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Effectiveness of road safety workshop for young adults

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ABSTRACT

The present study appraises the effectiveness of the Loewenstein Hospital's Rehabilitation Center's Road Safety Workshop, based on emotional experience. For the purposes of the study, a survey questionnaire was created based on Ajzen and Fishbein's Theory of Planned Behavior [Ajzen, I., 1991. The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes* 50, 179–211]. The study was carried out using the target study method, and included matching groups of students aged 17–18. The results of the study suggest that vocational school students who attended the workshop hold a more road safety oriented view than students who did not attend the workshop. No statistically significant difference was found between the views of academic high school students who did or did not attend the workshop. In addition, an enhanced effect of the workshop on holders of driver licenses was found.

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1. Introduction

The great over-representation of young drivers in crashes and road fatalities is a serious worldwide public health problem (Harre et al., 2000; Moller, 2004; OECD, 2006; Williams 1996a,b). The high levels of young driver risk result principally from three general factors: inexperience, age and gender (Maycock, Lockwood and Lester, 1991; Maycock and Forsythe, 1997; Maycock 2002a,b). This combination is highly complex as it involves a myriad of interacting factors. Evidence suggests that poor vehicle control skills account for only 10% of novice driver crashes; the remaining 90% is accounted for by factors such as inexperience, immaturity, inaccurate risk perception, overestimation of driving skills, and risk-taking (Edwards, 2001). There are also certain psychological characteristics, such as sensation seeking (Deery and Fildes 1999; Zuckerman, 1994), and driving situations, such as nighttime driving (Lin and Fearn, 2003; Williams and Preusser, 1997) or carrying passengers (Williams, 2003) that put young drivers at higher crash risk. Finally, although there are drivers of all ages that drive under the influence of drugs and alcohol, young drivers have had much less experience doing so, which further contributes to their higher crash rates (Masten, 2004).

Young drivers tend to view their risk and vulnerability to crashes differently than do older people, and this unrealistic subjective perception of their risk is a likely factor included in their high crash rates (Finn and Bragg, 1986; Gregersen, 1996a; Peck,

1985, 1993). Similar to all drivers (Waylen et al., 2004), even more extremely, young drivers consistently rate their own performance as above average and are more likely to equate “good” driving with the ability to master the controls of the car at higher speeds. They are more willing to break speed limits, drive too close to the car in front of them, cut corners, etc. than more experienced drivers (Elander et al., 1993).

The severity of young drivers' traffic accidents involvement has caused experts in road safety to take action by developing educational and preventative programs (Curtis and Meehan, 2003) in order to reduce young driver risk. These programs need to take into account the factors which motivate people to take risks while driving and to understand what people feel they have to gain through such behavior. In addition, young drivers' intervention programs should be tailored to the needs and motivations of the specific subgroups of young drivers identified as being at a higher risk of crash involvement. Such programs are oriented to increase public awareness of the problem; to provide effective disincentives to inappropriate driving behavior and to improve driver training and testing, including more focus on self-awareness and understanding of the surrounding circumstances. The programs vary in terms of target audience and content. Some involve young drivers only, while others include their parents as well (Dinh et al., 2001).

Many programs have been developed as interventions aimed at retraining high risk drivers by focusing on improving driver knowledge and safety awareness, and employ a variety of teaching strategies aimed at positively influencing attitudes and therefore changing behind-the-wheel behavior (OECD, 2006).

There are studies that have assessed the effect that driver educational programs have had on improving the knowledge, attitude and behavior of the participants (Curtis and Meehan, 2003;

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Masten and Peck, 2004). One of these programs is the “Teen at Risk” program (Governor’s Highway Safety Bureau, 2002) which included mentoring, good role modeling and the “social normalizing” of positive behaviors. The program perhaps changed the driver’s way of thinking and controlling his behavior by using seat belts (Governor’s Highway Safety Bureau, 2002). The New Zealand study (Anderson and Merrick, 1980) suggested that although an improvement in knowledge and attitude may be statistically evident, change in behavior may not be. Some reports of intervention studies found only a small effect of attitude change, motivation and emotions (Robazza and Bortoli, 2005; Masten and Peck, 2004), while others (Shope, et al., 2001b) found a positive effect, but only in the first year of licensure.

