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**PREDICTING FUTURE TRAFFIC OFFENDERS BY
PRE-DRIVERS' ATTITUDES TOWARDS RISKY DRIVING**

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Abstract

Worldwide statistics indicate that novice drivers are still one of the riskiest drivers' groups as they highly contribute to road accidents and traffic rules violations. Thus, the psychological variables that allow predicting whether novice drivers will violate traffic rules are important in risky driving research. The aim of this study is to find out if pre-drivers' attitudes towards risky driving measured before obtaining driving license could predict future traffic offences during the first year of independent driving. The research method was a longitudinal study, based on self-reported web-based questionnaire and later records by police. The Scale of Risk-Taking Attitudes to Driving (Ulleberg, Rundmo, 2002) was used to measure six different attitudes towards risky driving. Demographic data and information about committed traffic rules violations during the first year of independent driving were obtained from police records. 598 pre-drivers (262 males, 336 females), averagely aged at 23.63, participated in the study. Results showed that all types of pre-drivers' attitudes towards risky driving were distributed differently, with the attitude towards showing off driving skills as the highest scores and attitudes towards drunk driving and traffic rules violations as the lowest scores. It was found that male and younger pre-drivers possess some riskier attitudes towards driving than female and older pre-drivers. None of six different attitudes towards risky driving measured before obtaining driving license were significant in predicting traffic offences during the first independent driving year.

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Keywords: Pre-drivers, attitudes towards risky driving, traffic offences.



1. Introduction

Motor vehicle accidents worldwide are the leading cause of death in adolescents and young adults. The analysis of accidents, caused by novice drivers, shows that Lithuania is still one of the leading country (together with Poland, Romania and Bulgaria) in Europe regarding traffic injuries. In 2015, 34% of people injured in traffic accidents were at age 18 to 34 (Recorded accident statistics in Lithuania, 2016). Also, about 12.3% of all recorded traffic accidents were caused by inexperienced drivers who had less than two years of driving experience. According to State Road Transport Inspectorate (2016), 42.3% of novice drivers exceed speed limit, 16.8% of them do not wear seat belt and 8.5% - use mobile phone while driving. Also, it is found that driving errors, violation of traffic signals at intersections and illegal U-turns are the most common driving behaviours contributing towards traffic accidents especially among novice drivers (Ramisetty-Mikler, Almakadma, 2016). Therefore, novice drivers still can be characterized as one of the most dangerous drivers' group.

Previous research confirms that the first year of independent driving is a crucial period for road traffic rules violations and accidents (Scott-Parker et al, 2014). It is known that novice drivers (especially of young age) have insufficient driving skills, but most of them overestimate their own driving abilities and do not recognize various hazards on the road as risky ones (Useche, Serge, Alonso, 2015). Lack of driving experience together with high confidence in driving skills and positive attitudes towards risky behavior on the road might contribute significantly to the increased risk of traffic rules violations or accidents in this drivers group. Therefore, analysis on predictive values of important psychological factors for novice drivers' risk taking behavior on the road is important for earlier identification of future traffic offenders.

2. Problem Statement

Scientists agree that attitudes towards risky driving are one of the psychological factors, significantly related to the increased probability of road traffic rules violations while driving (Iversen, Rundmo, 2012, Lucidi et al, 2010; Mallia et al, 2015; Yıldırım-Yenier et al, 2016). In the context of road safety, the concept 'attitude' can be defined as personal driving-related beliefs of what is appropriate and inappropriate while driving (e.g. rule violations, speeding, careless driving, drunk driving) (Carpentiera et al, 2014; Ram, Chand, 2015). Road safety attitudes could be divided into general attitude towards traffic safety and specific attitudes towards different risky behavior while driving, e.g., speeding, drinking driving, as well as consideration for the other road users and their driving responsibility (Ram, Chand, 2016). The propensity to behave in a risky manner while driving (e.g. speeding) is related either to positive attitude towards risky driving in general or to particular risky driving behavior (Elliott et al, 2015). However, scholars suggest that behavior-specific attitudes are related stronger to a particular act in comparison to general attitude towards risky behavior (Sutton, 1998).

