



How Congruent Can Human Attitudes, Intentions and Behaviour Be: The Case of Risky Driving Behaviour Among Lithuanian Novice Drivers

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Abstract. The aim of this paper is to evaluate the possibilities to predict risky driving behaviour of novice Lithuanian drivers during the first nine months of their independent driving by risky attitudes and intentions to risk assessed before they were licenced to drive.

188 novice drivers participated in a three-wave longitudinal study. They were approached at driving schools in Lithuania in the beginning of driving training and after it and asked to fill in the questionnaire. To assess the risky driving participants were interviewed one year after the end of driving training.

Driving errors correlated with attitudes and intentions only for female drivers. Violations while driving were related to attitudinal variables for both males and females. Violations as well as driving errors could be predicted by attitudes and intentions measured at the same time as behaviour, when variables of other measurements were controlled.

Risky driving of drivers could be better explained by their attitudes and intentions, when they have already gained some driving experience. It might be presumed that driving experience shape risky attitudes and intentions, not vice versa as it was expected by theory.

Keywords: Risky driving · Risky attitudes · Intentions · Novice drivers

1 Introduction

Risky driving and the prevalence of its negative consequences remain as one of the major problems all over the world [1, 2]. Based on statistics of European Commission CARE database, Lithuania exceeded European average number of deaths during road accidents (66 people for 1 million population in Lithuania while in ES – 52 people) [3]. According to data of the Lithuanian Road Police Office (2017) almost a half of all recorded traffic accidents within all groups of drivers was caused by inexperienced drivers (those who have less than 2 years driving experience). Comparison of

statistics in 2017 and 2018 revealed that each year more novice drivers make serious traffic offences in the first two years of independent driving. For example, in 2018 287 novice drivers exceeded speed limit more than 30 km/h while in 2017 the number was 250. In 2018, 134 novice drivers drove under the influence of alcohol (0.4–1.5 BAC) while in 2017 it was 123 novice drivers [4]. Thus, risky driving among novice drivers still is one of serious issue in traffic safety.

Previous research confirmed that the first year of independent driving is a crucial period for road traffic rules violations and accidents [5]. Young novice drivers are at higher risk while driving because of insufficient driving skills and willingness to take a risk while driving, make impression on peers etc. [6–9]. It was found that maturation contribute significantly to the decrease of risky driving [10]. Thus, more extensive focus on psychological factors related to novice drivers' risky driving is crucial to understand the development of risky driving patterns at early stages [11] as well as to make significant improvements in driving training programs [12].

Theory of Planned Behaviour [13] was created to explain the relationships among attitudes, intentions, and reasoned human behaviour in various areas of functioning [13]. Ajzen described *attitudes* as positive or negative evaluation of certain behaviour. *Intentions* could be identified as the willingness and readiness to put the efforts to perform certain action. Positive attitudes form the intentions to act in certain way, therefore intentions lead to that specific behaviour [13]. Ajzen introduced few other constructs as perceived behavioural control and perceived social norms as well [13], but they are out of the scope for this paper, they are not introduced further. It should be noted that 'a behavioral intention can find expression in behavior only if the behavior in question is under volitional control, i.e., if the person can decide at will to perform or not perform the behavior' [14, pp. 181–182]. There might be arguing if driving is the type of behaviour that person rationally plan each time when performing [14]. Indeed, it might be treated as automatized behaviour or habit [15].

There were numerous attempts to explain risky driving behaviour by TPB [16–18]. Previous research found that more favourable attitudes towards risky driving (over the speeding, drink driving, phone use while driving, fatigued driving and riding with intoxicated driver) were positively related to intentions to behave in particular way [18–20]. Full model of TPB was tested and the results revealed that attitudes towards risky driving explained intentions to drive in a risky manner which explained self-reported risky driving in motorcyclists and truck drivers [17, 21].