Fear appeals are a popular method for drawing attention to themes such as road safety (Witte and Allen, 2008). A fear-based message captures and holds peoples’ attention and thus meets one of the requirements of successful information dissemination. People who see a fear-based spot for the first time are, as it were, emotionally drawn into the story about risky driving behavior and the disastrous consequences it can have for the victim and his/her family (Swov, 2007). Another fear-appeal-based intervention was mentioned by O’Brien et al. (2002).

Das et al. (2003) examined information processing as well as attitude change in response to fear appeals. They found that fear appeals generated favorable cognitive responses and consequent attitude change if participants felt vulnerable to threat. Thus, vulnerability operated as a motivator that fostered positive evaluation of the arguments in the fear-arousing message and resultant attitude change. On the other hand, some studies show negative effects of fear-appealing programs (Kohn and Schooler, (1983); Taubman Ari et al., 2000) such as causing young people in an extreme situation to react in an extreme response.

In line with these ideas, the social workers’ section in Loewenstein Hospital Rehabilitation Center set up a special short term workshop for adolescents in the hospital for the prevention of road accidents. This type of practical workshop format is well established in preventative frameworks (Byron, 2001; Kimbler, 2007; Silva and Ines, 2003).

For the past few years, the Loewenstein Hospital Rehabilitation Center has hosted workshops for 11th and 12th grade students from vocational and academic high schools. Some of those who attended the workshop already had a driver’s license and some not. The rationale of the intervention is to expose the young drivers (or the future drivers) to a meaningful experience that would imprint important messages of safety in their behavior, or at the least, in their attitudes. In line with the ideas of Taubman Ari et al., 2000 the workshop did not include extreme elements of injury or traumatic situations.

Over the course of the 4–5 h workshop, groups of 50–100 students watch a video documenting the lives of young people like themselves leading up to a road accident, and the ensuing recovery process. Following this, the students meet with a young person who has survived an accident. After hearing this person’s story, participants ask questions and hold a discussion. Sometimes, participants also meet a parent of a seriously injured young person and hear about the long recovery process. Finally, the students take part in a “simulation” in which they learn about living with a disability – for example, by controlling a wheelchair in a hospital or by attempting routine activities with one limb tied to their body.

Within the social cognition approach, models such as the Theory of Planned Behavior (Ajzen and Fishbein, 1991) and the health belief model (Rosenstock, 1974) have frequently been applied to study the determinants of risky driving behavior (Parker et al., 1992, 1995). According to these models, variables such as attitudes, perceived risk, social norms, perceived behavioral control and behavioral intention are central determinants of behavior.

Our study is based on the Theory of Planned Behavior (TPB) (Ajzen and Fishbein, 1991) which provides the theoretical framework for understanding driver behavior. This paradigm enabled us to examine separately for each safety facets (such as safety belt, drink and drive etc.) the youngsters’ attitudes and behavioral intentions.

The main issue in the theory is the behavioral intention as a predictor to future behavior. Although there is not a perfect relationship between behavioral intention and actual behavior, intention can be used as a proximal measure of behavior. The variables in this model can be used to determine the effectiveness of implementation interventions even if there is not a readily available measure of actual behavior (Francis et al. 2004).

Based on the above-mentioned ideas, we undertook research at the Loewenstein Hospital Rehabilitation Center. We hypothesized that adolescents who participated in the Loewenstein Workshop would hold safer attitudes than those who did not participate in the workshop.

The research question undertaken was whether there was a significant difference between young people who attended the workshop and those who did not *vis-à-vis* safe driving behavior.

2. Method

2.1. Participants

The study included 640 12th grade students, whose average age was 18.5 years. The study was conducted one year after the participation in the workshop. Eight questionnaires were disqualified due to improper completion. The students came from eight high schools in the Tel Aviv metropolitan region. The schools were divided into two categories: vocational and academic. Since the study was performed *post hoc*, the sample was taken as clusters (schools) so that each school type was carefully matched by geographical location, socio-economic status and type of school. In each school all the students of the 12th grade that were present at school at the day of the poll filled out the questionnaires on the request of the class teacher. From the academic high schools, whose students tended to be from a higher socioeconomic background, there was a total of 289 students of which 250 attended the workshop while 39 did not. From the vocational high schools, whose students tended to be from a weaker socioeconomic background, there was a total of 143 students, of which 114 students attended the workshop, while 29 did not. The study was completed over three months in the middle of the spring term.

