. The results have shown that the standard TPB model accounts for almost 70 % of variance in intentions not to speed. In other words, intentions to obey the speed limits are sufficiently explained by standard TPB predictors – attitudes, subjective norms and perceived behavioural control – with the latest having the largest impact upon intentions. According to these results anti-speeding intentions should primarily be influenced by shaping drivers' perceptions of control and ability to drive within the speed limits in all road contexts.

As the influence of the three standard TPB predictors upon intentions is far from being complete (or 100 %) it seems interesting to set up an extended version of the TPB model to check how do additional predictors contribute to the overall percentage of explained variance in intentions. Many recent scientific studies have done the same, as there are numerous influences upon behaviour and intentions in the road context (beside the standard TPB predictors) such as other kinds of norms, habits which are often measured in terms of past behaviour, perceptions of one's vulnerability and others (De Pelsmacker & Janssens, 2007). In this case personal norms, perceived risk and past behaviour were included in the standard TPB model and as a result the percentage of explained variance in intentions increased by additional 4-5 %. According to the regression coefficients perceived behavioural control is (again) the most powerful predictor of intentions, however, it is closely followed by personal norms, which indicates that one's personal beliefs about oneself and his/her moral obligations might also have a significant impact upon intentions not to speed.

Limitations

It is difficult to say if the observed changes can in fact be attributed to the combination of the anti-speeding campaign and the increased enforcement of the speed limits. It needs to be taken into account that data gathering after the campaign's running period had been confounded by the new law that was introduced in that period and accompanied by even stricter enforcement actions (the new law imposed substantially higher fines for all major traffic offences including speeding). This means that while answering the online questionnaire respondents might have been under the influence of the new law and accompanying enforcement and not only under the influence of the past anti-speeding campaign. Besides, it is also difficult to conclude about the effectiveness of the campaign in general as the two samples were not really representative of the target population (which were all car drivers especially those between 18 and 44 years old). For example, respondents with lower educational levels (e.g. elementary school) were almost absent from the sample while people employed in sectors other than commerce and industry were highly underrepresented in the sample. In addition, selection bias was introduced as lots of invited participants refused to participate, which means some specific subgroups very different from the general population might appear in the sample (very motivated individuals or those with extremely positive or negative attitudes towards speeding). Besides, the introduction of the new law could have further affected the selection bias in the after measurement period in such a way that it was more likely for the strict/extreme advocators or opponents of the new law to answer the online questionnaire.

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8 Evaluation of the Greek drink driving campaign

Teti Nathanail and Giannis Adamos[1]

Abstract

This report includes the results of a study on the effects of the Greek drink driving campaign. The campaign implementation started in April and ended in May 2008. The main aim of the campaign was to enhance young people's awareness of the problem of drink driving.

The scope of the campaign was local. The venue of the campaign implementation was the campus University of Thessaly campus (School of Engineering), the target group was young students (aged 18-30 years old), both drivers and passengers.

For the purposes of the campaign evaluation, a questionnaire survey was conducted in order to collect data before and after the implementation of the campaign. The questionnaire was constructed according to a modified version of the Theory of planned behaviour (TPB), which predicts that subjective norms, perceived behavioural control, and attitudes affect behaviour indirectly via intentions.

The results show that the campaign had greater effect on passengers than drivers. Furthermore, the drivers in the after study had become slightly more negative about drinking and driving although this effect was not significant. This would then indicate that the campaign had some effect even if it was not very great. It could therefore be argued that this behaviour is relatively difficult to change and more attempts are needed.

1 University of Thessaly, Greece.

Executive summary

The aim of the campaign was to enhance young people's awareness of the problem of drink driving. The campaign implementation also focused on making young drivers and passengers become more knowledgeable about the legal limits of alcohol usage and at the same time to be able to translate this information into a quantitative measure, meaning practically, the quantity of the upper permissible limit of alcohol.

This report contains the results of the evaluation research on the effects of the Greek drink driving campaign, which was launched for four weeks between 14th of April and 14th of May 2008. The campaign implementation consisted of the distribution of 500 brochures and 500 posters all around the campus of the University, as well as a Workshop concerning road safety and specific aspects of it (drink driving, seat belt and helmet usage) took place the last day of the campaign duration.

A questionnaire survey was conducted in order to collect data before and after the implementation of the campaign. The questionnaire was constructed according to a modified version of the Theory of planned behaviour (TPB), which predicts that subjective norms, perceived behavioural control, and attitudes affect behaviour indirectly via intentions.

The population was separated between drivers and passengers using two groups of students, those who belonged to civil engineering department (*experiment group*) and all the other students of the campus who were the control group. The sample size was confined to 200 students out of a population of 1500 students.

Both descriptive and inferential analyses were conducted in order to analyse the data. In the framework of the first category, a number of characteristics of the sample, like total number of sample size and population, age and gender is being described, as well as some other information about the sample, like percentage of participants being involved in accidents, is given. In the framework of the inferential analysis, the effectiveness of the campaign was tested. Hypothesis testing was used to assess on whether the values of the parameters between two groups were statistically different, while p-values were estimated so as to indicate the level of significance above, which the hypothesis rejection stands.

During the model testing, regression analysis was used in order to identify the causal relations between dependent and independent variables. In this part of the analysis, various combinations were examined, varying in the group considered (i.e. experiment before, experiment after, control before, control after, for drivers), in the dependent variable (i.e. intention and behavior), and the type and number of predictors (i.e. behavioral, control and normative beliefs, descriptive norm, past behavior and intention). In order to specify constructs to be used in each of the models considered, Cronbach Alpha was run. The assumption of a value greater than 0.6 was used before the items were combined into an aggregated measures. The results of Cronbach Alpha indicated that, in some cases, different variable combinations should be used for the development of prediction models.

The main results of the campaign evaluation showed, first of all, that the total percentage of those who had seen or heard about the local campaign was 79%, while the average mark of the appreciation of the campaign, on a scale of from 1 to 7, was 5.64 indicating that they really liked the campaign.

The comparison between before and after measures were used according to a modified version of the TPB, which showed that there were basically no significant changes between the experiment group of drivers before and after the implementation of the campaign. However, most of the noted changes were in the "right" direction, with the after groups agreeing more with statements concerning negative outcomes of drinking and driving and more likely to be convinced not to drink and drive. This would then indicate that the campaign had pushed the group in the right direction and perhaps some more attempts to change this group will be even more successful. As far as passengers are concerned the campaign appeared to be slightly more successful since the participants in the after study were more likely to persuade a driver not to drink and drive than in the before study.

The results of the comparison between the control group of drivers before and after the implementation of the campaign showed that there was no significant difference, albeit on just one occasion. The participants in the after study would be more convinced not to drink and drive if they had had a negative experience regarding the same. As far as passengers were concerned none of the differences were significant. The results also showed that the mean values of the variables were almost the same before and after the campaign, a result that we expected since the control group of passengers was not exposed to the campaign and so their answers were not affected.

The comparison between the experimental group of drivers and the control group before the implementation of the campaign showed that there was only one significant difference between the two groups. The participants in the control group had in the past been less likely to drive back after a party, if the journey back was long. This would then confirm that the two groups were very similar before the intervention. As far as passengers were concerned, the two groups did not differ.

The results of the regression analysis testing a modified and extended version of the TPB showed that the addition of descriptive norm and past behaviour increased the explained variance over and above the items already included in the TPB. For example, concerning the "experiment after" group, results show that the percentage of the variance in intention to drink and drive increased from 37% to 62% when the variable descriptive norm was added to the model, and to 76% when past behaviour was included.

Similar results were presented when past behaviour was included as the dependent variable and behavioural, control and normative Beliefs as the independent variables (model 4). The fifth model, added descriptive norm and the sixth model intention. The results showed that the percentage of the variance in past behaviour to drink and drive explained by TPB increased from 46% (model 4) to 60% (model 5) and rises to 74% (model 6).

Introduction

In its White Paper (EC, 2001) on the transport policy, the European Commission (EC) adopted an ambitious target to reduce the number of persons killed on the roads by 50% by the year 2010. Among other measures, it supports the realization of pan-European road safety campaigns to contribute to this objective. Specifically, the EC wishes to develop a powerful and innovative tool for the evaluation of campaigns to be able to improve the next campaign. The innovative tool has to be based on a methodology capable of isolating the effects of a campaign among effects inferring from other parallel measures and has to focus on the direct impact sought which is the reduction of the number of killed and injured in traffic.
In this framework, University of Thessaly, designed, implemented and evaluated a local road safety campaign with the theme of drink driving. The aim of the campaign was to enhance young people's awareness of the problem of drink driving and gain young people acceptance in a series of measures to alter this phenomenon. In Greece, road safety statistics indicate an annual rate of 20.000 road accidents, 1.700 fatalities and 30.000 injured people.

According to the formal tables of the Road Traffic Police, 89% of accidents are due to illegal driving, while drink driving is among the 3 main cases concerning illegal drivers' behaviour. The following tables indicate the severity of road accidents in Greece and show the number of crashes, injuries and deaths for each user category (Table 1), gender (Table 2) and age group (Table 3). Also, the number of drink driving offences is shown in tables 4 and 5.

Table 1. Fatalities by user group.

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Driver	1207	1199	1261	1228	1193	1131	979	1010	1017	1053	1077
Passenger	528	497	504	489	469	411	376	338	360	371	313
Pedestrian	422	409	417	399	375	338	279	257	293	234	267
Total	*2157*	*2105*	*2182*	*2116*	*2037*	*1880*	*1634*	*1605*	*1670*	*1658*	*1657*

Source: Care –Database.

Table 2. Fatalities by gender.

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Female	508	449	477	453	440	416	351	289	364	355	290
Male	1639	1647	1688	1653	1590	1458	1277	1313	1303	1296	1361
Unknown	10	9	17	10	7	6	6	3	3	7	6
Total	*2157*	*2105*	*2182*	*2116*	*2037*	*1880*	*1634*	*1605*	*1670*	*1658*	*1657*

Source: Care –Database.

Table 3. Fatalities by age group.

YEAR	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<14	*63*	*61*	*44*	*48*	*34*	*41*	*43*	*44*	*37*	*38*
14-17	*91*	*82*	*81*	*88*	*66*	*57*	*51*	*83*	*64*	*44*
18-25	*480*	*453*	*476*	*476*	*434*	*433*	*325*	*333*	*362*	*381*

Source: Care –Database.

Table 4. Drink driving offences (National).

Offences of alcohol use (1st Semester of 2008 – 2007)						
YEAR	***2008***		***2007***		**Difference**	***Difference of percentage of offences (2008-2007)***
PERSONS TESTED	779287	% of offences over tested persons	720957	% of offences over tested persons	58330	
DRUNK PERSONS	23409	3%	22644	3.14%	765	3.4%
OFFENCES	19744	2.54%	18981	2.63%	763	4.0%
0.10-0.24 mgr/l	2387	12.09%	2369	12.48%	18	0.8%
0.25-0.40 mgr/l	12109	61.33%	11604	61.13%	505	4.4%
0.41-0.60 mgr/l	5248	26.58%	2008	26.38%	240	4.8%

Note: The permissible alcohol limit is 0.25 mgr/l.
Source: Road Traffic Police.

Table 5. Drink driving offences (Local).

Offences of alcohol use (2007 – 2006)						
YEAR	***2007***		***2006***		**Difference**	***Difference of percentage of offences (2007-2006)***
PERSONS TESTED	11199	% of offences over tested persons	10820	% of offences over tested persons	379	
DRUNK PERSONS	860	7.68%	907	8.38%	-47	-0.7%

Source: Road Traffic Police.

This report contains the results of the evaluation research on the effects of the Greek drink driving campaign, which was launched for four weeks between 14th of April and 14th of May. The campaign implementation consisted of the distribution of 500 brochures and 500 posters all around the campus of the University, as well as a Workshop concerning road safety and specific aspects of it (drink driving, seat belt and helmet usage), which took place the last day of the campaign duration.

The overall aim of the campaign was to enhance young peoples' awareness of the problem of drink driving and gain young people acceptance in a series of measures to avert this phenomenon. The more specific ones were as follows:

1. To increase the percentage of people who know about the upper permissible limit of alcohol and link it to a glass of alcohol.
2. To raise the awareness of 18-30 years old drivers of the danger of drink driving.
3. To increase the positive attitude towards the upper permissible limit of alcohol use.
4. To check the measures that could convince young people not to drink and drive.
5. To decrease the percentage of young people who intend to drink and then drive home.
6. To increase the percentage of the people who report that when they have drunk they prefer not to drive.
7. To decrease the percentage of the young people who drink at least a glass of alcohol and then drive home.

METHOD

Participants and design

The population used in the evaluation of the campaign came from the School of Engineering at the University of Thessaly. Students in the Civil Engineering Department were in the experiment group and all the other students were in the control group.

The total number of the sample size was defined at 400 students (200 for the before study and 200 for the after study), while the total population was 1500 students.

These characteristics of the sample are shown in the following tables (Tables 6, 7, 8, 9 and 10).

Table 6. Number of participants across groups.

	BEFORE STUDY		AFTER STUDY	
	DRIVERS	PASSENGERS	DRIVERS	PASSENGERS
Experiment group	35	31	18	34
Control group	73	61	67	81
Total	**200**		**200**	

Table 7. Participants gender across the four groups.

GROUP – DRIVERS	*FREQUENCY*	*PERCENT*
Experiment-before		
Female	4	11.4
Male	31	88.6
Control-before		
Female	18	24.7
Male	55	75.3
Experiment-after		
Female	4	22.2
Male	14	76.1
Control-after		
Female	16	23..9
Male	51	76.1
GROUP – PASSENGERS	***FREQUENCY***	***PERCENT***
Experiment-before		
Female	20	64.5
Male	11	35.5
Control-before		
Female	38	62.3
Male	23	37.7
Experiment-after		
Female	22	64.7
Male	12	35.3
Control-after		
Female	47	58
Male	34	42

Table 8. Age statistics across the four groups.

GROUP - DRIVERS	N	Min	Max	M	SD
Experiment-before	35	19	30	22.7	2.3
Control-before	73	18	27	22.4	2.1
Experiment-after	18	20	31	23.5	2.5
Control-after	67	19	28	22.8	1.9
GROUP - PASSENGERS	**N**	**Min**	**Max**	**M**	**SD**
Experiment-before	31	18	27	22.2	2.2
Control-before	61	18	25	21	1.8
Experiment-after	24	18	28	21.7	2.6
Control-after	81	18	25	21.1	1.9

Table 9. Years owning a driver's licence.

YEARS	N	M
Drivers	193	3.8

Table 10. Involvement in accidents.

DRIVERS	N	YES	NO
N	193	54	139
Percent	100%	27.9%	72.1%

The possibility that students who belong to the control group could have been exposed to the campaign was avoided by asking them whether they have seen or heard about the specific campaign. In case someone stated that they had seen or heard about our campaign, they were rejected from being part of the control group.