The results allowed presuming that attitudes, intentions and driving behaviour could be congruent [22]. In other words, usually drivers drive in the way they initially intended and believed it is appropriate. For this reason, sometimes, researchers assess attitudes and intentions instead of behaviour when it cannot be observed directly [19]. In driving research context, the attitudes as behavioural indicators were assessed in pre-drivers when young people still did not have driving experience and were unable to report their driving peculiarities [23]. However, some studies failed to find significant relationships among TPB constructs. For example, Paris and Van den Broucke [24] reported that intentions to obey speed limits were not related to attitudes towards speeding behaviour; objective speeding behaviour and number of self-reported violations were not explained by intentions related to certain risky behaviour [24]. Therefore, behavioural variables should be substituted by attitudinal constructs cautiously.

The prediction of future driving behaviour based on attitudes and intentions to drive in a risky manner is even more problematic. Previous longitudinal studies revealed that intentional violations of novice drivers were predicted by more favourable attitudes towards speeding, measured before gaining the driving license. However, attitudes failed to predict later driving errors in the same sample [25]. Similar results were found by Rowe et al. [12]. Attitudes towards speeding of non-drivers were not significant in predicting future driving behaviour as they became fully-qualified drivers [12].

Still, it is questionable, if pre-driving attitudes and intentions are valid indicators of later risky driving. While pre-drivers have no experience of independent driving, they cannot develop the realistic representation of own driving style, despite the initial attitudes and intentions related to driving [26]. Even though TPB proposed and empirical studies supported the idea that attitudes form intentions and later behaviour [13, 22], reciprocal relationship between attitudinal and behaviour characteristics might be expected as well [27]. Results of some studies might serve as evidence of the assumption. Forward [16] found that self-reported intention to overtake dangerously was related to the frequency of this behaviour in the past [16]. Attitudes towards speeding became riskier at the beginning of their solo driving in comparison to driving training. However, other attitudes towards risky driving (close following and overtaking) became safer over this period [28]. It could be presumed that real driving experience changes the way how novice drivers perceive appropriate behaviour on the road.

Despite the results of previous studies, there is a lack of evidence how pre-driving attitudes and intentions can predict behaviour on the road while gaining some driving experience. Therefore, the aim of this paper is to evaluate the possibilities to predict risky driving behaviour of novice Lithuanian drivers during the first nine months of their independent driving by safety attitudes and intentions to risk assessed before they were licenced to drive.

2 Method

2.1 Subjects

In total, 188 novice drivers (71 males and 117 females) participated in three study stages (see Sect. 2.2). The average age among males were 19.52 (± 3.64) years (ranged from 16 to 31 years), while in females' group – 21.58 (± 6.65) years (ranged from 17 to 53 years). At the first and the third stages of study, participants were asked about their driving experience. Analysis showed that one third ($n = 63$, 33.5%) of all driving license candidates had no driving experience when they started driving training course. However, 32.4% of them ($n = 61$), reported that they had some driving experience (driving with other experienced driver). At the third stage, a half of all participants ($n = 103$, 54.8%) drove on daily basis or 4–6 times per week. Comparison analysis of driving experience showed that novice driver males had similar driving experience as novice driver females ($\chi^2(5) = 8.65$, $p = .12$).

2.2 Procedure

The longitudinal design was applied and consisted of three stages. Firstly, driving license candidates who signed for driving training courses were invited to participate and fill out the self-reported questionnaire during the theory classes. The same driving license candidates were surveyed at the end of driving training courses (after 2 months), when they passed theoretical exams at driving school. The third stage was carried out after nine months from the second stage of the study. Those novice drivers who participated in the earlier stages and who drive independently more than a month were asked to fill out the same self-reported questionnaire online or via personal email. Participants were asked to participate on voluntary basis. They were informed about the three-stage study and other ethical issues in written form.