In terms of gender, the breakup of the participants was 305 males and 326 females (one questionnaire had gender information missing). Of the males, 169 students attended the workshop and of the females, 195 students attended. Of those who attended the workshop, 169 already had a driver’s license, 170 did not (25 did not specify). Of those who did not attend the workshop, 136 had a driver’s license, and 113 did not (19 did not specify).

2.2. Instruments

The principle tool was the survey questionnaire and self-reporting form *vis-à-vis* road safety. The questionnaire, which was designed in accordance with Ajzen and Fishbein’s Theory of Planned Behavior (Ajzen, 1991), focused on five main facets of road safety: speeding, drunk driving, driving while tired, yielding the right of way, and proper passing (courtesy). The independent variables assessed in the survey were: (a) participation in the workshop (yes/no); (b) having a driver’s license (yes/no) and (c) type of school (academic/vocational). The dependent variables assessed in the survey were: (a) self-reporting of road behavior; (b)

intended behavior and (c) predicted intention. All at all, the questionnaire included 59 questions.

The questionnaire responses were ranked from 1 to 5 using a Likert scale:

One corresponded to the lower level of road safety and 5 to the highest level of road safety. For example, a question designed to check respondents' views regarding seatbelt use was worded as follows: "In my opinion, wearing a seatbelt at all times while driving is: 1. Harmful [...] 5. Essential." A question designed to check respondents' views regarding speeding was worded as follows: "I think that driving at the legal speed limit is: 1. Harmful [...] 5. Essential." The value assigned in each category was equal to the response given on the questionnaire. The total score for each respondent was equal to the sum total of all the answers on the questionnaire.

The questionnaires were anonymous and were handed out in the schools during the months of February, March and April. They were given out during an ordinary class, and were filled out under the supervision of one teacher and one of the researchers. Participants were informed only that the content of the questionnaires was related to road safety; no indication was given that the questionnaires were related to the workshop at Loewenstein Hospital Rehabilitation Center in which some of the students had participated.

2.3. Reliability

The variables were weighted beyond the individual categories (the person's view of a given behavior, the subjective norm, perceived behavioral control, expressed intention and self-reporting). The results of reliability tests for these five variables appear in Table 1.

In order to assess the questionnaire's construct validity, two stepwise-type regression analyses were conducted. In the course

Table 1 Results of reliability tests for five variables

Variable	Alpha-value
Attitude towards the behavior	0.70
Subjective norm	0.47
Perceived behavioral control	0.78
Expressed intention	0.68
Self-reporting	0.43

Table 2 Regression results – the effect of intention on independent variables, and the effect of self-reporting on independent variables and intention

Construct	R ²	R ² change	β
Perceived behavioral control	0.73	0.53	0.52
Attitudes	0.56	0.03	0.22
Subjective norms	0.57	0.00	0.09
Intention	0.39	0.39	0.31
Attitudes	0.46	0.08	0.29
Perceived behavioral control	0.47	0.01	0.16

of these analyses, the effect of the independent variables on intention, and the effect of the independent variables and intention on self-reporting were evaluated. In light of the results, it can be said that subjective norms do not have a significant effect on self-reporting vis-à-vis road safety. All betas had positive values, which suggests that they affect the reported behavior in the same direction as predicted by the Theory of Planned Behavior (see Table 2).

A new variable was created, entitled "Predicted Intention" by regressing the individual components (perceived behavioral control, attitudes towards behavior and subjective norms) in order to facilitate prediction of intention using the three independent factors.

Afterwards, a Pearson correlation test was carried out for the variables entitled "Self-Reporting" and "Predicted Intention"; this yielded a correlate of $r = 0.65, p < 0.001$.

In order to examine the effects of workshop participation, school type and gender on predicted behavioral intention and self-reported road behavior, two separate factorial univariate analyses of variance were performed, with the three former variables used as mediating factors. The probability for a type I error was kept below 0.05. For post hoc analyses the results were adjusted using the Bonferonni method.

3. Results

The predicted behavioral intention and self-reported road-behavior variables were distributed in a roughly normal fashion, with average of 0(SD = 1) and 3.72(0.68), respectively.

In order to examine the effects of workshop participation, school type and gender on predicted behavioral intention and self-reported road behavior, two separate factorial univariate analyses of variance were performed, with the three former variables used as mediating factors.