The evaluation has been set up as a quasi-experimental design with before and after measures including the use of an experiment and a control group.

The material

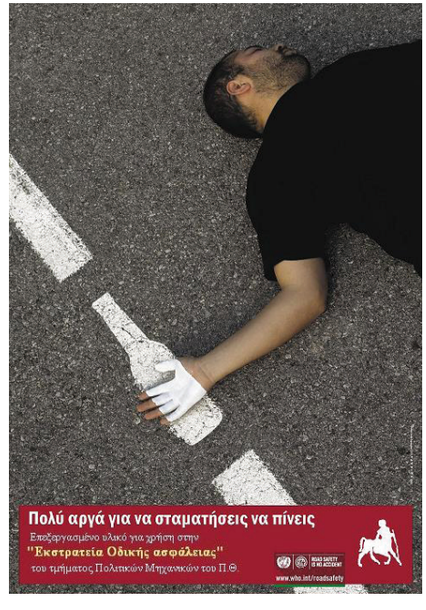
The campaign slogans were as follows:

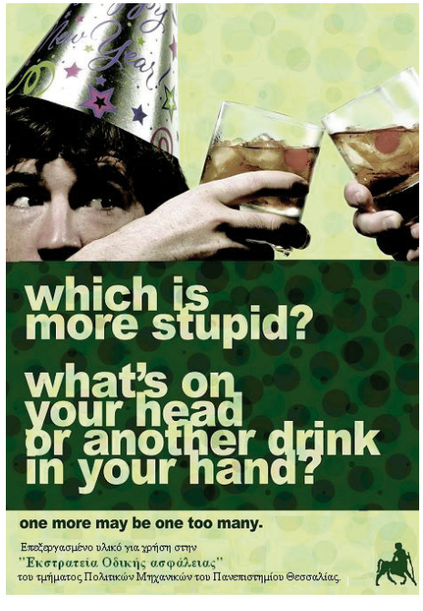
"Which is most stupid? What's on your head or another drink in your hand? One more may be one too many."

"Too late to stop drinking!"

"Alcohol? Not tonight, I am driving."

The messages focused on informing young students that drink driving increases the risk of a crash as well as the likelihood that death or serious injury will result. The proposal through the messages was never drink and drive. There was no pre-testing of the campaign messages and the main reason for this was timing. Nevertheless, all the messages of the campaign were based on drink driving campaigns that have already successfully run before the implementation of the specific campaign. Figure 1 and 2 shows the material used.





In order to investigate the type of approach of our target audience, limited research was conducted before the beginning of the campaign. This research included a questionnaire survey, which confirmed that posters, spots and leaflets were effective channels when reaching our target audience.

For the execution of the campaign the following activities were conducted:

- 500 (A3 size) posters all around the campus;
- 500 leaflets were distributed all around the campus;
- Workshop concerning road safety and specific aspects of it (drink driving, seat belt and helmet use). During the Workshop 4 spots were presented to students concerning drink driving.

The total costs of the design and the production of the campaign were 6000€, while the total budget for the evaluation study was 15000€.

Procedure

In order to collect our data, a face-to-face questionnaire survey was distributed to 200 students before and to 200 students, after the campaign implementation. This population was divided into experiment and control groups.

Measures were taken before and after the campaign. Each period of measures was 2 weeks (Before measures in March 2008 and after measures in June 2008). As far as the internal validity is concerned, our campaign ran at the same time that at least 3 other national campaigns were also running and that's why it is not clear enough whether the measured effects were due to the local campaign or not.

Two important objectives of the study were to predict actual drinking and driving and the intention to drink and drive. The questionnaire presented to the drivers was therefore more detailed than the one presented to passengers and included items designed according to a modified and extended version of the theoretical model (TPB).

The questionnaire started with asking both drivers and passengers to state what type of road users they were: car drivers, car passengers, motorcycle drivers or motorcycle passengers. Questions both for drivers and passengers were included in the questionnaire.

The second part of the questionnaire, in this case presented to the drivers only, was based on the TPB-related variables, which were all measured on a 7-point scale ranging from 1 (Strongly disagree/very unlikely/not at all/ never) to 7 (Strongly agree/very likely/a lot/always). Five categories of these variables were used describing behavioural beliefs, control beliefs, normative beliefs, descriptive norms and intentions. Before the items were presented a scenario was outlined:

> *Suppose you are driving back home after a party or a club with your friends and you have all drunk at least one glass of alcohol.*

Examples of the questions asked in the first category (behavioural beliefs) are the following: "Even I have drunk, I can still drive safely" or "to drink and drive will increase my chance of being involved in an accident". Control beliefs, on the other hand, were measured by asking questions like "would you be more or less likely to drink and drive if no transport is available", while normative beliefs were tested by questions like "If passengers believe that I can't drive safely, I prefer not to drive". Instead of measuring normative beliefs in the conventional manner (i.e. acceptance of others) the question raised was if their friend would let them drive home after they had drunk at least one glass of alcohol. Descriptive norms included a similar question but this time it was about their friends own behaviour: "My friends would drive home after they have drunk at least one glass of alcohol". Intention was measured by the question "How likely is it that you will drink at least one glass of alcohol and then drive in the next month?".

Past behaviour was measured by how often they would drink a glass of alcohol and then drive back home in the last 2 months when returning from a party or club. This question was separated into six sub-categories, referring to the type of the route: urban, motorway, familiar, unknown, near or long. A 7-point scale was used for the answers, ranging from never (1) to always (7).

The questions to the passengers were slightly different and included the following scenario:

> *Suppose you are going back home after a party or a club and the driver of your company has drunk at least one glass of alcohol. (Passengers)*

However, in this instance only questions concerning how safe they would feel to let the driver take them home and how likely it was that they would prevent the driver from driving or drinking alcohol.

The questionnaire presented to both drivers and passengers then included items measuring the recall and appreciation of the campaign itself. Participants were asked whether they had seen or heard an alcohol campaign in the last couple of weeks and especially the campaign UTh designed. They were also asked if they could describe the campaign they had seen or heard and the means (TV, internet, etc) they had noticed it. A 7-point scale ranging from totally disliked (1) to totally liked (7) was used in order to describe how much participants liked the campaign or not.

A couple of general questions were included in the questionnaire, like "Do you know the upper permissible limit of alcohol while driving" or "Do you know that it is equivalent to a glass of drink?" testing, for example the factor "knowledge" in our survey.

Finally some questions about their background were included such as; age, gender, number of years owning a driver's licence, how often they drive and if they had been involved in an accident.

Data analysis

In the framework of the *descriptive* analysis, a number of characteristics of the sample, like total number of sample size and population, age and gender is being described, as well as some other information about the sample, like percentage of participants being involved in accidents, are given.

All the above information was addressed by estimating the frequency distribution per gender and per age, as well as the mean values and the standard deviations. The estimation of theses values was conducted according to the separation of the sample into experiment and control groups and to the measures taken before and after the implementation of the campaign.

In the framework of the *inferential* analysis, the effectiveness of the campaign was tested. Hypothesis testing was used to assess on whether the values of the parameters between two groups were statistically different, while p-values were estimated so as to indicate the level of significance above, which the hypothesis rejection stands. Regression models were also developed in order to predict a dependent variable based on various parameters.

After the collection of the data, these were separated into before and after measures, control and experiment and drivers and passengers.

In order to compare after study with before study, t-tests were used among the following groups of measures: experiment before & after, control before & after and experiment before & control before (to check whether the experimental was the same as the control group).

In order to test a slightly modified version of the theoretical model (TPB), multiple regression analysis was conducted using SPSS as software and specifically the "ENTER" procedure and "GROUP" as a moderator.

Before the multiple regression analysis, an alpha test was conducted on the different constructs, in order to check which items should be combined, see Table 11 for an overview.

Table 11. Cronbach's alpha values.

GROUP	BEHAVIOURAL BELIEFS (BB)	CONTROL BELIEFS (CB)	DESCRIPTIVE NORM (DN)	PAST BEHAVIOUR (PB)
Experiment-before	0.6	0.66	0.859	0.85
Control-before	0.35	0.74	0.6	0.9
Experiment-after	0.6	0.82	0.78	0.97
Control-after	0.6	0.75	0.69	0.9
Control-before + Control-after	0.43	0.74	0.63	0.9
Experiment-before + Control-before	0.43	0.73	0.72	0.9

Note: When a>0.6 the items were combined.

After the definition of the Cronbach's alpha and the combination (or not) of the items, the relationship between these items was tested bivariately, so as to check with which *variables intention* (for models 1, 2, 3) and *past behaviour* (for models 4, 5, 6) were significantly, positively or negatively associated.

Examining the bivariate correlations of all groups helped us choose the appropriate model to test. Briefly, the aim was to choose those items that would be most successful in predicting either the intention to drink and drive or self-reported behaviour.

RESULTS

In this section the evaluation are divided into four subsections:

- Knowledge (of the upper permissible limit of alcohol use and that this limit is one glass of alcohol).
- Recall and appreciation of the campaign.
- Comparison between before and after measures according to a modified version of the Theory of planned behaviour (TPB).
- Model testing (TPB).

Knowledge

The participants were asked about what the upper permissible limit of alcohol use was and the percentage of right answers, see Table 12.

Table 12. Knowledge of the upper permissible limit of alcohol use.

	BEFORE STUDY						AFTER STUDY					
	DRIVERS			PASSENGERS			DRIVERS			PASSENGERS		
	Knowledge	Sample	%	Knowledge	Sample	%	Knowledge	Sample	%	Knowledge	Sample	%
Experiment group	20	35	57.14	5	31	16.13	8	18	44.44	7	34	20.58
Control group	35	73	47.95	13	61	21.13	35	67	52.24	15	81	18.52

The results show that after the campaign fewer drivers in the experiment group had knowledge of the upper permissible limit of alcohol although the reversed could be seen in the control group. With regard to passengers the same understanding had increased after the campaign but this only applied to the experiment group. The participants were also asked about the quantity of the permissible limit of alcohol and their answers are shown in table 13.

Table 13. Knowledge of the quantity of the upper permissible limit of alcohol.

	BEFORE STUDY						AFTER STUDY					
	DRIVERS			PASSENGERS			DRIVERS			PASSENGERS		
	Knowledge	Sample	%	Knowledge	Sample	%	Knowledge	Sample	%	Knowledge	Sample	%
Experiment group	25	35	71.43	12	31	38.71	15	18	83.33	19	34	55.88
Control group	48	73	65.75	28	61	45.90	59	67	88.06	45	81	55.96

The results showed that the percentage of the four groups of the sample that know that the upper permissible limit of alcohol is one glass is increased after the campaign's implementation.

Recall and appreciation of the campaign

In the after-measurement the respondents were asked whether they could remember to have seen or heard about a drink driving campaign in the last couple of weeks and if they could describe the specific campaign that had seen or heard.

Table 14. Recall of the campaign.

	AFTER STUDY					
	DRIVERS			PASSENGERS		
	Recall	Sample	%	Recall	Sample	%
Experiment group	15	18	83.3	26	34	73.5

The results presented in table 14 show that the proportion of drives and passengers who had seen or heard about the local campaign was rather large (drivers 83.3%, passengers 73.5%).

Appreciation of the campaign

In order to find out how much the respondents liked the campaign, they were asked to rate this on a scale from 1 to 7 (1=totally dislike; 7= totally liked). The average score was 5.64, which can be regarded as a remarkable result.

Comparison between before and after measures

In order to compare after study with before study, t-tests were used among the following groups: experiment before & after, control before & after and experiment before & control before (to check whether the experiment was the same as the control group).

The values that were tested, as regards their statistically significant differences between the two examined groups, are combined in seven sets concerning drivers and three sets concerning passengers. Each of these sets, as well as the items that compose them, are given in table 15.

Table 15. Set of variables.

SET OF VARIABLES	VARIABLES	
	DRIVERS	PASSENGERS
1st	Behavioural beliefs (BB)	Intention
2nd	Control beliefs (CB)	Risk
3rd	Normative beliefs (NB)	Other
4th	Descriptive norms (DN)	
5th	Past behaviour (PB)	
6th	Intention	
7th	Other (O)	

As far as drivers are concerned, the first set concerns the *behavioural beliefs* (BB), where three items were tested, the second set, *control beliefs* (CB), includes four items, the third, *normative beliefs* (NB) includes one item, the fourth, *descriptive norms* (DN), includes two items, the fifth, past behaviour, six, the sixth set, *intention* (I), includes one item and the last set, *other* (O), includes six items.

As far as passengers are concerned, the first set concerns intention, where two items were tested. The second set, risk (R), includes one item and the third set, other (O), includes one item. Due to the differences in the items examined, the analysis that follows has been conducted separately for drivers and passengers.

Comparison between experiment group before and after the campaign

Tables 16 (drivers) and 17 (passengers) depict the results form the t-test, for each item for the before and after experiment group. In the same tables, the information provided includes the number of respondents, the average rating, the standard deviation of the rating, the t-value, the p-value and the Cohen's d.

Table 16. Comparison between experiment group before and after (drivers).

VARIABLE	GROUPS	N-population	Average	ST-Deviation	t-value	p-value	d
BEHAVIOURAL BELIEFS (BB)							
Even if I have drunk, I can still drive safely (BB1)	Experiment-before	35	4.49	2.23	-0.56	0.578	-0.16
	Experiment-after	18	4.83	1.95			
To drink and drive will increase my chance of being involved in an accident (BB2)	Experiment-before	18	4.89	2	-1.434	0.157	-0.44
	Experiment after	35	5.63	1.42			
To drink and drive will increase my chance of being fined (BB3)	Experiment-before	35	6.03	1.65	-0.857	0.395	-0.27
	Experiment-after	18	6.39	0.92			
CONTROL BELIEFS (CB) Would you be more or less likely to drink and drive if:							
No public transport is available (CB1)	Experiment-before	35	3.57	2.57	-0.277	0.783	-0.08
	Experiment-after	18	3.78	2.56			
You have promised somebody a lift (CB2)	Experiment-before	35	3.01	2.1	0.193	0.848	0.04
	Experiment-after	18	2.94	1.83			
You need the car for the next day (CB3)	Experiment-before	35	2.49	1.95	0.804	0.425	0.24
	Experiment after	18	2.06	1.63			
You need to get home late at night (CB4)	Experiment-before	35	3.26	2.38	-0.194	0.847	-0.06
	Experiment-after	18	3.39	2.25			
NORMATIVE BELIEFS (NB)							
If passengers believe that I can't drive safely, I choose not to drive (NB)	Experiment-before	35	5.06	2.32	-0.085	0.933	-0.02
	Experiment-after	18	5.11	1.94			
DESCRIPTIVE NORMS (DN)							
My friends allow me to drive home after I have drunk at least one glass of alcohol (DN1)	Experiment-before	35	2.31	1.86	-1.701	0.095	-0.49
	Experiment-after	18	3.22	1.8			

Table 16. Comparison between experiment group before and after (drivers) (continued).