2.3 Instruments

The Driver Behavior Questionnaire (DBQ) [29] was used to examine self-reported risky driving. 24-item questionnaire scored on a 5-point Likert scale ranging from 1 – “strongly disagree” to 5 – “strongly agree”. Two aspects of risky driving: the driving errors (16 items) and intentional traffic rules violations (8 items) were evaluated. Originally this questionnaire measures three types of risky driving behaviour: violations, errors, and lapses, but a two-factor solution fit the data better in Lithuanian drivers’ sample [30]. Driving errors consisted of actions that are not planned and appeared mostly because of some mistakes (e.g. “Misjudge your crossing interval when turning right and narrowly miss collision”) while intentional traffic rules violations (e.g. “Get involved in unofficial “races” with other car drivers”) were considered to be deliberate deviations from safe driving practices. The higher scores in each scale indicated riskier driving – more driving errors and more intentional violations. The internal validity of each scale was sufficient: Cronbach α ranged from .75 (for intentional violations) to .85 (for driving errors). Driving behaviour was measured in the third (T3) stage of the study.

In order to determine the attitudes of novice drivers towards risky driving, the questionnaire *Attitudes towards Risky Driving* was used [31]. The questionnaire (16 statements) measured several aspects of the attitude towards traffic safety: attitude towards non-compliance with the rules and over speeding, attitude towards risky driving of other persons and attitude towards drink-driving (e.g. “If you are a good driver, it is acceptable to drive a little faster”; “I would never drive after drinking alcohol”). Attitudes towards risky driving were measured by Likert scale from 1 – “strongly disagree” to 5 – “strongly agree”. Higher score of attitudes towards risky driving indicated the risk-favourable attitude towards driving. The internal validity of the scale in all three measurements was sufficient – Cronbach α ranged from .76 to .82. The answers of the first (T1), second (T2) and third (T3) stages of the study were used in further analysis.

Intentions to drive in risky manner were measured by four scenarios related to safe distance keeping, drunk driving, speeding, dangerous overtaking [32]. Each outline included a line drawing together with a short description (see [32], p. 95). Respondents were instructed to imagine themselves in the depicted set of circumstances and make judgments on each standardized and hypothetical scenarios by Likert scale from 1 “Never” to 7 “I always would do this”. Higher scores indicated stronger intentions to

drive in a risky manner and stronger intentions to violate road traffic rules. The internal validity of the scale was sufficient – Cronbach $\alpha = .64$. Data about intentions to drive in risky manner was collected in the second (T2) and the third stages (T3) of the study.

Demographic data was obtained, and it included gender, age and driving experience.

3 Results

3.1 Relationship Among Safety Attitudes, Intentions, and Driving Behaviour

To assess relationships among attitudes towards road safety, intentions to drive in a risky manner, and driving behaviour (errors and violations) the correlational analysis using Spearman's coefficient was performed. Results were presented for males and females separately as scholars revealed gender differences in risky driving [33].

Data showed that driving errors in male drivers were significantly correlated only with intentions to drive risky measured at the same time as behaviour (Table 1). Violations while driving were positively related to risk favourable attitudes before training and after some driving experience, intentions to drive risky at the latest measurement as well. Safety attitudes and intentions measured right after training were not related to later behaviour on the road for male novice drivers. It should be noted that attitudes and intentions measured right after training did not correlated with attitudes and intentions nine months later. Attitudes towards risky driving correlated positively with risk-taking intentions at the same measurement time, but coefficients were rather moderate.

Table 1. Correlations among driving behaviour, attitudes, and intentions in male drivers.

	Violations	Attit.1	Attit.2	Inten.2	Attit.3	Inten.3
Errors	.208	-.067	-.148	-.163	.119	.316**
Violations		.336***	.096	.128	.489***	.432***
Attit.1			.311***	.212**	.260*	.387***
Attit.2				.473***	-.030	-.082
Inten.2					-.044	.074
Attit.3						.360***

Note: Attit.1 = Attitudes at T1; Attit.2 = Attitudes at T2; Inten.2 = Intentions at T2; Attit.3 = Attitudes at T3; Inten.3 = Intentions at T3.