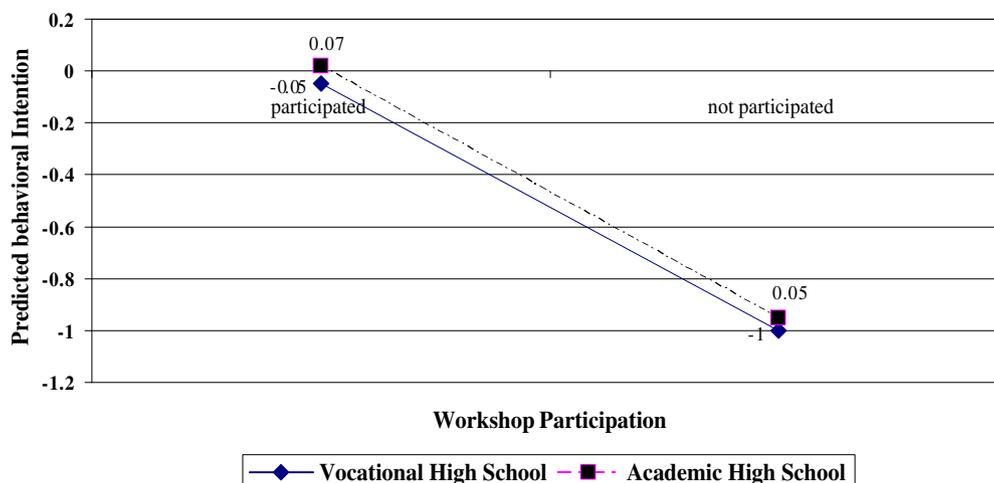


Fig. 1. Means of predicted behavioral intention for academic and vocational high.

In the analysis of predicted behavioral intention, a major effect was found for gender ($F(1,617) = 13.32, p < 0.001$), where male participants' scores were lower (less safe) than female participants (0.28(0.83)) in their predicted behavioral intention (-0.3(1.08)). In addition, an interaction was found between school type and workshop participation ($F(1,167) = 17.78, p < 0.001$). Workshop participation was associated with higher predicted behavioral intention only among the vocational school participants (see Fig. 1).

In the analysis of self-reported road behavior, a pattern similar (albeit not as pronounced) to the predicted behavioral intention emerged. A major effect was found for gender ($F(1,615) = 9.22, p = 0.002$), where male participants were lower in their self-reported road behavior (3.5(0.05)) than female participants

(3.74(0.06)). In addition, an interaction was found between school type and workshop participation ($F(1,615) = 4.45, p = 0.035$). Workshop participation was associated with higher level of safe road use as measured by self-reporting only among the vocational-school participants (see Fig. 2).

Two additional analyses were designed to determine the extent to which a student's possession of a driver's license affected the interaction between the school type and workshop attendance. In the predicted behavioral intention analysis, no main effect for having a driver's license was found. An interaction between possession of a driver's license and workshop attendance was found ($F(1,615) = 3.9, p = 0.049$), such that those students who had a driver's license and participated in the workshop reported a higher behavioral intention to abide by the traffic laws (0.084(0.08)) than