VARIABLE	GROUPS	N-population	Average	ST-Deviation	t-value	p-value	d
My friends drive back after they have drunk at least one glass of alcohol (DN2)	Experiment-before	35	2.2	1.84	0.064	0.9	0.017
	Experiment-after	18	2.17	1.65			
PAST BEHAVIOUR (PB) How often did you drink even a glass of alcohol and then drive home in the last 2 months when returning from a party or club?							
In an urban area (PB1)	Experiment-before	35	3.34	2.29	-0.813	0.42	-0.24
	Experiment-after	18	3.89	2.37			
On motorway (PB2)	Experiment-before	35	5.43	2.05	-0.211	0.834	-0.06
	Experiment-after	18	5.56	2.12			
On a familiar route (PB3)	Experiment-before	35	3.14	2.34	-0.945	0.349	-0.28
	Experiment-after	18	3.78	2.26			
On an unknown route (PB4)	Experiment-before	35	5	2.17	0	1	0
	Experiment after	18	5	2.57			
On a nearby route (PB5)	Experiment-before	35	2.94	2.26	-0.765	0.448	-0.22
	Experiment-after	18	3.44	2.25			
On a long route (PB6)	Experiment-before	35	4.9	2.27	-0.285	0.777	-0.08
	Experiment-after	18	5.1	2.59			
INTENTION (I)							
How likely is it that you will drink (at least one glass of alcohol) and then drive in the next month (I1)	Experiment-before	35	2.89	2.27	-0.612	0.54	-0.18
	Experiment-after	18	3.28	2.08			
OTHER (O)							
If I have drunk, I prefer not to drive (O1)	Experiment-before	35	3.8	2.5	-1.622	0.111	-0.49
	Experiment-after	18	4.89	1.88			
How much would the following measures convince you not to drink and drive?							
More controls (more intensive enforcement) (O2)	Experiment-before	35	5.37	2.18	-0.117	0.907	-0.033
	Experiment after	18	5.44	2.06			
Higher fines (O3)	Experiment-before	35	5.46	2.23	-0.674	0.503	-0.19
	Experiment-after	18	5.89	2.17			
Negative experience in near environment (O4)	Experiment-before	35	5.89	1.71	-1.416	0.163	-0.44
	Experiment-after	18	6.5	0.92			
Media campaigns (O5)	Experiment-before	35	3.71	1.96	0.081	0.936	0.02
	Experiment after	18	3.67	2.14			
Images of crash test (O6)	Experiment-before	35	3.71	2.28	0.973	0.335	0.29
	Experiment-after	18	3.11	1.81			

Note. Scale from 1 to 7 (1=strongly disagree/very unlikely/not at all; 7=strongly agree/very likely/ a lot).

The results presented in Table 18 show that there is no significant difference between drivers in the experiment group before and after the implementation of the campaign in all types of variables. Although there has been a relative increase in the mean values of the variables tested, the significance test showed no differences.

Table 17. Comparison between experiment group before and after (passengers).

VARIABLE	GROUPS	N-population	Average	ST-Deviation	t-value	p-value	d
INTENTION (I)							
How likely is it that you will prevent him/her (the driver) from driving (I1)?	Experiment-before	31	4.48	1.88	-0.917	0.363	0.1
	Experiment-after	34	4.28	1.84			
How likely is it that you prevent the driver of your company to drink even a glass of alcohol? (I2)	Experiment-before	31	2.94	1.93	-2.042	0.045*	-0.56
	Experiment-after	34	3.96	1.65			
RISK (R) How safe do you feel that the driver will get you back home safely? (R1)	Experiment-before	31	3.56	1.71	-2.539	0.014*	-0.44
	Experiment-after	34	4.27	1.47			
OTHER (O)							
Do you agree with the upper limit of alcohol at 0.25 mg/l? (O1)	Experiment-before	.31	4.03	1.68	-1.898	0.062	-0.35
	Experiment-after	34	4.6	1.58			

Note. Scale from 1 to 7 (1=very unlikely/not at all/strongly disagree; 7=very likely/a lot/strongly agree).

Table 17, which presents the results from the passengers in the experimental group, shows a significant increase in the mean values measuring risk and intention. This would then imply that passengers after the campaign were more likely to prevent other drivers in their company from drinking and driving and that they would feel less safe if a drunk driver was going to take them home.

Comparison between control group before and after the campaign

Following the same procedure as before, tables 18 (drivers) and 19 (passengers) present the results form the t-test, for each item for the before and after control group. The same tables, also, present the number of respondents, the average rating, the standard deviation of the rating, the t-value, the p-value and the Cohen's d.

Table 18. Comparison between control group before after (drivers).

VARIABLE	GROUPS	N-population	Average	ST-Deviation	t-value	p-value	d
BEHAVIOURAL BELIEFS (BB)							
Even if I have drunk, I can still drive safely (BB1)	Control-before	73	4.22	2.1	-0.856	0.394	-0.146
	Control-after	67	4.51	1.86			
To drink and drive will increase my chance of being involved in an accident (BB2)	Control-before	73	5.95	1.39	0.693	0.5	0.12
	Control-after	67	5.79	1.23			
To drink and drive will increase my chance of being fined (BB3)	Control-before	73	5.9	1.48	1.15	0.25	1.19
	Control-after	67	5.63	1.39			
CONTROL BELIEFS (CB) Would you be more or less likely to drink and drive if:							
No public transport is available (CB1)	Control-before	73	3.97	2.52	0.114	0.91	0.016
	Control-after	67	3.93	2.38			
You have promised somebody a lift (CB2)	Control-before	73	3.51	2.39	-0.548	0.584	-0.093
	Control-after	67	3.72	2.11			
You need the car for the next day (CB3)	Control-before	73	3.14	2.31	1.021	0.309	0.171
	Control-after	67	2.77	2.02			
You need to get home late at night (CB4)	Control-before	73	3.79	2.34	0.273	0.785	0.04
	Control-after	67	3.69	2.31			
NORMATIVE BELIEFS (NB)							
If passengers believe that I can't drive safely, I choose not to drive (NB)	Control-before	73	4.88	2.2	-1.213	0.26	-0.19
	Control-after	67	5.27	1.88			
DESCRIPTIVE NORMS (DN)							
My friends allow me to drive home after I have drunk at least one glass of alcohol (DN1)	Control-before	73	2.11	1.4	-1.066	0.288	-0.18
	Control-after	67	2.39	1.69			
My friends drive back after they have drunk at least one glass of alcohol (DN2)	Control-before	73	1.96	1.41	0.403	0.688	0.066
	Control-after	67	1.87	1.32			

Table 18. Comparison between control group before and after (drivers), (continued).

VARIABLE	GROUPS	N-population	Average	ST-Deviation	t-value	p-value	d
PAST BEHAVIOUR (PB) How often did you drink even a glass of alcohol and then drive home in the last 2 months when returning from a party or club?							
In an urban area (PB1)	Control-before	73	3.92	2.26	-0.224	0.823	-0.037
	Control-after	67	4	2.07			
On motorway (PB2)	Control-before	73	5.95	1.82	-1.799	0.074	-0.302
	Control-after	67	6.43	1.32			
On familiar route (PB3)	Control-before	73	3.66	2.35	-0.197	0.844	-0.032
	Control-after	67	3.73	20.5			
On a unknown route (PB4)	Control-before	73	5.75	1.87	-0.375	0.708	-0.068
	Control-after	67	5.87	1.67			
On a nearby route (PB5)	Control-before	73	3.63	2.37	-0.11	0.913	-0.018
	Control-after	67	3.67	2.08			
On long route (PB6)	Control-before	73	6.04	1.69	-0.282	0.778	-0.048
	Control-after	67	6.12	1.59			
INTENTION (I)							
How likely is it that you will drink (at least one glass of alcohol) and then drive in the next month (I1)	Control-before	73	3.01	2.15	-0.047	0.963	-0.009
	Control-after	67	3.03	1.91			
OTHER (O)							
If I have drunk, I prefer not to drive (O1)	Control-before	73	4.67	2.21	-0.173	0.86	-0.029
	Control-after	67	4.73	1.86			
How much would the following measures convince you not to drink and drive?							
a: More controls (more intensive enforcement) (O2)	Control-before	73	5.43	1.79	-0.485	0.6	-0.008
	Control-after	67	5.57	1.68			
Higher fines (O3)	Control-before	73	5.73	1.89	-0.572	0.57	-0.09
	Control-after	67	5.9	1.58			
Negative experience in near environment (O4)	Control-before	73	5.62	1.85	2.014	0.05*	-0.34
	Control-after	67	6.16	1.38			
Media campaigns (O5)	Control-before	73	3.23	1.81	0.236	0.81	0.04
	Control-after	67	3.16	1.62			
Images of crash test (O6)	Control-before	73	3.26	1.95	2.826	0.005*	0.48
	Control-after	67	2.42	1.53			

Note. Scale from 1 to 7 (1=strongly disagree/very unlikely/never/not at all; 7=strongly agree/very likely/always/a lot).

The results show that there is no significant difference between the control group of drivers before and after the implementation of the campaign in almost all types of variables. Only the questions about negative experience and images of crash test and if these would convince them not to drink and drive presented a significant difference.

Table 19. Comparison between control group before and after (passengers).

VARIABLE	GROUPS	N-population	Average	ST-Deviation	t-value	p-value	d
INTENTION (I)							
How likely is it that you will prevent him/her (the driver) from driving (I1)?	Control-before	61	3.64	2.03	0.386	0.7	0.064
	Control-after	81	3.52	1.7			
How likely is it that you advert the driver of your company to drink even a glass of alcohol? (I2)	Control-before	61	3.75	2.15	0.573	0.568	0.09
	Control-after	81	3.57	1.72			
RISK (R) How safe do you feel that the driver will get you back home safely? (R1)	Control-before	61	3.74	1.55	-1.047	0.297	-0.17
	Control-after	81	4.02	1.62			
OTHER (O)							
Do you agree with the upper limit of alcohol at 0.25 mg/l? (O1)	Control-before	61	4.44	2	-1.008	0.315	-0.17
	Control-after	81	4.77	1.8			

Note. Scale from 1 to 7 (1=very unlikely/not at all/strongly disagree; 7=very likely/a lot/strongly agree).

Table 19 shows no significant difference between the two groups of passengers before and after the campaign. The results also showed that the mean values of the different items were almost the same before and after the campaign.

Comparison between experiment group before and control group before the campaign

Finally, the results of the t-test among the experiment group before and the control group before, both for drives and passengers, are shown in tables 20 (drivers) and 21 (passengers). In the same tables, the information provided includes the number of respondents, the average rating, the standard deviation of the rating, the t-value, the p-value and the Cohen's d.

Table 20. Comparison between experiment group and control group before the campaign (drivers).

VARIABLE	GROUPS	N-population	Average	ST-Deviation	t-value	p-value	d
BEHAVIOURAL BELIEFS (BB)							
Even if I have drunk, I can still drive safely (BB1)	Experiment-before	35	4.29	2.15	0.153	0.879	0.033
	Control-before	73	4.22	2.1			
To drink and drive will increase my chance of being involved in an accident (BB2)	Experiment-before	35	5.63	2	-0.955	0.342	-0.18
	Control-before	73	5.95	1.39			
To drink and drive will increase my chance of being fined (BB3)	Experiment-before	35	6.03	1.65	0.393	0.695	0.08
	Control-before	73	5.96	1.48			
CONTROL BELIEFS (CB) Would you be more or less likely to drink and drive if:							
No public transport is available (CB1)	Experiment-before	35	3.57	2.57	-0.796	0.44	-0.157
	Control-before	73	3.97	2.52			
You have promised somebody a lift (CB2)	Experiment-before	35	3.057	2.1	-0.952	0.344	-0.201
	Control-before	73	3.51	2.39			
You need the car for the next day (CB3)	Experiment-before	35	2.49	1.95	-1.442	0.152	-0.304
	Control-after	73	3.14	2.31			
You need to get home late at night (CB4)	Experiment-before	35	3.26	2.38	-1.111	0.269	-0.3
	Control-before	73	3.79	2.34			
NORMATIVE BELIEFS (NB)							
If passengers believe that I can't drive safely, I choose not to drive (NB)	Experiment-before	35	5.06	2.32	0.393	0.695	0.08
	Control-before	73	4.88	2.2			
DESCRIPTIVE NORMS (DN)							
My friends allow me to drive home after I have drunk at least one glass of alcohol (DN1)	Experiment-before	35	2.31	1.86	0.637	0.525	0.121
	Control-before	73	2.11	1.4			
My friends drive back after they have drunk at least one glass of alcohol (DN2)	Experiment-before	35	2.2	1.84	0.751	0.454	0.146
	Control-before	73	1.96	1.41			

Table 20. Comparison between experiment group and control group before the campaign (drivers) (continued).

VARIABLE	GROUPS	N-population	Average	ST-Deviation	t-value	p-value	d
PAST BEHAVIOUR (PB) How often did you drink even a glass of alcohol and then drive home in the last 2 months when returning from a party or club?							
In an urban area (PB1)	Experiment-before	35	3.34	2.29	-1.233	0.22	-0.255
	Control-before	73	3.92	2.26			
On a motorway (PB2)	Experiment-before	35	5.43	2.05	-1.323	0.189	-0.263
	Control-before	73	5.94	1.82			
On a familiar route (PB3)	Experiment-before	35	3.14	2.34	-1.066	0.289	-0.222
	Control-before	73	3.66	2.35			
On an unknown route (PB4)	Experiment-before	35	5	2.17	-1.869	0.064	-0.372
	Control-before	73	5.75	1.85			
On a nearby route (PB5)	Experiment-before	35	2.94	2.26	-1.433	0.155	-0.298
	Control-before	73	3.63	2.37			
On a long route (PB6)	Experiment-before	35	4.91	2.27	-2.896	0.005*	-0.567
	Control-before	73	6.04	1.67			
INTENTION (I) How likely is it that you will drink (at least one glass of alcohol) and then drive in the next month (I1)	Experiment-before	35	2.89	2.27	-0.284	0.777	-0.054
	Control-before	73	3.01	2.15			
OTHER (O)							
If I have drunk, I prefer not to drive (O1)	Experiment-before	35	3.8	2.5	-1.838	0.068	-0.37
	Control-before	73	4.67	2.21			
How much would the following measures convince you not to drink and drive?							
More controls (more intensive enforcement) (O2)	Experiment-before	35	5.37	2.18	-0.135	0.893	-0.03
	Control-before	73	5.43	1.79			
Higher fines (O3)	Experiment-before	35	5.46	2.23	-0.651	0.516	-0.13
	Control-before	73	5.73	1.88			
Negative experience in near environment (O4)	Experiment-before	35	5.89	1.71	-0.274	0.471	0.15
	Control-before	73	5.62	1.85			
Media campaigns (O5)	Experiment-before	35	3.71	1.96	1.26	0.21	0.25
	Control-before	73	3.23	1.81			
Images of crash test (O6)	Experiment-before	35	3.71	2.28	1.07	0.287	0.68
	Control-before	73	2.26	1.95			

Note. Scale from 1 to 7 (1=strongly disagree/very unlikely/not at all; 7=strongly agree/very likely/a lot).