* $p < .05$; ** $p < .01$; *** $p < .001$

Slightly different results of correlational analysis emerged in female drivers' group. Driving errors positively correlated with all variables of the study, except intentions to violate rules measured after training. Rule violations were found to be related with all variables across all measurements for women. Attitudes and intentions were found to be related to each other in all instances of measurements (Table 2).

Table 2. Correlations among driving behaviour, attitudes, and intentions in female drivers.

	Violations	Attit.1	Attit.2	Inten.2	Attit.3	Inten.3
Errors	.282**	.349***	.282**	-.108	.350***	.305**
Violations		.477***	.210*	.267**	.577***	.667***
Attit.1			.465***	.341**	.350***	.532***
Attit.2				.391***	.553***	.337***
Inten.2					.359***	.410***
Attit.3						.630***

Note: Attit.1 = Attitudes at T1; Attit.2 = Attitudes at T2; Inten.2 = Intentions at T2; Attit.3 = Attitudes at T3; Inten.3 = Intentions at T3.

* p < .05; ** p < .01; *** p < .001

To summarize the results of correlational analysis, violations while driving rather than errors were better explained by attitudinal variables for both males and females. Driving errors correlated with attitudes and intentions only for female drivers. The higher correlation coefficients were observed among variables of the same measurement (e.g. attitudes, intentions, driving errors, and violations after some independent driving).

3.2 The Role of Safety Attitudes and Intentions at Different Measurement Periods in Predicting Risky Driving of Novice Drivers

Correlational analysis revealed significant relationships among attitudes, intentions, and driving behaviour for both male and female drivers. But this did not allowed concluding that later behaviour might be predicted by previous attitudinal variables. As it was found that attitudes and intentions are interrelated across some measurement, this confound association might account for significant correlations among previous attitudinal characteristics and later behavioural variables. To make valid conclusion about possibility to predict later risky driving, it was necessary to control for interrelations among attitudes and intentions measured at the different instances. Several linear regression analyses were run separately for male and female drivers. Driving errors and violations were chosen as dependent variables. They were treated as distributed according to normal distribution (skewness and kurtosis did not exceed ± 2 , logarithmic transformation was applied to variable of violations to meet the condition). Attitudes at Times 1–3 and intentions at Times 2–3 were considered as independent variables.

Results of linear regression to predict driving errors for males and females were presented in Table 3. Regression model for driving errors in males was found to be statistically significant ($F = .194$; $df = 5$; $p = .013$). Independent variables together could explain 19.4% of variance of driving errors. After controlling for interrelations among independent variables only intentions to drive risky measured at the same time as self-reported errors was significant predictor. In other words, self-reported driving

errors in male drivers' group could not be predicted in advance prior independent driving. For female drivers regression model was statistically significant ($F = 7.451$; $df = 5$; $p < .001$) and it allowed explaining 25.1% of driving errors' variance, none of independent variables were found to be predictors. There was only statistical tendency that risky attitudes measured before training could be related to driving error ($p = .057$). Due to low statistical power this result should be treated cautiously.

Table 3. The role of safety attitudes and intentions to predict driving errors in male and female groups.

	Males			Females		
	Stand. Beta	t	p	Stand. Beta	t	p
Attit.1	.024	-.175	.861	.216	1.925	.057
Attit.2	-.018	-.118	.907	.095	.920	.359
Inten.2	-.176	-1.270	.209	-.132	-1.379	.171
Attit.3	.056	.454	.652	.181	1.367	.174
Inten.3	.378	2.932	.005	.177	1.557	.122

Note: Attit.1 = Attitudes at T1; Attit.2 = Attitudes at T2;
Inten.2 = Intentions at T2; Attit.3 = Attitudes at T3;
Inten.3 = Intentions at T3.

Table 4. The role of safety attitudes and intentions to predict violations while driving in male and female groups.