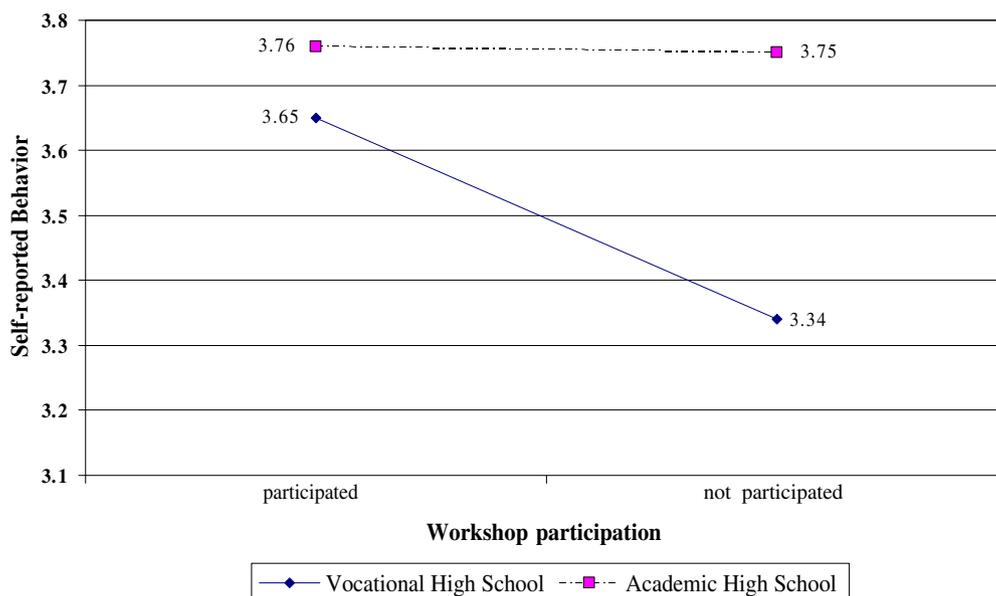


Fig. 2. Means of self-reported road-using behavior for academic and vocational high school participants by workshop participation.

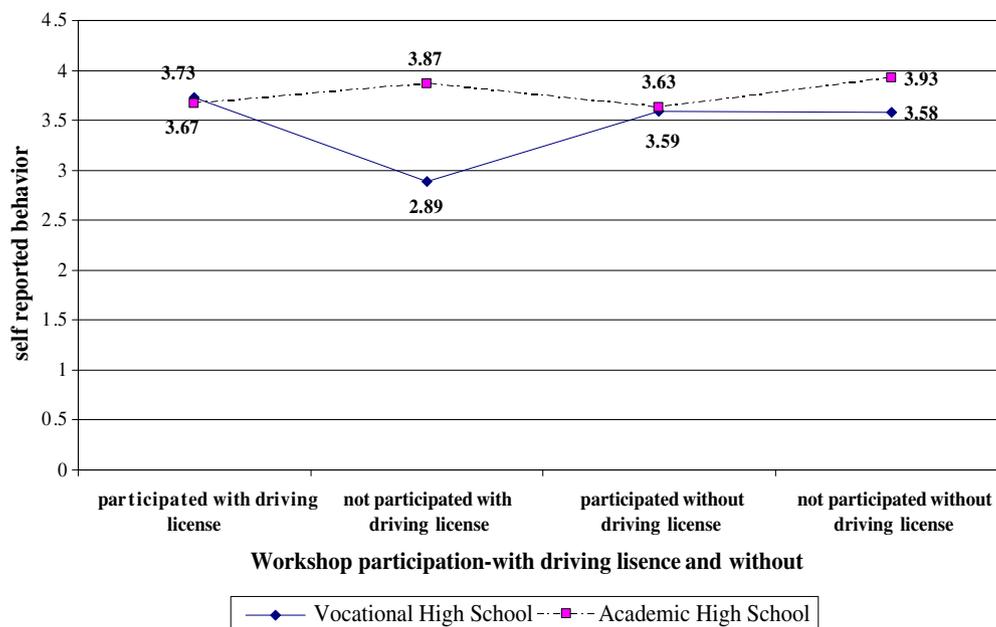


Fig. 3. Means of Self reported road behavior for academic and vocational high school workshop participants with and without driving license.

the students who had a driver's license and did not participate in the workshop ($-0.67(0.16)$). This result suggests an enhanced effect of the workshop on holders of driver's licenses.

In the self-reported road behavior, a three-way interaction between workshop attendance, possession of a driver's license and type of school was found ($F(1,614) = 5.24, p = 0.02$). This pattern of results may suggest that in the group where each student had a driver's license at the time of the workshop, the interaction between workshop participation and school type was more pronounced than in the group that did not have a license. For this reason, two additional, separate analyses were performed for the two groups (those with/without a license). In the license-holding group, an interaction between workshop participation and school type was found ($F(1,339) = 10.84, p < 0.001$), so that the difference in self-reported behavior between the two types of schools is evident only for those who did not participate in the workshop, whereas among those who took part in the workshop, no difference was found. In the group with no license, no such interaction was found (see Fig. 3).

In sum, no evidence was found that the workshop was beneficial for all the participants. There is evidence that it was effective for vocational school students and for those participants who already held a driving license while attending the workshop.

4. Discussion

In the present study, the schools whose students participated in the traffic safety workshop were carefully matched with schools whose students did not participate in the project in order to assess the effectiveness of the workshop in changing attitudes towards the traffic safety.