The results show that there is no significant difference between drivers in the experiment group and the control group before the implementation of the campaign in almost all types of items. A "clear" significant difference is shown only with regard to the item measuring how often they would drive home during the last 2 months if the journey home was long. This would then mean that drivers in the experimental group were less likely to drink and drive.

Table 21. Comparison between experimental group and control group before the campaign (passengers).

VARIABLE	GROUPS	N-population	Average	ST-Deviation	t-value	p-value	d
INTENTION (I)							
How likely is it that you will prevent him/her (the driver) from driving (I1)?	Experiment-before	31	4.48	1.88	-0.356	0.723	0.43
	Control-before	61	3.64	2.03			
How likely is it that you prevent the driver of your company to drink even a glass of alcohol? (I2)	Experiment-before	31	2.94	1.93	-1.785	0.078	-0.4
	Control-before	61	3.75	2.15			
RISK (R) How safe do you feel that the driver will get you back home safely? (R1)	Experiment-before	31	3.26	1.71	-1.355	0.179	-0.29
	Control-before	61	3.74	1.55			
OTHER (O)							
Do you agree with the upper limit of alcohol at 0.25 mg/l? (O1)	Experiment-before	31	4.03	1.68	-0.978	0.331	-0.22
	Control-before	61	4.44	2			

Note. Scale from 1 to 7 (1=very unlikely/not at all/strongly disagree; 7=very likely/a lot/strongly agree).

Table 21 show no significant differences between passengers in the experimental and control group before the campaign.

Model testing

During the model testing, regression analysis was used in order to identify the causal relationship between dependent variables (past behaviour and intention to drink and drive) and independent variables (attitude, norms, perceived control, descriptive norm). In this part of the analysis, various combinations were examined, varying in the group considered (i.e. experiment before, experiment after, control before, control after, for drivers), in the dependent variable (i.e. intention and behavior), and the type and number of predictors (i.e. behavioral, control and normative beliefs, descriptive norms, past behavior and intention). In order to specify the various constructs to be used in each of the models considered, Cronbach Alpha was run. The assumption of a value greater than 0.6 was used before the items were combined. The results of Cronbach Alpha indicated that, in some cases, different combinations should be used.

Table 22 shows the items used in the model testing and the descriptive code (e.g. BB1, CB4, etc) used in the previous tables and the questionnaire survey, in order to make it easier to follow the construction of the models and the parameters used.

Table 22. Variables classification.

Variable	*Code*	*Variable*	*Code*
Even if I have drunk, I can still drive safely	BB1	My friends allow me to drive home after I have drunk at least one glass of alcohol	DN1
To drink and drive will increase my chance of being involved in an accident	BB2	My friends drive back after they have drunk at least one glass of alcohol	DN2
To drink and drive will increase my chance of being fined	BB3	In urban area, last 2 months	PB1
No public transport is available, more or less likely	CB1	On motorway, last 2 months	PB2
You have promised somebody a lift, more or less likely	CB2	In familiar route, last 2 months	PB3
You need the car for the next day, more or less likely	CB3	In unknown route, last 2 months	PB4
You need to get home late at night, more or less likely	CB4	How often did you drink even a glass of In near route, last 2 months	PB5
If passengers believe that I can't drive safely, I choose not to drive	NB	In long route, last 2 months	PB6
How likely is it that you will drink (at least one glass of alcohol) and then drive in the next month	I		

Below, the dependent and independent variables are given, along with the different groups being tested. It is noted here, that apart from the basic groups (experiment and control) and time of data collection (before or after the campaign), models for two additional groups were developed (where feasible and sensible). The first additional group was constructed from the control group as in total, not discriminating between before and after measurements, since the control group was never exposed to the campaign (even after its completion).

The second group covers all the measurements made before the campaign, thus including experiment and control groups, since both populations were not exposed to any measures, and therefore, no differences should exist. The above combinations are justified by the analysis presented in the previous paragraphs, where it is indicated that no significant differences apply between the relevant groups. In the first model Behavioural Beliefs (BB), Control Beliefs (CB) and Normative Beliefs (NB) were included as the independent variables, while the dependent variable was Intention.

Model 1:
Groups:
Experiment-before; Control-before; Experiment-after; Control-after; Control-before + Control-after; Experiment-before + Control-before

Independent variables: BB, CB, NB
Dependent variable: Intention

In the second model of the test procedure, descriptive norm was added, while Intention remained as the dependent variable.

Model 2:
Groups:
Experiment-before; Control-before; Experiment-after; Control-after; Control-before + Control-after; Experiment-before + Control-before

Independent variables: BB, CB, NB, DN
Dependent variable: Intention

In the third model of the test procedure, Past Behaviour was added, while Intention remained as the dependent variable.

Model 3:
Groups:
Experiment-before; Control-before; Experiment-after; Control-after; Control-before + Control-after; Experiment-before + Control-before

Independent variables: BB, CB, NB, DN, PB
Dependent variable: Intention

In the fourth, fifth and sixth model of the test procedure we examined only the experiment group after the implementation of the campaign. The independent variables were Behavioural Beliefs (BB), Control Beliefs (CB) and Normative Beliefs (NB), while the dependent variable was Past Behaviour, assuming that the variable indicated as past behaviour for the experiment after group depicts the group's actions, once the relevant population was exposed to the campaign, and potentially its behaviour was affected by this. The dependent variable here is considered as the "behaviour". In the fifth model, descriptive norm was added, while behaviour remained as the dependent variable. Finally, in the sixth model, intention was added, while behaviour was the dependent variable.

Model 4:
Groups:
Experiment-after

Independent variables: CB, NB, BB
Dependent variable: PB

Model 5:
Groups:
Experiment-after

Independent variables: CB, NB, BB, DN
Dependent variable: PB

Model 6:
Groups:
Experiment-after

Independent variables: CB, NB, BB, DN, Intention
Dependent variable: PB

The results concerning the prediction of intention and self-reported behaviour are presented in this paragraph. Tables 23 to 24 present the hierarchical regression analysis indicating the reliability of the models (i.e. R2, Adjusted R2 and F). In table 25 the coefficients are presented.

Table 23. Summary of hierarchical regression analysis predicting intention to drink and drive.

Model	Group	R^2	Adjusted R^2	F
1	DRIVERS			
	Experiment-before	0.281	0.212	4.047
	Control-before	0.413	0.369	9.425
	Experiment-after	0.483	0.372	4.356
	Control-after	0.367	0.337	12.184
	Control-before + Control-after	0.394	0.372	17.459
	Experiment-before + Control-before	0.347	0.315	10.835
2	DRIVERS			
	Experiment-before	0.419	0.341	5.408
	Control-before	0.468	0.42	9.685
	Experiment-after	0.711	0.622	8.001
	Control-after	0.440	0.403	12.159
	Control-before + Control-after	0.454	0.429	18.414
	Experiment-before + Control-before	0.434	0.4	12.888
3	DRIVERS			
	Experiment-before	0.510	0.425	6.026
	Control-before	0.617	0.576	14.988
	Experiment-after	0.832	0.762	11.877
	Control-after	0.643	0.613	21.934
	Control-before + Control-after	0.623	0.603	31.191
	Experiment-before + Control-before	0.577	0.547	19.472

Table 24. Summary of hierarchical regression analysis predicting past behaviour.

Model	Group	R^2	Adjusted R^2	F
4	DRIVERS			
	Experiment-after	0.556	0.461	5.852
5	DRIVERS			
	Experiment-after	0.692	0.598	7.311
6	DRIVERS			
	Experiment-after	0.821	0.746	11.002

Table 25. Coefficients.

Model	Group	Predictors	Unstandardized coefficients		Unstandardized coefficients	t	p
			B	Std. Error	Beta		
1	Experiment-before	Constant	-0.476	1.662		-0.286	0.777
		BB	0.446	0.313	0.276	1.425	0.164
		CB	-0.164	0.228	-0.115	-0.720	0.477
		NB	0.297	0.187	0.302	1.587	0.123
	Control-before	Constant	-1.622	1.186		-1.367	0.176
		BB1	0	0.168	0	0.01	1
		BB2	0.13	0.139	0.090	0.935	0.353
		BB3	0.479	0.103	0.468	4.650	0*
		CB	0.335	0.122	0.279	2.754	0.008
		NB	0.132	0.105	0.135	1.26	0.212
	Experiment-after	Constant	-1.021	3.570		-0.286	0.779
		BB2	0.628	0.443	0.277	1.418	0.178
		CB	-0.450	0.297	-0.364	-1.514	0.152
		NB	0.324	0.256	0.301	1.264	0.227
	Control-after	Constant	-3.609	1.333		-2.970	0.004
		BB	0.898	0.193	0.510	4.645	0*
		CB	0.185	0.117	0.162	1.585	0.118
		NB	0.128	0.114	0.127	1.129	0.263
	Control-before + Control-after	Constant	-1.995	0.816		-2.445	0.016*
		BB1	0.082	0.119	0.053	0.691	0.491
		BB2	0.161	0.098	0.113	1.643	0.103
		BB3	0.463	0.076	0.453	6.128	0*
		CB	0.269	0.083	0.229	3.232	0.002*
		NB	0.125	0.075	0.127	1.678	0.096
	Experiment-before + Control-before	Constant	-1.465	0.949		-1.545	0.126
		BB1	0.081	0.129	0.060	0.603	0.529
		BB2	0.103	0.116	0.073	0.890	0.375
		BB3	0.448	0.094	0.433	4.779	0*
		CB	0.197	0.104	0.157	1.898	0.061
		NB	0.157	0.090	0.160	1.735	0.086
2	Experiment-before	Constant	-0.620	1.521		-0.408	0.687
		BB	0.222	0.298	0.137	0.745	0.462
		CB	-0.069	0.212	-0.048	-0.326	0.747
		NB	0.259	0.172	0.264	1.513	0.141
		DN	0.543	0.204	0.414	2.665	0.012
	Control-before	Constant	-2.365	1.173		-2.017	0.048*
		BB1	0.014	0.162	0.009	0.089	0.929
		BB2	0.156	0.134	0.107	1.165	0.248
		BB3	0.470	0.099	0.460	4.762	0*
		CB	0.315	0.117	0.262	2.697	0.009*
		NB	0.068	0.103	0.070	0.663	0.510
		DN	0.452	0.173	0.247	2.619	0.011
	Experiment-after	Constant	-1.368	2.770		-0.494	0.63
		BB2	0.189	0.37	0.083	0.51	0.619
		CB	-0.065	0.26	-0.053	-0.249	0.807
		NB	0.262	0.2	0.244	1.312	0.212
		DN	0.853	0.266	0.641	3.206	0.007*

Table 25. Coefficients (continued).

Model	Group	Predictors	Unstandardized coefficients		Unstandardized coefficients	t	p
			B	Std. Error	Beta		
	Control-after	Constant	-2.767	0.986		-2.807	0.007*
		BB	0.699	0.196	0.397	3.559	0.001*
		CB	0.17	0.111	0.149	1.534	0.13
		NB	0.111	0.108	0.109	1.025	0.309
		DN	0.424	0.15	0.296	2.831	0.06
	Control-before + Control-after	Constant	-2.283	0.782		-2.92	0.004
		BB1	0.069	0.113	0.045	0.613	0.541
		BB2	0.153	0.093	0.108	1.645	0.102
		BB3	0.42	0.073	0.412	5.77	0*
		CB	0.257	0.079	0.219	3.243	0.001*
		NB	0.079	0.072	0.08	1.088	0.279
		DN	0.417	0.11	0.256	3.799	0*
	Experiment-before + Control-before	Constant	-1.886	0.894		-2.109	0.037
		BB1	0.042	0.121	0.031	0.345	0.731
		BB2	0.097	0.109	0.068	0.896	0.373
		BB3	0.425	0.088	0.411	4.834	0*
		CB	0.224	0.097	0.178	2.303	0.023
		NB	0.087	0.086	0.089	1.008	0.316
		DN	0.492	0.125	0.31	3.933	0*
3	Experiment-before	Constant	-1.043	1.433		-0.728	0.472
		BB	-0.093	0.198	-0.065	-0.47	0.642
		CB	0.024	0.291	0.015	0.083	0.935
		NB	0.217	0.161	0.221	1.347	0.189
		DN	0.349	0.208	0.266	1.678	0.104
		PB	0.534	0.231	0.39	2.314	0.028
	Control-before	Constant	-2.303	1.002		-2.298	0.025*
		BB1	-0.147	.0.142	-0.095	-1.034	0.305
		BB2	0.022	0.117	0.015	0.185	0.854
		BB3	0.364	0.087	0.356	4.19	0*
		CB	0.175	0.104	0.145	1.684	0.097
		NB	0.047	0.088	0.048	0.533	0.596
		DN	0.401	0.148	0.219	2.713	0.09
		PB	0.59	0.117	0.468	5.036	0*
	Experiment-after	Constant	-2.603	2.24		-1.162	0.268
		BB2	0.085	0.296	0.037	0.287	0.779
		CB	0.188	0.224	0.152	0.841	0.417
		NB	0.184	0.161	0.171	1.143	0.275
		DN	0.441	0.254	0.331	1.738	0.108
		PB	0.591	0.201	0.626	2.936	0.012
	Control-after	Constant	-3.725	0.810		-4.598	0*
		BB	0.387	0.167	0.22	2.320	0.024*
		CB	0.182	0.089	0.16	2.038	0.046*
		NB	-0.007	0.089	-0.007	-0.078	0.938
		DN	0.303	0.122	0.212	2.48	0.016*
		PB	0.694	0.108	0.536	5.886	0*

Table 25. Coefficients (continued).