It is stated that novice drivers are more accident prone due to a lower perception of risk while driving as the result of positive attitudes towards risky driving (Ram, Chand, 2015; Ulleberg, Rundmo, 2002). Previous research indicates that pre-drivers who have risky attitude towards traffic safety tend to ignore traffic rules, safety signs and ethical driving principles even in driving learning process (Ram,

Chand, 2015). Driven by own risky attitudes, novice drivers tend to use unsafe behavioral strategies to manage dangerous situations while driving (Lucidi et al, 2010). It is also stated that attitudes towards risky driving might differ when taking into account drivers' gender, age and driving experience. Research shows that male and young drivers with less driving experience have less favorable general attitude towards driving safety in comparison to female and older drivers (Akaateba, Amoh-Gyimah, 2013; Nordfjærn et al, 2010; Starkey, Isler, 2016). In addition, the same tendencies are found when considering novice drivers' attitudes towards particular risky behavior while driving. Younger novice male drivers possess more positive attitudes towards speeding (Horvath, Lewis, Watson, 2012), drunk driving (Impinen et al, 2009; Astrauskienė, Bulotaitė, 2011) and other road traffic rules violations (Gauld, Lewisa, White, 2014) in comparison to experienced drivers or female novice drivers. These results imply that because of possessed riskier attitudes towards driving young male novice drivers tend to be less sensitive to risk. Therefore they underestimate the probability and severity of risks caused by traffic conditions. So, it is more likely that male novice drivers will violate road traffic rules or cause the first traffic accident earlier in their driving history than female novice drivers (Gylfason, Thórisdóttir, Peersen, 2004).

Road traffic rules violations are the result of driving mode that is chosen by driver (Reason et al, 1990). Violations particularly are categorized as deliberate maladaptive driving behavior on the road (Stanton, Salmon, 2009). It is found that frequency of road traffic rules violations increases over the first three years of independent driving (Roman et al, 2015). Traffic violation rates for all age groups of novices are found to be the highest during their first year of independent driving (Chapman et al, 2014). Therefore, it is important to evaluate if future traffic violation rates of novice drivers can be predicted beforehand by their psychological features. Both cross-sectional and longitudinal studies of young drivers confirm that driving attitudes are significant predictors of future driving behavior (Ulleberg, Rundmo, 2002; Rowe, Maughan, Gregory, Eley, 2013).

3. Research Questions

- 3.1 Do attitudes towards risky driving differ within group of pre-drivers taking into account their gender and age?
- 3.2 Are attitudes towards risky driving significant predictors of traffic offences in the first year of independent driving?

4. Purpose of the Study

The purpose of this study is to find out if pre-drivers' attitudes towards risky driving measured before obtaining driving license are significant in prediction of traffic offences during the first year of independent driving.

5. Research Methods

5.1. Participants

Pre-drivers were invited to participate in the study using web-page of the state enterprise “Regitra” responsible for drivers’ licensing in Lithuania. Using the online platform participants were given informed consent and were asked to fill in the self-report questionnaire at the web-page before they made a reservation time for their driving exam procedure. Participants' personal information (name and surname) was asked in order to relate their data to the police records on traffic rules violations and accidents that happened in the first year of independent driving. Ethical approval for the study was obtained from the Ethics Committee of Psychology at the Department of Psychology, at Vytautas Magnus University in Lithuania.

598 pre-drivers (262 males, 336 females) participated in this longitudinal study. Their age ranged from 17 to 58 years ($M=23.63$, $SD=8.31$). Female participants were slightly older than males (mean age of females’ $M=24.72$, $SD=9.07$, mean age of males $M=22.22$, $SD=6.98$, Student $t=-3.81$, $df=595.9$, $p<0.001$). Two-thirds of all participants (71%) were younger than 25 years old. 22.9 percent of the respondents had a university education and 77.1% of them had a lower than university education.