In assessing the impact of the workshop throughout the sampled group, we realized that the effect of the workshop on both predicted intention and self-reporting *vis-à-vis* safe driving was mediated by the type of school the respondents attended. Students at vocational high schools who attended the workshop showed markedly safer attitudes towards driving than their classmates who did not attend; no such difference was found among students at academic high schools. It would appear that students from schools with relatively low achievement rankings come to the workshop with less outside knowledge regarding road safety. After participating in the workshop, their knowledge increases, their intentions change, and they become more willing to implement what they have learned. The outside knowledge and awareness of students from schools with higher achievement rankings do not lead to any change regarding intentions as a result of participation in the workshop. Indeed, the literature (Ulleberg, 2001) predicts variance among youths as a result of educational and developmental factors and along socioeconomic lines.

According to Murray (1998) and Gregersen and Bjurulf (1996), home and school background of drivers may have a central role in the shaping of attitudes towards safe driving and in involvement in road crashes. School achievement and school attainment were positively correlated with involvement in road crashes. School grades in the school-leaving certificate from compulsory school education (at age 16) of all male motor vehicle drivers involved in accidents were below average and men with compulsory education only as well as men with a vocational upper secondary education were over-represented among these drivers.

The over-representation of lower-educated men and women among drivers involved in car accidents could not be explained by a higher risk exposure (driving distances). Thus, educational achievement and attainment were found to be powerful variables explaining accident risk (Murray, 1998). One possible explanation may be that students with low academic achievement might be

more effectively influenced by emotional interventions (such as the Loewenstein Workshop) rather than by cognitive interventions (Kolb, 1984).

Moreover, evidence was found that the workshop is more effective as a means of bringing about a change in attitude (predicted intention) among those vocational students who already hold a driver's license at the time of the workshop. This is also true of self-reported behavior among students at vocational high schools; the effect is greater when students hold a driver's license at the time of the workshop.

It is possible that the intervention is more beneficial for young drivers who have driver's licenses, have some driving experience as well as have participated in the workshop. They might be more aware of the dangers on the road and thus, the issues are more relevant for them.

The driving experience of young adults who do not yet have a driver's license is limited to episodes of driving with the driving instructor. In this situation, perhaps the young student does not feel the responsibility of coping with traffic conflicts but rather relies on the instructor.

The major effect found for gender – male participants were lower (less safe) in their predicted behavioral intention and the self-reported road behavior than female participants – can be explained by the basic differences between men and women in terms of their driving behavior and accident rates (in line with findings of DeJoy, 1992, for example).

In sum, behavioral change through attitude change is quite a hard mission, especially when it is reflected in everyday life behavior, such as driving. There are so many unpredictable factors involved in driving (Williams, 2006). In line with this notion, the current study shows that this kind of workshop might suit some young adults while it might not suit others.

Nevertheless, this study's findings can provide confirmation for the notion of exposing young adults holding drivers licenses from a lower educational background to emotional episodes in order to make a robust impact. These young adults who attended the workshop a year before the study was conducted (and meet the two conditions mentioned above) displayed significantly safer attitudes compared to those who did not attend the workshop.

4.1. Recommendations

Our recommendations derive from the above-mentioned findings: First, the activity of these workshops is fruitful for young adults who actually drive so it would be beneficial to focus this activity among the older group (12th grade). Likewise, in line with the finding that the students from vocational schools who participated in the workshop benefited more than those from vocational schools who did not participate in these workshops, we recommend focusing the activity towards students from vocational schools.

The workshops should be tailored to the needs of the student, i.e. from the kind of school they are from. Vocational school students need different stimuli than non-vocational school students. It is preferred to focus on young adults who already have a driver's license with even little driving experience. Potentially, they can yield a greater benefit from attendance in the workshop.

5. Methodological remark

It is noteworthy that the measurement of the effectiveness of workshop participation was not direct: none of the participants were explicitly asked whether they felt that the workshop was effective or whether they were satisfied with it. The potential benefit of the workshop for each student could only be concluded from

the comparison of the answers of those who participated and those who did not. This might strengthen the power of the findings. If after a year from the time the workshop was conducted and after being exposed to a variety of safe road use messages (such as lectures at school, in the media etc.), students who attended the workshop (for example, in vocational schools) got higher scores on self-reporting of road use or of behavioral intention, it might reflect some values that were acquired at the workshop.

Nevertheless, it is recommended to further study the specific effects of the workshop in a before-after design (with an experimental group and a control group), which may increase the power of the results, considering that so many other factors other than participating in this workshop can effect the teen-agers' attitudes.

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