Model	Group	Predictors	Unstandardized coefficients B	Unstandardized coefficients Std. Error	Beta	t	p
	Control-before + Control-after	Constant	-2.594	0.653		-3.972	0*
		BB1	-0.082	0.096	-0.053	-0.848	0.398
		BB2	0.04	0.079	0.028	0.51	0.611
		BB3	0.308	0.062	0.302	4.932	0*
		CB	0.184	0.067	0.156	2.749	0.007*
		NB	0.023	0.061	0.023	0.374	0.709
		DN	0.345	0.092	0.212	3.755	0*
		PB	0.620	0.08	0.487	7.705	0*
	Experiment-before + Control-before	Constant	-1.866	0.777		-2.402	0.018*
		BB1	-0.131	0.109	-0.097	-1.201	0.233
		BB2	-0.005	0.096	-0.003	-0.05	0.96
		BB3	0.334	0.078	0.323	4.285	0*
		CB	0.1	0.087	0.079	1.144	0.255
		NB	0.08	0.075	0.081	1.062	0.291
		DN	0.375	0.11	0.236	3.394	0.001**
		PB	0.585	0.101	0.46	5.817	0*
4	Experiment-after	Constant	2.372	3.502		0.677	0.509
		BB2	0.355	0.435	0.222	1.23	0.239
		CB	-0.742	0.297	-0.568	-2.546	0.023*
		NB	0.183	0.251	0.16	0.727	0.479
5	Experiment-after	Constant	2.089	3.029		0.69	0.502
		BB2	0.176	0.404	0.073	0.434	0.671
		CB	-0.428	0.284	-0.327	-1.505	0.156
		NB	0.132	0.218	0.116	0.605	0.556
		DN	0.697	0.291	0.495	2.396	0.032
6	Experiment-after	Constant	3.056	2.427		1.259	0.232
		BB2	0.042	0.324	0.018	0.13	0.899
		CB	-0.382	0.226	-0.292	-1.688	0.117
		NB	-0.053	0.184	-0.047	-0.288	0.778
		DN	0.094	0.309	0.067	0.304	0.766
		Intention	0.707	0.241	0.667	2.936	0.012

The results of the model testing show that the addition of descriptive norm increased the explained variance in all groups, meaning that the second model increased the predictive power of the model. The third model, where the variable past behaviour is added shows an additional increase in the value of R2 in all groups and the predictive power is now even greater.

The same results appear in models 4, 5 and 6. The dependent variable of this set of models is past behaviour and the independent variables are behavioural belief, control belief, normative belief, descriptive norm and intention. The fifth model, which also included descriptive norm, increased the explained variance as compared to the fourth model. An additional increase in predictive power appears in the sixth model, where the variable intention is added to the model.

Summary and conclusions

The results of the evaluation of the Greek local drink driving campaign were presented in this report.

University of Thessaly funded, set up and conducted both the campaign implementation and the evaluation. The venue of the campaign implementation was the University of Thessaly campus (School of Engineering), while the campaign was launched for four weeks between 14th of April until 14th of May 2008. The target group of the campaign was divided into experimental or control group. Young drivers – students of the University campus, men and women aged 18 to 30 years old were the experimental group, while young passengers – students of the university, men and women aged 18 to 30 years old were the control group.

The theoretical model used for the design of the campaign was a modified version of the Theory of planned behaviour (TPB), according to which the specific objectives of the campaign were defined. The evaluation of the campaign was also based on the same model. Self reported data from drivers were gathered to measure the variables that had been identified through the analysis of TPB.

The main results can be summarized as follows:

Knowledge of the upper permissible limit of alcohol use:

Results show that there has been an increase in the percentage of the passengers of the experiment group who know the upper permissible alcohol limit after the campaign implementation, although the percentage of drivers of the same group is lower after the campaign. On the other hand, the opposite result appears in the control group, where this time an increase in the percentage of drivers appears, while passengers were more likely to be incorrect in the after study than the before study.

The previous results could probably be explained or interpreted by the fact that the group of drivers, in order to get their driving licence, need to know the Road Traffic Code (RTC), part of which is the knowledge of the permissible alcohol usage. Also, the stricter penalties resulting of the revision of the RTC, in the last year, could probably made drivers' awareness stronger.

However, the percentage of young drivers knowing the permissible limit was only 50% meaning that still half of them do no know this limit TRC provides.

Knowledge that the upper limit of permissible alcohol is one glass:

Results show that an increasing number of people in the experimental group had become more knowledgeable about how much alcohol was allowed to drink before driving. However, the same effect was noted in the control group and it could therefore be argued that this increased knowledge was not due to the campaign itself.

Recall and appreciation of the campaign:

Both the recall and the appreciation of the campaign were high. The total percentage of those who had seen or heard about the local campaign was 79%, while the average mark of the appreciation of the campaign, on a scale of from 1 to 7, was 5.64.

Comparison between before and after measures according to the variables of TPB:

Three pairs of groups (both for drivers and passengers) were used for the analysis of the results according to a modified version of the TPB: experiment before & after (1st pair of groups), control before & after (2nd pair of groups) and experiment before & control before (3rd pair of groups).

The results of the 1st pair of groups (experiment before and after) show that there is no significant difference between the experiment group of drivers before and after the implementation of the campaign. Though, even if the differences were not significant it was, in most instances, in the right direction. That is participants in the after study agreed more strongly that the behaviour could results in a negative consequence and answered that it was more things which could convince them not to drink and drive.

When the response from passengers were analysed the results presented two significant results between the before and after study. Passengers in the after study were more likely to persuade the driver in their company to not drink and drive even if it was "only" one glass of alcohol. However, the same group would also feel safer if a driver who had been drinking at least one glass of alcohol would drive them home something, which is not very easy to understand.

The results of the 2nd pair of groups (control group before and after) show no significant difference between the control group of drivers before and after the implementation of the campaign in almost all types of variables. The same applied to passengers. However, two exceptions could be noted with regard to drivers. After the campaign negative events were more likely to convince them not to drink and drive although images of crash tests were less likely to influence them.

The results also showed that the mean values of the variables were almost the same before and after the campaign, a result that we expected since the control groups were not exposed to the campaign.

The results of the 3rd pair of groups (before study - experimental group and control group) show that there is no significant difference between the drivers in the experimental group and the control group before the implementation of the campaign in almost all types of variables. A "clear" significant difference is shown only in the variable measuring past behaviour and how often they had been drinking in the last 2 months if the journey back from the party was long. For people in the control group it was more usual to drink and drive than in the experimental group. As far as passengers are concerned no difference between the two groups was presented.

Since the separation of the population into experiment and control groups was random and the sample was homogenous before the implementation of the campaign, the results should confirm that the two groups were basically the same before the campaign.

Model testing

The results of the model testing show that both descriptive norm and past behaviour increased the explained variance over and above the items already included in the TPB. As an example, in the "experiment after" group, the results show that the percentage of the variance in intention to drink and drive is increased from 37% to 62% when the variable descriptive norm is added to the model, and to 76% when past behaviour is included in the final step. The strongest predictor is behavioural beliefs as indicated by the magnitude of the beta weights. Normative beliefs contribute also significantly to the amount of the explained variance. The weakest TPB variable seems to be perceived behavioural belief.

Similar results appear when past behaviour was used as the dependent variable in model 4, 5 and 6. Descriptive norm and intention increased the explained variance when they were entered after behavioural beliefs, normative beliefs and control beliefs.

Specifically, results show that the percentage of the variance in past behaviour to drink and drive explained by TPB increases from 55.6% (model 4) to 69.2% when descriptive norm was added (model 5) and rises to 82.1% when intention was added (model 6). The strongest predictor in the fourth model is control belief as indicated by the beta values, while the weakest seems to be normative belief. In the fifth model, normative beliefs remains the weakest predictor, while the additional predictor descriptive norm seems to be the strongest. Finally, in the sixth model when intention was added intention became the strongest predictor, and normative belief still remains the weakest.

The main conclusion of this report is that the implementation of a campaign concerning drink driving and targeting University students was unlikely to alter attitudes very easily. However, the campaign results did indicate a small measure of success. More campaigns are thus needed, which should probably be combined with supportive activities, like education, enforcement etcetera.

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9 Evaluation of the Polish "Drunk? Don't Drive" campaign 2008

Barbara Król [1]

Abstract

This report contains the results of the Polish drink driving campaign which was launched locally in April 2008. The campaign was an integrated combination of national mass media and law enforcement on drinking and driving. The target group of the campaign consisted of young people 20-30 years old in the city of Lublin. The general aim of the campaign was to reduce alcohol impaired driving.

The results showed that the campaign reached 95% of the target group and affected attitudes towards drinking and driving. After the campaign 58% reported that they would prefer not to drive when they go to or come back from a party. 86% of the female and 78% of the male respondents reported after the campaign that they would try to prevent others from driving under the influence of alcohol. As a result of the campaign people became more aware of the risks associated with drinking and driving.

1 The Road and Bridge Research Institute and The Ministry of Transport/ The National Road Safety Council, Warsaw, Poland.

Executive Summary

This report contains the results of a qualitative study carried out before the campaign and a quantitative study assessing the effects of the "Drunk? Don't drive" campaign. The campaign was launched locally in the city of Lublin (population 350 000), south-east Poland, in April 2008. The campaign used a combination of various mass media, including national, local and individual (at point of sale). The campaign was funded and coordinated by the Ministry of Transport and Polish Spirit Industry, Polish Breweries. In the development and execution of the campaign the Ministry worked together with regional authorities, police forces, advertising agency Factory of Social Communication.

The target group of the campaign consisted of young people 20-30 years old in the city of Lublin. The study showed that the target group most at risk regarding drunk driving is young men, more often students than men having families.

The creative concept focused on the aspects of responsibility for life of others – the biggest fear of young respondents; and the long term consequences of drinking and driving such as guilt, which stays forever and is worst than life term sentence. campaign "Pileś? – Nie jedź", (Drunk? – Don't drive) was a part of the project named "Włącz myślenie" (Turn of thinking) which is an umbrella logo for all road safety communication in Poland. The slogan was: "100 years is not even enough to pay for someone's life".

The general aim of the campaign was to reduce alcohol impaired driving which is one of the main contributing factors to road crashes in Poland. The legal obligation to drive sober (legal limit is 0.2) is contrasted with many social beliefs and justifications for such behaviour therefore the campaign had to make strong emotional impact. In 2007, drunk drivers took part in 6 505 traffic accidents (13.1% of the total number of traffic accidents), which resulted in the death of 774 people (13.9% of the total number of fatalities), and 8 193 injuries (12.9% of the total number of people injured). The problem of drunk driving in the Lubelskie voivodeship region, where Lublin is located, is higher than the national average. In 2007, people under the influence of alcohol were involved in 476 traffic incidents in the voivodeship (7.3% of the total number of traffic incidents).

The evaluation of the campaign was based on the results of the qualitative study conducted in March 2008. The conclusion regarding the questionnaire was that it should be fairly short and since it is being conducted by independent research institutes or companies it also had to be cost effective.

The main aim of the qualitative study was to obtain information from men and women aged 20 to 30 years old that would help to choose the right way of communication with regard to drunk drivers. The qualitative study was the basis for the quantitative study design. More detailed aims of the qualitative study included:

- Familiarizing with behaviour of the respondents after drinking alcohol and assessing such behaviour according to their reference group.
- Assessment of the respondents' knowledge on the consequences of drunk driving (the effect on physical and mental state, penalties).
- Assessment of the rational and emotional response to each of the spots.
- Assessment of the respondents' ability to identify with each of the spots.
- Drawing conclusions concerning the potential effect of the spots.
- Choosing one of the TV spots from 5 countries.

From the studies conducted by TNS OBOP for National Road Safety Council, since 2005, we know that people are not used to declare in public that they have been drinking and driving. Their openness and acceptance for driving under alcohol influence is shown in opinions about the others.

Drinking and driving was a subject of few campaigns in 2006 and 2007 but none of them was well evaluated and the police statistics did not demonstrate any significant improvement in the issue. Therefore, there was a strong need for prior research evaluating previous communication concepts for developing a better argumentation and campaign strategy. The research allowed an investigation into the reasoning behind the problem of drinking and driving and argumentation appealing to high risk group – young passengers and drivers.

The main aim of the quantitative study was to evaluate whether the 2008 campaign has been effective or not. The results would then justify further actions and funding for awareness rising campaigns. Furthermore it establishes a base of information which is a starting point for a more long term strategy. The campaign evaluation can require a lot of resources, but even with limited funding, it is important to collect some evaluation data that will be useful for future reference and stakeholders.

Before and after the different activities a street survey was conducted. The respondents then completed the questionnaire. In total 800 people aged 20-30 took part in the study (400 before and 400 after the event). The survey covered:

1. Purposes of motor car use
2. Causes of traffic accidents
3. Identification of drinking and driving persons
4. Ability to drive under the influence of alcohol
5. Consequences of driving under the influence of alcohol
6. Permissible limit of alcohol content in driver's blood
7. Declarative change in attitudes resulting from the „Drunk? Don't drive!" campaign
8. Media effectiveness of the "Drunk? Don't drive!" campaign
9. Assessment of the "Drunk? Don't drive!" campaign

The main result of the evaluation is that the campaign reached the target group (95%) and made a significant difference in the beliefs and opinions on drinking and driving. Both before the campaign (46%) and after (58%), the majority of respondents indicated they would prefer not to drive when they go or come back from a party. This response was most prevalent amongst persons aged between 20 and 25. The increase in the percentage of respondents was 12% (49% before the campaign and 61% after the campaign). The opinion is shared by respondents aged 26-30: in this group, the increase was from 42% to 55%.

Furthermore, as a result of the campaign, men admitted more frequently to witnessing a drunken person driving a car: the results were 48% before the campaign and 58% after it. The most significant change, resulting from the campaign, was noted in responses to the question concerning a ride in a car driven by a person under the influence of alcohol in the group aged between 26 and 30. The decrease in the share of persons admitting to this was 13% (from 29% to 16%). In the younger group, the share of persons in the same situation after the campaign was 30%. Following the campaign, the share of persons riding in a car driven by a drunk driver decreased both for men and women: from 25% to 18% for women and from 35% to 26% for men. The campaign resulted also in a significant rise in the share of respondents (both men and women) who refused to answer the question concerning talking a driver into drinking a small amount of alcohol by the closest circle.

After the campaign, the worst consequences of drinking and driving presented by the respondents were: death of others (83%), own death (64%) and disability of others (50%).
In the first survey, both women (73%) and men (67%) indicated most frequently the death of others as the consequence of driving under the influence of alcohol. A significant increase was observed in the share of younger drivers (aged 20-25) who claimed that no alcohol could be consumed if the driving should be safe – 63% before and 78% after the campaign. In the group of older drivers, the increase was smaller: from 80% to 82%.

Following the campaign, 82% of the younger respondents declared they would try to prevent others from driving under the influence of alcohol. The same applied to older respondents (77%). 86% of women and 78% of men declared after the campaign they would try to prevent others from driving under the influence of alcohol. A large number of the respondents would also argue that it was very rare that their friends would talk them into drinking and driving (86% before and 77% after).

In each age group, the campaign was recognized by a very high share of drivers: 94% of younger and 92% of older drivers.

The media budgets are very often the highest elements of campaign costs therefore it is important to verify media planning and target contacts. The media evaluation research proved that the most effective means of reaching younger drivers were TV and outdoor advertising. The situation in case of older drivers (25-30 years) was similar, although the television appeared to be less effective. Posters in churches and advertisements shown in cinemas were the least effective mean to reach the target group. A significant reach of the Internet is worth attention: 54% for younger and 44% for older drivers.