According to "Regitra" records 598 of pre-drivers got their driving license during a year. 67.1 percent of them succeed in theoretical driving exam in their first attempt (number of attempts ranged from 1 to 13), however only 30.6% succeed in the practical exam the first time (number of attempts ranged from 1 to 17).

5.2. Measures

The Scale of Risk-Taking Attitudes to Driving (Ulleberg, Rundmo, 2002) was used to measure pre-drivers’ attitudes towards risky driving. Originally this scale measures 11 distinct risk-taking attitudes (45 items). However, only 6 specific attitudes towards risky driving were used for the purpose of this study: attitude towards violation of traffic rules (VIOLATIONS, 2 items, Cronbach alpha .79), attitude towards speeding (SPEEDING, 5 items, Cronbach alpha .81), attitude towards drinking and driving (DRINKDRIVING, 3 items, Cronbach alpha .66), attitude towards showing off driving skills to others (SHOWINGOFF, 3 items, Cronbach alpha .65), attitude towards traffic flow vs. rule obedience (OBEDIENCE, 9 items, Cronbach alpha .86), and attitude towards joyriding (JOYRIDING, 3 items, Cronbach alpha .62). All items were scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher score on each subscale indicated a higher preference for risk-taking.

Information about pre-drivers committed traffic rules violations during the first year of independent driving were obtained from the police records. Information about success of theoretical and practical driving exams (number of attempts) was also obtained from “Regitra”. Additionally, pre-drivers were asked to indicate their gender, age and education level.

6. Findings

The first part of the presented findings is a comparison analysis of all types of the attitudes toward risky driving within pre-drivers group taking into account their gender and age. The second part of the

findings is aimed to present the evaluation of measured attitudes towards risky driving for the prediction of traffic offenders during the first year of their independent driving.

6.1. Differences in expression of attitudes towards risky driving among pre-drivers, taking into account their gender and age

First of all, the comparison using MANOVA was made in order to find out differences of specific attitudes towards risky driving across pre-driver groups. For comparison the mean score of each attitude scale was used instead of the sums. The analysis revealed significant differences in all attitudes towards risky driving (MANOVA; $F=23.238$; $p<.0001$; $\eta^2=.038$; see Table 1). Post-hoc analysis showed that most acceptable attitude of pre-drivers was the attitude towards showing off driving skills to others. The second one was the acceptance of joyriding; the third - positive attitude towards speeding. Attitudes towards drink driving and traffic rules violations were evaluated with the lowest scores in comparison to all other attitudes, and no statistically significant difference were found between them.

Table 01. Comparison of the attitudes towards risky driving in the pre-drivers group, among males and females; correlation between attitudes and age.

Attitudes towards risky driving	Age ^a	Males' mean n=262	Females' mean n=336	t ^b
VIOLATIONS	-.140**	4.10	3.15	5.376**
SPEEDING	-.122**	11.66	10.42	3.177**
DRINKDRIVING	-.007	6.07	5.09	4.309**
SHOWINGOFF	-.031	9.31	9.63	-1.327
OBEDIENCE	-.102*	20.13	17.90	3.682**
JOYRIDING	.011	8.81	8.72	.358

* $p<.001$

a Pearson correlation coefficients for relations between age and attitudes towards risky driving.

b t statistic comparison of means among male and female pre-drivers.

Correlation analysis between age and risky driving attitudes (see Table 1) revealed that younger pre-drivers possessed significantly riskier attitude towards violation of traffic rules, attitude towards speeding and attitude towards traffic flow vs. rule obedience. Student's t test was used in order to measure pre-drivers gender differences in attitudes towards risky driving (see Table 1). The results showed that male pre-drivers possessed riskier attitudes towards driving than females in almost all attitudes' scales. They had more positive view towards traffic rules violations, speeding, drinking and driving, and necessity to maintain the traffic flow even if rules are violated.