	Males			Females		
	Stand. Beta	t	p	Stand. Beta	t	p
Attit.1	.134	1.083	.283	.093	1.027	.307
Attit.2	.027	.194	.847	-.155	-1.858	.066
Inten.2	.089	.709	.481	-.005	-.067	.947
Attit.3	.340	3.070	.003	.304	2.845	.005
Inten.3	.273	2.342	.022	.480	5.228	<.001

Note: Attit.1 = Attitudes at T1; Attit.2 = Attitudes at T2;
Inten.2 = Intentions at T2; Attit.3 = Attitudes at T3;
Inten.3 = Intentions at T3.

Violations as well as driving errors could be only explained by attitudes and intentions measured at the same time as behaviour for both male and female novice drivers (Table 4). Regression model for driving violations in male participants was statistically significant ($F = 7.451$; $df = 5$; $p < .001$) and parameters could predict 34.2% of variance of dependent variable. Thus, violations were associated with risky attitudes and intentions at Time 3 but could not predicted by intentions and attitudes assessed earlier. The model for female driving violation was significant as well ($F = 23.245$; $df = 5$; $p < .001$). Risky attitudes towards behaviour on the road and intentions to violate could explain 51.1% of variance of violations in female drivers' group. The statistical tendency that non-risky attitudes just after training could predict violations was observed.

4 Discussion

This study was aimed to predict risky driving behaviour of novice Lithuanian drivers during the first nine months of their independent driving by safety attitudes and intentions assessed before they were licenced to drive. Correlational analysis revealed significant relationships among later driving behaviour and risky attitudes as well as intentions, measured before driving training course, after driving training course and in follow-up for female drivers. It was found that driving errors were only related to intentions to take risk while driving in nine-month period after licencing among male novice drivers. Self-reported intentional violations correlated to risky attitudes measured before driving training course and in follow-up, as well as to intentions at follow-up. Similar results were found in previous studies [18–20, 25]. Despite significant relationships between attitudinal variables assessed before driving training and later driving behaviour, the conclusion that this behaviour could be predicted before licensing might be premature. Therefore, multivariate statistics was applied to consider covariance among attitudinal characteristics measured at different time points and ensure valid conclusions.

Results revealed that risky attitudes and intentions to risk on the road measured either before or after driving training course failed to predict self-reported risky driving during the first nine months after licencing when data of all measurements were considered. Quite similar results were found in previous research. Driving errors and speeding were not predicted by pre-driving attitudes in several novice drivers' samples [12, 25]. It could be assumed that to some extent prior licensing people have unrealistic expectations related to own abilities to drive and obey traffic rules which change when drivers start to drive independently and have to make own decisions on the road [28]. Results of this study pointed that either attitudes or intentions to behave in a certain way were not highly reliable indicators of future behaviour when people have no experience performing it in the context of driving. Therefore, they would not serve as characteristic which allows identifying at risk group for additional intervention or training before driving.

Nevertheless, driving behaviour in this study operationalized as self-reported driving errors and intentional violations had some relationship with risky attitudes and intentions even when more sophisticated statistics was applied. It was found that driving errors were explained by intentions to risk on the road measured at the same time point as the behaviour for males but not for females. When controlled for other attitudinal variables across measurements both attitudes and intentions evaluated after some driving experience remained significant indicators of intentional violations in novice drivers. The data might suggest that people possess attitudes and intentions that are congruent to their behaviour [13, 16, 17, 21]. It should be emphasized that intentional violations were better explained by attitudes and intentions than driving errors. This is in line with the idea that errors and violations are of the different psychological nature: errors might be associated with poorer cognitive abilities, like attentional inaccuracy, while violations might happen due to deliberate decision to behave in a risky way [34].

To sum-up risky driving could be better explained by attitudes and intentions, when drivers have already gained some driving experience. It might be presumed that driving experience shapes risky attitudes and intentions [27], not vice versa as it was expected by theory. The results imply the necessity to monitor what attitudes novice drivers gain during first year of independent driving. Some additional training during the first year of driving that emphasize analysis of emerging driving experience and own motives to obey traffic rules could be proposed.

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