All respondents who had been in contact with the campaign were asked to evaluate the campaign itself. Every second respondent confirmed that the campaign had changed his/her attitude towards drinking and driving (31% said – "definitely yes", 18% - "qualified yes"). It is important that the more people were driving the more were convinced about the influence of the campaign. 56% of "every day drivers" the answers said yes (37% "definitely yes" + 19% "qualified yes").

The main conclusion from the evaluation is that drivers have increased their awareness of risks associated with drinking and driving.

General introduction

This report contains the results of a qualitative and quantitative study assessing the effects of the "Drunk? Don't drive" campaign. This campaign was launched locally in the city of Lublin (population 350 000), south-east Poland, in April 2008. The campaign was based on previous research results. The campaign was an integrated combination of various national mass media because it assured a better target reach locally, supporting local communication (local mass media and personal communication at the point of alcohol sale/consumption) coupled with enforcement on drinking and driving. The campaign was funded and coordinated by the Ministry of Transport and Polish Spirit Industry, Polish Breweries. In the development and execution of the campaign the Ministry worked together with regional authorities, police forces and an advertising agency (Factory of Social Communication).

Specific campaign objectives were based on the results of a qualitative study conducted before the campaign, in March 2008. The pre- and post-measurements contained a set of questions, developed by CAST and additional questions defined by the National Road Safety Council of Republic of Poland.

Background information

Road users impaired by alcohol have an increased risk of being involved in a road crash. According to the WHO World report on Road Traffic Injury Prevention, drinking and driving is one of the leading causes of road crashes worldwide and alcohol impaired crash victims often suffer from more severe crash injuries. Reducing the levels of drinking and driving will have considerable impact on preventing road crashes and saving lives and injuries.

In follow-up to the World report, a series of road safety good practice manuals were produced as part of the UN Road Safety Collaboration covering the key issues identified in the World report. One of these manuals focuses on preventing road crashes due to drinking and driving. The manuals reflect the views of the World report and advocate for a systems approach to improving road safety, following the principle that road safety should be pursued across many disciplines.

The campaign "Drunk? Don't drive!" was a project developed in close cooperation with local and national stakeholders in Poland to assist the city of Lublin to develop an implement a dedicated multi-sector drinking and driving prevention initiative using Polish law, the recommendations of the manual, and EU recommendations were used as guidelines.

The Polish national road safety programme, GAMBIT, recognizes alcohol impaired driving to be one of the main contributing factors to road crashes in Poland. In 2007, drunk drivers took part in 6 505 traffic accidents (13.1% of the total number of traffic accidents), which resulted in the death of 774 people (13.9% of the total number of fatalities), and 8 193 injuries (12.9% of the total number of people injured).

GAMBIT names a series of measures to reduce fatalities caused by drinking and driving to 6% of total fatalities by 2013 in comparison to 12% in 2003, including strengthening legislation, increasing enforcement, and implementing public education and information campaigns. It hopes to achieve its aims through toughening laws and improving the level of their enforcement, as well as educating the public and undertaking information campaigns.

Stakeholders

The following stakeholders were involved in the "Drunk? Don't drive!" campaign:

- Ministry of Transport, the National Road Safety Council (funding, partners coordination and media planning; PR activities; evaluation research)
- The Road and Bridge Research Institute (coordination, analysis)
- the City Council of Lublin (funding and coordination of local promotional activities, press campaigns and regional media contacts)
- Police in the city of Lublin (drinking and diving enforcement)
- Polish Spirit Industry Association (funding, substantial materials)
- Polish Association of Breweries (education activities in points of sale/ bars)

Campaign description

Theme, slogan and strategic approach

The findings of a qualitative study and first wave of quantitative research allowed generating information for the creative team from professional advertising agency Factory of Social Communication to develop an appealing idea for the selected target group. The collected data gave also a picture of habits and profile of the target group which supported media planning and dissemination of the campaign materials.

The creative concept focused on; the responsibility for the life of others. the biggest fear of young respondents; and the long term consequences of drinking and driving such as guilt, which stays forever and is worst than life term sentence. The main action of the television spot was located at the party which had to be close to the respondents – regular party like each weekend, nothing extraordinary, just close friends, and alcohol is only a background and none of the people is "too drunk". The respondents could easily associate themselves with such behaviour as it looks just like their own weekend party. The background was linked to the largest problem with drinking and driving - social acceptance of such behaviour and common perception that any celebration of an important occasion (birthdays, name days, holidays, family gathering) most often justifies drinking and driving because no one should refuse to toast. In the movie and radio spots birthday song was used, lyrics say "100 years, 100 years of life and prosperity". This most common tune can be easily recognized and remembered and is linked to the slogan of the campaign: "100 years is not even enough to pay for someone's life". The research demonstrated that young people non drinking at the party already feels uncomfortable and the social pressure makes it even more difficult. The situation is additionally complicated when a driver is not only responsible for himself but drives his family or friends home and neither driver nor passengers oppose to drinking and driving because the situation justifies such behaviour.

Qualitative study - pre-testing of the campaign concept and materials

The city of Lublin provided useful source for a large-scale qualitative study on drinking and driving. In preparation for launching a campaign against drink driving five different TV spots were tested.

The main aim of study was to obtain information that would help choose of the right way of communication with regard to drunk drivers.

The aims of study included:

- Familiarizing with behaviour of the respondents after drinking alcohol and assessing such behaviour according to their reference group.
- Assessment of the respondents' knowledge on the consequences of drunk driving (the effect on physical and mental state, penalties)
- Assessment of the rational and emotional response to each of the spots
- Assessment of the respondents' ability to identify with each of the spots
- Drawing conclusions concerning the potential effect of the spots.
- Choosing one of the TV spots from 5 countries

The qualitative study was performed in Lublin on 13 and 14 March 2008. It comprised four focus discussion groups (FDG) including respondents chosen according to the following criteria:

- Persons with driving license who drive a car at least once a week.
- Persons visiting clubs/pubs at least once every three months.
- Persons drinking alcohol, who admit that occasionally they drive a car after drinking a small amount of alcohol.

The participants were diverse in terms of age, sex and life situation:

- Women students (20-25 years) that do not have a family;
- Men students (20-25 years) that do not have a family;
- Married women (26-30 years) that work and have at least one child;
- Married men (26-30 years) that work and have at least one child.

Except for the drink drivers, their social group seems to be an interesting group. The respondents admitted that very often a driver that has no intention of drinking is persuaded to do so, and rarely does the group try to stop them from deciding to drive a car. It happens only in situations when the driver is extremely drunk.

The qualitative study helped to eliminate some communication concepts. The research team did not recommend the following campaigns:

- the Polish campaign from 2006 – it is funny, the character is very likeable. The problem is that the storyline does not show any consequences of drunk driving that would stimulate their imagination. It has no potential of affecting drivers' behaviour.
- the Czech campaign – most funny and least disturbing of all those presented. However it brings associations with a beer commercial, which is in this instance especially undesired.
- the Icelandic campaign – it refers solely to the viewer's intelligence and does not evoke any emotions, the respondents had problems identifying with it and it shows only the consequences for the driver – his misfortune which he causes himself to a certain degree did not make such a great impression on the respondents as the misfortune and dangers he might cause to the others.
- Road and Safety spot – it does not evoke any emotions.

The recommendation was made on one of the remaining two campaigns. They both had a strong effect on the viewer, evoke many emotions, and inspired deeper thoughts. They also underlined the danger that a drunk driver poses to others by showing death as potential consequence. Moreover, both have a potential power of affecting the respondents' behavior.

- The British campaign is recommended as it shows circumstances closer to the reality the respondents live in and present the reaction of the surrounding people that the participants often experience (inducing to drink alcohol).

- The French campaign is recommended because it has a stronger influence on emotions. Importantly, it does present the injured anonymously and underlines the guilty conscience to be another consequence and at the same time the punishment for the drivers' behaviour.

The findings were able to generate information for the creative team from professional advertising agency Factory of Social Communication.

Target group

The target group of the campaign consisted of young people 20-30 years old in the city of Lublin. The study showed that the most significant target groups for the spots regarding drunk driving are young men, more often students than men having families.

Not only does this group decide to drink and drive more often but they also showed the least imagination as far as the potential consequences are concerned.

Scope of the campaign

The campaign had a regional scope. The campaign was carried out in the city of Lublin in south-eastern Poland (population 350 000) which has large number of young inhabitants because it's the largest academic centre in that part of the country. Each fifth adult person is a student which gives large target group for the campaign focused on young alcohol consumers – drivers and passengers.

The problem of drunk driving in the Lubelskie voivodeship, where Lublin is located, is higher than the national average. In 2007, people under the influence of alcohol were involved in 476 traffic incidents in the voivodeship (7.3% of the total number of traffic incidents).

Timing and duration of the campaign

The campaign was presented in various media in the city of Lublin in April 2008. The campaign was also broadcast for one week on the national TV to support local media coverage.

The campaign is part of the long term communication strategy of the Ministry of Transport, which started in 2004 and was an effect of cooperation of the Memorandum of Understanding with the Netherlands. The campaign "Pileś? – Nie jedź", (Drunk? – Don't drive) was a part of the long term project named "Włącz myślenie" (Turn of thinking) which is an umbrella logo for all road safety communication in Poland. The road safety communication strategy covers drinking and driving, seat belt use and child restraint systems, speeding and vulnerable road users. Each year a campaign for each of that subject is being held coupled with enforcement. All campaigns gather various agencies, national and regional authorities, non-governmental organizations and private partners. Special campaign calendars were developed by the National Road Safety Council and National Police Headquarters were in 2006 to help coordinate the operation.

Objectives of the campaign

The general aim of the campaign was to tackle alcohol impaired driving which is one of the main contributing factors to road crashes in Poland. The legal obligation to drive sober (legal limit is 0.2) is contrasted with many social beliefs and justifications for such behaviour therefore the campaign had to make strong emotional impact. The objective of the campaign to raise awareness of drinking and driving consequences, risk perception and minimize social acceptance for such behaviour.

Media plan

Media selected for the campaign "Drunk? Don't drive":

1. Advertising in the movie theaters as there is highest rate of young viewers – more than 70% of audience are between 15 and 39 years old. Advertising in movie theaters gives also coverage of most of the city inhabitants. The spectators are not distracted and the impact of the spot is greater on the large screen. The advertisement was broadcast in six cinema theaters in the city of Lublin.
2. TV advertising in local TV stations and national public TV.
3. Outdoor advertising – all city inhabitants have contact with billboards but it's not interfering like other advertising. The advertisement was displayed on 75 billboards (posters 5x2m) and 15 street lights (posters 2,5 x1,5m).
4. Indoor advertising was specially selected in correlation with the topic of the campaign. Indoor displays of posters (104 posters) in restaurants, bars, pubs and clubs – only target group, consumption of alcohol and decision making process contrasted with campaign's message.
5. Daily newspaper with 50% of readers under 35 years old.
6. Internet – banner, virus marketing and link to the website. Focused on students in the city of Lublin. 85% of people under 30 years old.
7. Ambient media used in the campaign was recognized in advertising press as very innovative and effective. The picture of prison crate was displayed on mirrors in toilets of bars and clubs. A person using the bathroom would see themselves in the mirror like in a prison with a slogan: "Get used to this view if you are going to drink and drive tonight".

Accompanying activities

The campaign was coupled with the sale education program "Driving not drunk" carried out by Polish Breweries. During the campaign period specially trained staff carried a program for bars and clubs occupants, referring to the campaign message and materials. The program was carried on in few cities in Poland prior to the campaign in Lublin but it was evaluated for the first time.

Production costs

The total costs of the campaign, without media purchasing, amounted to approximately € 50.000. This included concept development (advertising agency), production (TV and radio spots, cinema handouts, billboards, posters, website). The research (qualitative, quantitative research) amounted at € 13.000. The media costs are hard to estimate as some media were discounted at the rates for social campaigns.

Quantitative study

The aim of the quantitative study was to gather information on attitudes and knowledge of respondents on following topics:

1. What the vehicle is used for most often
2. Causes of traffic accidents
3. Identification of persons who drink and drive
4. Influence of alcohol on the driving abilities
5. Consequences of drinking and driving
6. Permissible limit of alcohol content in the blood

Method

Participants

The target group of the campaign "Piłeś? – Nie jedź!" (Drunk? – Don't drive!) was young people 20-30 years old. This is a group with a high risk and tendency to use alcohol and drive or be a passenger of a car with drunk driver.

The quota (gender) - random sample was used.

The interviews in pre and post-campaign surveys were conducted with a representative sample of:

- people in age 20-30
- with a driving licence
- who drive at least once a month

The sample consisted of 400 people before and after the campaign (70% men and 30% women). Table 1 and 2 presents a more detailed description of the participants.

Tabel 1. Participants gender, age and education.

GENDER	n
male	280
female	120
AGE	
20-21	89
22-23	89
24-25	78
26-28	79
29-30	65
EDUCATION	
elementary, basic vocational	34
secondary, post-secondary	266
university	98

Table 2. Participants frequency of driving and purpose of trip.

FREQUENCY OF DRIVING	n
every day	215
2 – 3 times a week	80
once a week	38
less than once a week	31
once a month	36
MOST FREQUENT USE OF A VEHICLE	
out of town	145
commuting to work/school	164
shopping	166
meetings with friends/family	165
wherever I can	133
other	7
don't know/hard to say	1

Procedure

Two studies were carried out (before and after the campaign) using the same methodological assumptions.

Following the qualitative study prior to the campaign a street survey was carried out in the major Lublin communication nodes using street survey and PAPI (Pen & Paper Interview) method. To guarantee geographical spread, for each survey selected 40 points (streets in Lublin) were included (10 interviews per each point). The respondents was approached and asked to complete a paper questionnaire.

The second quantitative survey was carried two weeks after the end of media activities (between 15 and 20 May 2008) following the same procedure as the before study.

The survey covered:

1. Purposes of motor car use
2. Causes of traffic accidents
3. Identification of drinking and driving persons
4. Ability to drive under the influence of alcohol
5. Consequences of driving under the influence of alcohol
6. Permissible limit of alcohol content in driver's blood
7. Declarative change in attitudes resulting from the „Drunk? Don't drive!" campaign
8. Media effectiveness of the „Drunk? Don't drive!" campaign
9. Assessment of the „Drunk? Don't drive!" campaign

The effectiveness of the campaign was defined in three ways:

- Contact with the campaign (the post – measurement analysis)
- Perception of the TV spots (the post – measurement analysis)
- And influence on the people attitude toward drinking & driving and declaration of future behaviour (comparison of answers form pre- and post- campaign measurements).

Evaluation budget

The research (qualitative, quantitative research) amounted to € 13.000.

Field timetable

Pre campaign survey was conducted in March 2008. The post-evaluation began six weeks later (15-30th of May 2008).

Analysis

The data of the inquiry was analysed for differences between the pre- and after-measurement, held before and after the campaign. We also made comparisons between the group of people who recalled the campaign with those who did not remember it.