6.2. Prediction of traffic offences by pre-drivers' attitudes towards risky driving taking into account their gender, age, driving experience and success in driving exams

According to the police records 75 (12.5%) of pre-drivers committed at least one of traffic offences during the first year of independent driving. More than a half of offenders exceeded speed limits (57.3%; $n=43$); 17.3% of them ($n=13$) committed several offenses (e.g. exceeded speed limits and drove under the influence (DUI)); 10.7% of them ($n=8$) drove without seat belt or disregarded traffic signs.

Binary logistic regression analysis was used in order to evaluate if attitudes towards risky driving were significant in predicting traffic offences during the first year of independent driving. Pre-drivers' gender, age as well as success in theoretical and practical driving exam were included in the regression model as significant variables which might be related to the traffic rules violations. Predicted group was traffic offenders. Six types of attitudes towards risky driving, gender (1 – male, 2 – female), age as well as success in practical and theoretical driving exams (measured by number of attempts taking each type of exam; higher score representing higher number of attempts) were included as independent variables in the regression model.

Table 02. Prediction of traffic offences by pre-drivers' attitudes towards risky driving, gender, age, and success in driving exams (N=598).

Variables	Prediction of future traffic offences		
	B	SE B	β
Age	.034	.021	.967
Gender	-1.212	.283	3.362**
Success in theoretical exam	-.220	.077	1.246**
Success in practical exam	.210	.078	.810**
VIOLATIONS	-.022	.069	1.023
SPEEDING	.022	.044	.978
DRINKDRIVING	.002	.051	.998
SHOWINGOFF	-.009	.058	1.009
OBEDIENCE	-.027	.028	1.027
JOYRIDING	.038	.060	.963
Nagelkerke R ²		.134	
Chi-square		44.078**	

*p<.01; **p<.001

Results, presented in Table 2, showed that regression model was statistically significant and this indicated that future traffic offences could be predicted by some variables measured beforehand. It was found that male pre-drivers tend to become traffic offenders in the first year of independent driving more frequently than females. Also, success in both theoretical and practical driving exams found to be important for prediction of future traffic rules violations but inversely. Being an offender was related to less attempts in practical, but also to more attempts in theoretical driving exams. Unexpectedly, none of the attitudes towards risky driving were significant predictors of traffic offences during the first year of independent driving.

7. Conclusion

The aim of this study was to find out if attitudes towards risky driving measured before obtaining driving license were significant in prediction of traffic offences during the first year of independent driving. The results showed that none of the six different attitudes towards risky driving measured before obtaining driving license were significant predictors of novice drivers' traffic offences. However, success in both theoretical and practical driving exams as well as pre-drivers' gender were important indicators of

traffic rules violations in the future. Two possible explanations of these results might be suggested. First of all, previous studies on novice drivers' risky attitudes and risky driving were based on self-reported evaluations of behaviour and attitudes, showing medium correlations between these two (Ulleberg, Rundmo, 2002). Prospective research on the attitudes and future behaviour are scarce, but show that particular attitudes measured at the first survey are quite successful in predicting later risky driving behaviour (Iversen, 2004). However, quite contradictory results of this study might be related to differences in measurement of the risky driving. In previous studies accidents and other traffic rules violations were measured by self-reporting (Iversen, 2004; Ivers, Rundmo, 2012), but not by using objective indicators (e.g. police records). In this study no self-reported measures of risky driving were used. As recorded traffic rules violations were quite rare events, it is difficult to capture valid information about the precedent psychological indicators of this behaviour (Iversen, 2004). On the other hand, significance of success in theoretical (negatively) and practical (positively) driving exams for violations might imply that other psychological characteristics of pre-drivers could be important for prediction of traffic rules violations in the future. It is possible that those pre-drivers who had more practice in driving and/or higher confidence in their driving skills (succeeded the practical driving exam from the first attempt) felt more comfortable in their driving and risk more on the road comparing to those who lack or perceive lacking of these skills (were not successful in the practical driving exam). On the contrary, those who were successful in the theoretical driving exam (it could be assume that they know the road traffic rules well), were not inclined to disobey them during their independent driving after obtaining their driving license. These results suggest that other psychological characteristics of pre-drivers should be assessed together with attitudes towards risky driving in order to have more completed picture of future traffic rules violators. For example, other research confirmed that difficulties in emotion regulation, lack of executive functions are important correlates of novice drivers risky driving (Brown et al, 2016; Nabi et al, 2005).

Analysis of pre-drivers' attitudes towards risky driving confirmed Ulleberg and Rundmo (2002) suggestion on importance of measuring specific attitudes towards risky driving instead of general risky driving attitude. The results showed that pre-drivers differently accept various forms of risk behavior on the road. It was found that attitudes towards serious violations (e.g. drink and driving, violating traffic rules) were evaluated more negatively, as their consequences might be extremely dangerous; while attitudes towards showing off your driving skills or joyriding were rated as more acceptable. These results suggest that pre-drivers possessed different dispositions towards various traffic rules violations before starting their independent driving (Glendon et al, 2014; Mann, 2010). Cultural factors especially societal attitudes towards following the rules might be also important in development of these risky driving attitudes. For example, it is common opinion that in Lithuania exceeding speed limits up to 10 km/h is acceptable, especially among young drivers. It seems that pre-drivers learn these rules before they start to drive independently. These results imply that more attention for appropriate attitudes formation should be dedicated in the pre-drivers training in order to increase traffic safety. Interventions targeted at driving safety promotion at the society level should be implemented as well.

Finally, some gender and age related differences in the attitudes towards risky driving should be discussed. In line with the previous research (Iversen, Rundmo, 2012; Glendon et al, 2014; Lucidi et al,

2010; Useche, Serge, Alonso, 2015), results of this study confirmed that younger and male pre-drivers should be targeted firstly for the traffic safety prevention as they have more positive attitudes towards violation of traffic rules, speeding, drink driving and traffic flow vs. rule obedience. Scholars suggest that differences in gender socialization, limited self-control abilities and executive functions might be important for young drivers' risky driving attitudes and risky behavior in general (Cerniglia et al, 2015; Cestac, Paran, Delhomme, 2011; Feldman, Greeson, Renna, Robbins-Monteith, 2011). In most countries including Lithuania male role is related to risk taking, showing off and disobeying the rules (Motiejūnaitė-Timinskienė, Bulotaitė, 2012; Gulliver, Begg, 2007; Özkan, Lajunen, 2006; Akaateba, Amoh-Gyimah, 2013; Yilmaz, Çelik, 2004). Similarly, disregard of the rules, importance of peer pressure and limitations in emotion regulation which are related to the young age (Brown et al, 2016; Cerniglia et al, 2015; Chan, Sinhal, 2013; Rhodes, Pivik, Sutton, 2015) might also be important for the positive attitudes towards risky driving.

Some strengths as well as some limitations of this study also should be mentioned. Firstly, data based on online study was collected from a quite large sample that allowed to evaluate dominating attitudes towards risky driving of pre-drivers considering their age and gender. However, the participation in this study was voluntary, therefore 598 respondents did not represent the whole sample of Lithuanian pre-drivers. Moreover, the longitudinal study design was significant for observing what type of committed road traffic rules violations were most common during the first year of independent driving. However, due to relatively small number of traffic offenders it was not possible to implement in-group comparisons which would be useful for better understanding of high risk novice drivers. Also, the study design allowed gathering police records about committed road traffic rules violations that could be used as a criterion variable when evaluating the predictive value of general attitude measures (Iversen, 2004). Obtained information is valid and significant for prediction of future traffic offenders more objectively. Still, self-reported risky driving measure (e.g. DBQ) might be also important for future studies in order to capture significant relations among risky driving attitudes, measured before driving, self-reported risky driving and objective indicators of risk taking in the future. Finally, the results of this study had a meaningful contribution for transport psychology field because it allows predicting what percentage of pre-drivers is likely to become traffic offenders. It is significant in order to systematically plan the scope of interventions for novice drivers. Nevertheless, in order to get more information about psychological portrait of future traffic offenders other significant psychological variables should be taken into account.

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