In the evaluation the frequency of answers were analyzed and the statistical differences before and after the campaign, between those aware and unaware of the campaign was analysed using a Chi-square test. The frequency is computed separately for each cell. Each time it refers to 2 x 2 four-fold table.

Moreover some conditions must be fulfilled for computing the statistical test:

1. Frequency of the four-fold table in question >= 50
2. None of the cells is empty
3. Expected value of none of the 4 cells is lower than 5

For each of these 4 cells an expected value (resulting form marginal values) is computed and compared against an empirical one. The statistics shown in the table are adjusted and standardized. It is computed by dividing difference between observed and expected frequency by statistical estimation of error and this is expressed in standard deviation units below or above the arithmetic mean.

This value squared is equivalent to Chi-square. The higher the absolute value of the residual, and by the same token Chi square statistic, the lower is the probability of that the value received is random in its character. Negative value of the rest indicates that the value in the cell is lower that the expected one, and positive that the value is higher than that. There is no maximal value, it could [asymptotically] approach normal distribution. For the significance level .01 it is 2.58, and for level .05 it is 1.96.

Results

Reach and appreciation of the campaign

In the after-campaign measurement 74% of requested had contact with information, news about the drunk drivers and actions connected with this subject (spontaneous declarations).

After ads screenshots and other materials presentation (aided recall), incredibly high percentage of respondents (94%[1]) confirmed to have had contact with the campaign "Pileś? – Nie jedź! Sto lat – Nawet tyle nie wystarczy żeby zapłacić za życie innych".

The openness for information depended on the frequency of driving – the more often people were driving, the more remembered the campaign. Table 3 presents the relationship between frequency of driving and recall of the campaign.

Table 3. Frequency of driving vs. aided recall of the campaign.

	Remembered the campaign	Not remembered the campaign
	%	%
Everyday	95*	5*
2 – 3 times a week	91	9
once a week	90	10
less than once a week	90	10
once a month	85	15
N	377	23

The channels effectiveness

The campaign "Pileś? – Nie jedź! Sto lat – Nawet tyle nie wystarczy żeby zapłacić za życie innych" was prepared as multi-channel what with adjusted communication to guarantee better coverage.

The most people remember the campaign form billboards (75%) and form television (70%). The banners shown in the Internet were seen by half of the respondents.
Fewer people saw advertisement on placed on buses and by petrol stations, see Table 4.

1 If we exclude the influence of the local campaign conducted in Lublin, the aided recall was 93.3%.

Table 4. Percentage of respondents who remember the campaign.

Have you come across?	Yes	No	Do not know / hard to say
	%	%	%
TV spot	70	28	3
cinema spot entitled	20	77	3
outdoor billboards	75	23	2
gas station posters/petrol fillers with the slogan	42	52	6
posters at the back of the bus	48	45	7
posters at pub, discos, restaurant	26	68	6
posters at the church	9	87	4
leaflets	26	69	5
radio advertisement	41	54	6
Internet banners	50	47	3
prevention activities in clubs, pubs, discos	19	77	4
N	400	400	400

The interesting results bring the activities in pubs, clubs, discos and restaurants. 26% respondents remember the posters placed there, and almost every fifth (19%) mentioned prevention. But the more often people visit these places, the higher the campaign reach was. 55% "Clubbers" (visits more than 3 times a week) remembered the campaign, 71% of them had contact with prevention in clubs.

Table 5. Percentage of respondents who remember the campaign in clubs, pubs, discos, restaurants vs. frequency of visits in these places.

Remember vs. How often you visit pubs, clubs, parties?	Posters at pub, discos, restaurant	Prevention activities in clubs, pubs, discos
	%	%
more than 3 times a week	43	71
1-3 times a week	41	32
once a month	28	14
less than once a month	8	8
hard to say	56	11
N	400	400

Appreciation of TV spots

It is said today that TV has the widest coverage and thanks to that the best GRPs results. People in age 20-30 spend a lot of time at the TV sets (2h20m per day) and are affected by many advertisements.

The results presented in Table 6 and 7 show that the spots shown on TV were remembered by 70% of respondents. This high attraction is additionally confirmed by respondents opinions where 42% did not agree with the statement that the TV advertisement is not standing out (mean is 2.06), 46% did not agree that it was boring (mean 1.92). People found it as a worthy to remember (mean 4.70) and informative (mean 4.57). The advertisement shows pictures form real life. It was not perceived as abstraction and thanks to clear message could start to work.

Table 6. Reaction to the TV spot by people who remember the campaign from television.

Reaction	Informative	Readable	Untrue	Boring	Convincing	Worth to remember	Real-life	Not outstanding
	%	%	%	%	%	%	%	%
(1) definitely yes	1	0	59	46	0		0	42
(2) rather yes	0		23	23	1	1	1	20
(3) rather no	5	3	12	19	4	2	4	26
(4) definitely no	29	40	3	8	40	21	35	6
(97) do not know / hard to say	65	57	1	1	54	75	60	3
N	278	278	278	278	278	278	278	278
Mean	4,57	4,53	1,59	1,92	4,48	4,70	4,54	2,06
SD	0,68	0,59	0,87	1,06	0,66	0,58	0,64	1,12

Driving under the influence of alcohol

Before the campaign almost all respondents agreed that dinking has influence of the ability to drive. In post-measurement significantly more people shared this opinion (75% to 83%).

Table 7. Influence of alcohol consumption on driving - before and after campaign and in the group with and without a contact with the campaign[1].

Does, in your opinion, alcohol consumed impairs the driver's ability to safely drive a car?	*Before the campaign*	*After the campaign*	*Have remembered the campaign*	*Have not remembered the campaign*
	%	%	%	%
(1) definitely agree	*75**	*83**	*82*	*91*
(2) rather agree	*21*	*16*	*17*	*9*
(3) rather disagree	*3*	*1*	*1*	*0*
(4) definitely disagree	*1*	*0*		
(97) do not know / hard to say	*2*	*0*	*0*	*0*
N	*400*	*400*	*377*	*23*
Mean	*1.28*	*1.18*	*1.18*	*1.09*
SD	*0.532*	*0.402*	*0.408*	*0.288*
Pearson Chi-Square	9.892		1.253	
Df	3		2	

Knowledge of the law

Polish law allows to drive a car if the level of alcohol in blood does not exceed 0.2 ‰ blood alcohol content (0.1 mg / dm3 of breath). About 60% of respondents knew this limit. After the campaign people were more likely to be more restricted. The percentage of people who define accepted maximum blood alcohol content on level 0.1 ‰ (0.05 mg / dm3 of breath) was significantly higher (form 5% to 16%), and percentage of respondents who thought that the level of concentration was higher (0.5 ‰ blood alcohol content) than allowed by Polish law is significantly lower (from 15% to 9%). In the post-campaign survey the percentage of people who did not know the level of legal limit decreased significantly from 11% to 6%.

1 "The group is defined as all people who remembered the campaign "Piłeś? – nie jedź!" form any channel.

Table 8. Awareness of allowed limit of alcohol for drivers - before and after campaign and in the group with and without a contact with the campaign.

Do you know what the legal alcohol limit is for a driver in Poland?	Before the campaign	After the campaign	have Remembered the campaign	have not Remembered the campaign
	%	%	%	%
.0 ‰ in blood (.0 mg per dm3 of breath)	4	6	6	4
.1 ‰ in blood (.05 mg per dm3 of breath)	5*	16*	17	9
.2 ‰ in blood (.1 mg per dm3 of breath)	65	60	59	78
.5 ‰ in blood (.25 mg per dm3 of breath)	15*	9*	9	0
1.0 ‰ in blood (.5 mg per dm3 of breath)	0	0	0	0
there is no legal limit	0*	4*	4	4
do not know / hard to say	11*	6*	6	4
N	400	400	377	23
Pearson Chi-Square	44.550		4.467	
df	5		5	

Polish law defines usage of alcohol by drivers between 0.2 ‰ and 0.5 ‰ blood alcohol content (0.1 mg – 0.25 mg / dm3 of breath).

Almost every fifth of surveys participants thought that this definition was also applicable to the drivers who drank less (0.1 ‰ in blood, 0.05 mg dm3 of breath). People mainly connected "being under the influence of alcohol" with the maximum accepted by law level. And after the campaign percentage of people who shared this opinion significantly increased (form 37% to 48%). In addition in post-campaign survey decreased (form 21% to 11%) the percentage of people who did not know the level of limit (this change was significant).

Table 9. Definition of being "under the influence of alcohol when driving" - before and after campaign and in the group with and without a contact with the campaign.

Do you know what amount of alcohol in organism indicates "being under the influence of alcohol"?	Before the campaign	After the campaign	have Remembered the campaign	have not Remembered the campaign
	%	%	%	%
.1 ‰ in blood (.05 mg per dm3 of breath)	19	19	18	26
.2 ‰ in blood (.1 mg per dm3 of breath)	37*	48*	49	35
.5 ‰ in blood (.25 mg per dm3 of breath)	22	21	21	26
1.0 ‰ in blood (.5 mg per dm3 of breath)	2	2	2	0
there is no legal limit	21*	11*	11	13
N	400	400	377	23
Pearson Chi-Square	3.26		2.36	
df	3		3	

Polish Penal Codes describes drunk driver as a person with more than 0.5 ‰ blood alcohol content (0.25 mg / dm3 in breath). In post-survey the percentage of people who gave the right answer to the question decreased (statistical significant change). But this is not a very bed new if we look at the others answers. After the campaign people were more likely to decrease the levels of alcohol for drunk drivers (22% more agreed that drunk driver has 0.2‰ of blood alcohol content)! Similar situation we could observe in group of people who remembered the campaign and those who did not. Similarly previous analysis in post-measurement significantly decreased the percentage of people who did not know the answer (from 20% to 6%).

Table 10. Definition of being drunk - before and after campaign and in the group with and without a contact with the campaign.

Do you know what amount of alcohol in organism indicates "drunkenness/being intoxicated with alcohol"?	before the campaign	after the campaign	have remembered the campaign	have not remembered the campaign
	%	%	%	%
.1 ‰ in blood (.05 mg per dm3 of breath)	4	3	3	0
.2 ‰ in blood (.1 mg per dm3 of breath)	8*	30*	31	13
.5 ‰ in blood (.25 mg per dm3 of breath)	56*	45*	43*	70*
1.0 ‰ in blood (.5 mg per dm3 of breath)	13	17	17	13
there is no legal limit	20*	6*	6	4
N	400	400	377	23
Pearson Chi-Square	50.74		6.52	
df	3		3	

Most respondents thought that after the usage of alcohol there is no 'safe driving'. And after-measurement the percentage of people who shared this opinion significantly increase form 69% to 80% (but did not depends on the campaign).

People who accepted drinking and driving defined a one beer or wine glass as safe for driving amount of alcohol.

Table 11. Definition of the alcohol you could drink and safe drive a car - before and after campaign and in the group with and without a contact with the campaign.

How much can one drink, in your opinion, to be able to safely drive a car?	Before the campaign	After the campaign	Have remembered the campaign	Have not remembered the campaign
	%	%	%	%
no alcohol at all	69*	80*	79	83
one beer / wine-glass	26*	17*	17	9
two beers / two wine-glasses	2	3	2	4
one shot of vodka / two shots of vodka	1	0	0	0
others	1	1		
do not know / hard to say	2	0	1	4
N	400	400	377	23

Perception of the risk

Drinking and driving, speed and recklessness were three main reasons of the road accidents in respondents' opinion. Before and after the campaign, alcohol was mentioned most frequently (73% and 82%) as one of the main factors of road accidents. It is worthy to mention that after the campaign people tend to see the reasons for the road accidents more as a result of people behaviour (alcohol usage, speed, recklessness), than other reasons (roads, weather). These changes were statistically significant.

Table 12. The main reasons of a road accident - before and after campaign and in the group with and without a contact with the campaign.

What are in your opinion three most important causes of road accidents?	before the campaign	after the campaign	have remembered the campaign	have not remembered the campaign
	%	%	%	%
other drivers' speeding	57*	67*	66	83
my speeding	10*	17*	16	22
other drivers' recklessness	57*	65*	66	52
drink driving	73*	82*	82	78
pedestrians on roads	16	15	15	13
cyclists on roads	9	5	6	0
inexperienced (young) drivers	11*	7*	7	0
poor road conditions	33*	21*	20	22
bad weather	18*	9*	8	26
my feeling unwell	1	0	0	0
others	4	6	6	4
do not know / hard to say	1	0		
N	400	400	377	23

Women are more likely to see the alcohol as a factor of the road accidents than a men. Before the campaign this differences was 81% vs. 69%, after 88% vs. 79%.

Table 13. Drinking – as the main reason of the road accidents - men and women.

	Before the campaign	After the campaign
	%	%
In total	73	82
Gender		
men	69*	79*
women	81*	88*

Respondents connected the main consequences of driving under alcohol influence with life and health of others. They were more focused on other than themselves. As a worst consequence most of them defined the death of others. It is important that after the campaign the awareness of these consequences are significantly higher (see results in table).

Table 14.The three main consequences of driving under alcohol - before and after campaign and in the group with and without a contact with the campaign.

What are in your opinion the three worst consequences of drink driving?	Before the campaign	After the campaign	Remembered the campaign	Not remembered the campaign
	%	%	%	%
having driving license revoked	48*	28*	28	13
my disability	24*	38*	38	39
others' disability	39*	50*	49	70
my death	45*	64*	64	52
death of others	69*	83*	82	87
material losses	6	4	3	17
imprisonment (probation)	22	19	19	17
fine	7	6	6	0
others	6	5	5	4
do not know / hard to say	8*	0*	0	0
N	400	400	377	23

Driving under the influence of alcohol

The driving under the influence of alcohol is one of the main causes of accidents in Poland. The scale of the problem is visible in the official police statistics and in the results of the projects. From the studies conducted by TNS OBOP for the National Road Safety Council since 2005 we know that people are not used to open says that they are drinking and driving. Their openness and acceptance for driving under alcohol influence is shown in opinions about the others.

Similar results were achieved in before- and after- measurements, but on the last survey less people confirmed that they were drinking and driving (from 15% to 8%), traveled as passengers of a car driven by someone under the alcohol influence (form 32% to 23%), and when they observed others in pubs, clubs who drank and drove (form 55% to 48%). And all this changes were significant.

Table 15. Drinking and driving - before and after the campaign and in the group with and without a contact with the campaign.

Have you ever been drinking and driving?	Before the campaign	After the campaign	Remembered the campaign	Not remembered the campaign
	%	%	%	%
Yes	15*	9*	8	9
No	85*	91*	91	91
do not know / hard to say	0	1	1	0
N	*400*	*400*	*377*	*23*
Pearson Chi-Square	8.007		0.001	
df	1		1	

Table 16. Being a passenger in a car driven by a person under alcohol influence - before and after campaign and in the group with and without a contact with the campaign.

Have you ever been a passenger of a car driven by a drunk driver?	Before the campaign	After the campaign	Remembered the campaign	Not remembered the campaign
	%	%	%	%
Yes	32*	23*	22	0
No	64*	73*	75	100
do not know / hard to say	4	4	3	0
N	*400*	*400*	*377*	*23*
Pearson Chi-Square	7.78		0.46	
df	1		1	

Table 17. Ability to see drinking and driving -- before and after campaign and in the group with and without a contact with the campaign.

While being at club, pub, cafe have you seen people who drank alcohol and drove later?	Before the campaign	After the campaign	Remembered the campaign	Not remembered the campaign
	%	%	%	%
Yes	55*	48*	48	39
No	40	47	46	52
do not know / hard to say	5	6	6	9
N	*400*	*400*	*377*	*23*
Pearson Chi-Square	4.284		0.506	
df	1		1	

Changes of attitude towards drinking and driving

All respondents who had a contact with the campaign were asked to evaluate its influence on their behaviour. Every second requested confirmed that the campaign had changed his/her attitude towards drinking (31% said – "definitely yes", 18% - "qualified yes"). It is important that the more people were driving the more were convinced about the influence of the campaign (0.278 significant at the 0.01 level, 2 tailed). 56% Every days drivers the answers said yes (37% "definitely yes" + 19% "qualified yes").

Table 18. Change of attitude towards drinking and driving - before and after campaign and in the group with and without a contact with the campaign.

Have you as a result of coming across the campaign "Have you drunk? Do not drive!" changed your attitude towards drink driving?	Remembered the campaign
	%
(1) definitely yes	31
(2) rather yes	18
(3) rather no	27
(4) definitely no	12
(97) do not know / hard to say	13
N	377
Mean	1.057
SD	1.057

Persuading to drive or not to drive under the influence of alcohol

The survey included a question about their friends and if they would persuade others to drink and drive, see Table 19.

Table 19. Persuasion - before and after campaign and in the group with and without a contact with the campaign.

Is a driver persuaded to drink a small amount of alcohol in your close neighbourhood?	Before the campaign	After the campaign	Remembered the campaign	Did not remember the campaign
	%	%	%	%
(1) very often		2	2	4
(2) often	8	6	7	0
(3) rather rarely	21	18	18	17
(4) very rarely	65	59	58	74
(97) do not know / hard to say	6*	15*	15	4
N	400	400	377	23
Mean	3.535	3.569	3.561	3.682
SD	0.759	0.731	0.732	0.716
Pearson Chi-Square	0.454		2.562	
Df	3		3	

Table 20 shows that before the campaign 64% of respondents have seen someone trying to persuade others not to drive after drink, or refused to drive by themselves. In the after-campaign this had increased to 73% (significant).

Table 20. Persuading not to drive under the influence off alcohol - before and after campaign and in the group with and without a contact with the campaign.

Have you seen someone trying to persuade another driver from drinking and driving, or have you tried it yourself?	before the campaign	after the campaign	remembered the campaign	did not remember the campaign
	%	%	%	%
Yes	64*	73*	74	57
No	31*	23*	21*	43*
do not know / hard to say	5	5	5	0
N	*400*	*400*	*377*	*23*
Pearson Chi-Square	**7.347**		**5.349**	
Df	**1**		**1**	

All of respondents who remembered the campaign were directly asked whether thanks to this action they would persuade people not to drive after drinking. 80% of the participants had promise to do this prevention. Analysing the socio-groups it is clear that "everyday drivers" did so significantly more frequently then others (85%), and participants with only primary education did so less frequently (59%).

Table 21. Influence of the campaign of the prevention activity.

Have you as the result of the campaign persuaded others not_to drink and drive?	%
(1) definitely yes	36
(2) rather yes	22
(3) rather no	25
(4) definitely no	13
(97) do not know / hard to say	4
N	*76*
Mean	2,220
SD	1,079

Awareness and influence of the action

In Lublin the special action of prevention was held in pubs, clubs, discos and restaurants. 19% of survey participants remembered this part of the campaign and thanks to it 88% were more aware of the consequences of drinking and driving.

Table 22. Awareness of the action "Prowadzący nie pijący" and its effectiveness.

Do you remember the action of prevention "Drivers not drinking" held in Lublin coffees, clubs and pubs during last month?		**Are you aware of the consequences of drinking and driving thanks to the "Drivers not drinking" action?**	
	%		%
Yes	80	yes	88
No	5	no	9
do not know / hard to say	15	do not know / hard to say	3
N	377		76

Table 23. Influence of "Prowadzący nie pijący" (Drivers not drinking) action of attitude towards drinking and driving?

Would you thanks to the "Drivers not drinking" action change your attitude towards drinking and driving?	**%**
Yes	**80**
No	**5**
do not know / hard to say	**15**
N	*377*

Conclusions and recommendations

This report contains the results of a study assessing the effects of the "Drunk? Don't drive" campaign. This campaign was launched locally in the city of Lublin (population 350 000), south-east Poland, in April 2008. The campaign was based on the previous research. The campaign was an integrated combination of a mass media communication because it assured better target reach locally, supporting local communication (local mass media and personal communication at the point of alcohol sale/consumption) coupled with enforcement on drinking and driving. The campaign was funded and coordinated by the Ministry of Transport and Polish Spirit Industry, Polish Breweries. In the development and execution of the campaign the Ministry worked together with regional authorities, police forces and an advertising agency (Factory of Social Communication).

The target group of the campaign consisted of young people 20-30 years old in the city of Lublin. The study showed that the most significant target group for the spots regarding drunk driving is young men, more often students than men having families.

The creative concept focused on aspects related to the responsibility for life of others; the biggest fear of young respondents; and the long term consequences of drinking and driving such as guilt, which stays forever and is worst than life term sentence. The campaign "Pileś? – Nie jedź", (Drunk? – Don't drive) was a part of the project named "Włącz myślenie" (Turn of thinking) which is an umbrella logo for all road safety communications in Poland. The slogan was: "100 years is not even enough to pay for someone's life".

The general aim of the campaign was to tackle alcohol impaired driving which is one of the main contributing factors to road crashes in Poland. The legal obligation to drive sober (legal limit is 0.2) is often contrasted with many social beliefs and justifications for such behaviour therefore the campaign had to make strong emotional impact.

In 2007, drunk drivers took part in 6 505 traffic accidents (13.1% of the total number of traffic accidents), which resulted in the death of 774 people (13.9% of the total number of fatalities), and 8 193 injuries (12.9% of the total number of people injured).

The problem of drunk driving in the Lubelskie voivodeship region, where Lublin is located, is higher than the national average. In 2007, people under the influence of alcohol were involved in 476 traffic incidents in the voivodeship (7.3% of the total number of traffic incidents).

Specific campaign objectives were based on the results of a qualitative study conducted in March 2008. The conclusion regarding the questionnaire was that it should be fairly short and since it is being conducted by independent research institutes or companies it also had to be cost effective.

The main aim of the qualitative study was to obtain information that would help to choose the right way of communication with regard to drunk drivers. The qualitative study was a basis for the quantitative study design. More detailed aims of the qualitative study included:

- Familiarizing with behaviour of the respondents after drinking alcohol and assessing such behaviour according to their reference group
- Assessment of the respondents' knowledge on the consequences of drunk driving (the effect on physical and mental state, penalties)
- Assessment of the rational and emotional response to each of the spots
- Assessment of the respondents' ability to identify with each of the spots
- Drawing conclusions concerning the potential effect of the spots.
- Choosing one of the TV spots from 5 countries

Drinking and driving was a subject of few campaigns in 2006 and 2007 but neither of them was well evaluated and the police statistics did not demonstrate any significant improvement in that matter. Therefore there was a strong need for prior research evaluating previous communication concepts for the development a better campaign strategy. The research was able to better understand the reasoning behind the problem of drinking and driving which in turn can help in formulating the arguments appealing to a high risk group – young drivers and passengers.

The main purpose of the evaluation research was to determine whether the 2008 campaign have been effective or not. The results would then justify further actions and funding for awareness rising campaigns. Furthermore it establishes a base of information which is a starting point for long term strategy. Campaign evaluation can require a lot of resources, but even with limited funding, it is important to collect some evaluation data that will be useful for future reference.
For the purpose of final monitoring the campaign's progress was carefully planned and the research started two weeks after last media activities to properly evaluate its results.

The same methodology enabled the data comparison and evaluation of effectiveness. The survey covered:

1. Purposes of motor car use
2. Causes of traffic accidents
3. Identification of drinking and driving persons
4. Ability to drive under the influence of alcohol
5. Consequences of driving under the influence of alcohol
6. Permissible limit of alcohol content in driver's blood
7. Declarative change in attitudes resulting from the „Drunk? Don't drive!" campaign
8. Media effectiveness of the „Drunk? Don't drive!" campaign
9. Assessment of the „Drunk? Don't drive!" campaign

The main result of the evaluation study is that the campaign had reached the target group (95%) and made a significant difference in the beliefs and opinions on drinking and driving. Both before the campaign (46%) and after (58%), the majority of respondents indicated they would prefer not to drive when they go or come back from a party. This response was selected the most often by persons aged between 20 and 25. The increase in the percentage of respondents was 12% (49% before the campaign and 61% after the campaign). The opinion is shared by respondents aged 26-30: in this group, the increase was from 42% to 55%.

As a result of the campaign, men admitted more frequently to witnessing a drunk person driving a car: the results were 48% before the campaign and 58% after it.
The most significant change, resulting from the campaign, was noted in responses to the question concerning a ride in a car driven by a person under the influence of alcohol in the group aged between 26 and 30. The decrease in the share of persons admitting to this was 13% (from 29% to 16%). In the younger group, the share of persons in the same situation after the campaign was 30%.

Following the campaign, the share of persons riding in a car driven by a drunk driver decreased both for men and women: from 25% to 18% for women and from 35% to 26% for men.

The campaign resulted in a significant rise in the share of respondents (both men and women) who refused to answer the question concerning talking a driver into drinking a small amount of alcohol by the closest circle.

After the campaign, the worst consequences of drinking and driving presented by the respondents were: death of others (83%), own death (64%) and disability of others (50%).
In the first survey, both women (73%) and men (67%) indicated the most frequently the death of others as the consequence of driving under the influence of alcohol.

A significant increase was observed in the share of younger drivers who claimed no alcohol could be consumed for safe driving – 63% before and 78% after the campaign. In the group of older drivers, the increase was small: from 80% to 82%.

Following the campaign, 82% of the younger respondents declared they would try to prevent others from driving under the influence of alcohol. The same was the answer of 77% of the older respondents. 86% of women declared after the campaign they would try to prevent others from driving under the influence of alcohol. The same was the answer of 78% of men.

In each age group, the campaign was recognized by a very high share of drivers: 94% of younger and 92% of older drivers.

The media budgets are very often the highest elements of campaign costs therefore it is important to verify media planning and target contacts. The media evaluation research proved that the most effective means of reaching younger drivers were TV and outdoor advertising. The situation in case of older drivers (25-30 years) was similar, although the television appeared to be less effective. Posters in churches and advertisements shown in cinemas were the least effective mean to reach the target group. A significant reach of the Internet is worth attention: 54% for younger and 44% for older drivers. The most effective manners of reaching both men and women were TV (78% for women, 66% for men) and billboards (78% for women and 74% for men).

All respondents who had a contact with the campaign were asked to evaluate its influence on their behaviour. Every second respondent confirmed that the campaign had changed his/her attitude towards drinking and driving (31% said – "definitely yes", 18% - "qualified yes"). It is important that the more people were driving the more were convinced about the influence of the campaign. 56% of "every day drivers" the answers said yes (37% "definitely yes" + 19% "qualified yes").

The main conclusion from the evaluation is that drivers have an increased awareness of risk associated with drinking and driving.

Recommendations

The campaign coordination and design with pre- and post – study gives the following recommendations:

- Since drinking and driving is one of the main road fatalities cause it is advisable to continue campaigns with regard to drinking and driving. Only repeated advertising ensures desired perception and behaviour change.
- The campaign had worked and reached the target group. After presentation of advertisements 95% of participants recall and remembered the campaign. People remembered the campaign from outdoors (billboards - 75%) and TV (70%). Such channels of distribution should be considered as the most effective in the communication on drinking and driving.
- Every second person confirmed that the campaign had changed his/her attitude towards drinking and driving (31% said – "definitely yes", 18% - "rather yes"). The most frequent people were driving the more they were convinced. Therefore the subject has to be constantly repeated to prevent alcohol related accidents.
- The in-depth qualitative study allowed to design good evaluation tool and gathered necessary information to understand motivations and reasoning of drinking and driving. Such data collection provided a base for effective communication design which applied exactly to information formulated by respondents during the qualitative study. It is recommended to follow the same in-depth research path any before forthcoming road safety campaigns.
- Campaigns have influence on the probability of not driving under the influence of alcohol. People who have remembered the campaign "Piłeś? – Nie jedź!" from any of the channels of the distribution are less likely to drink and drive.
- The prevention activities had less influence on the younger group and men. They were less likely to change their negative behaviours.

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10. Conclusions and recommendations

Based on the materials presented in this publication the main conclusions and recommendations are as follows:

- By including both primary (e.g. behaviour) and secondary objectives (e.g. attitudes) the evaluation is able to assess change with greater accuracy.
- The use of a well established theory helps in selecting and assessing a range of different constructs known to predict behaviour.
- Differences in output variables between treatment group and a control group can be due to systematic differences between the two groups and not as a consequence of the intervention itself. Hence, the results from an evaluation using a before and after study is more valid and easier to interpret.
- Direct contact with the target group is an effective method when communicating the use of cycle helmets amongst a group of employees.
- Combined actions including both campaigns and enforcement appear to be effective as indicated by both the meta-analysis and the results from Slovenia and The Netherlands.
- To be exposed to a campaign stimulus is no guarantee that it will have an effect. More attention needs to be given to its location and how it is being presented (e.g., the Belgian study: no differences were found between the pre-attentive and the control group).
- All types of car occupants (i.e., passengers and drivers) have to be informed about the risks (e.g., the Greek study: knowing about the upper permissible limit of alcohol use).
- Combine quantitative (questionnaires) with qualitative strategies (in-depth interviews, e.g., the Polish study). It helps designing the campaigns in ways that target groups can identify with and as a result recall better.
- Effects of verbal vs. written communication/information differ (e.g., the Austrian study).
- The need to consider the effects of external events happening during the campaign as was the case in the Slovenian study [a new law imposing higher penalties for major traffic offences].
- Small effects can also be important (e.g., the Dutch study: 1% more seat belt usage makes a difference of saving 3 lives and preventing 20 severely injured each year).
- Availability of external resources makes the behaviour easier to perform (e.g., the Swedish study, campaign participants were offered bicycle helmets for free when signing a contract).

EVIDENCE FROM SEVEN EUROPEAN COUNTRIES

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CAST
CAMPAIGNS AND AWARENESS-RAISING STRATEGIES IN TRAFFIC SAFETY

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