Revija za kriminalistiko in kriminologijo / Ljubljana 68 / 2017 / 4, 359–370

The Impact of Sanctions on the Views held by and Behaviour of Motor Vehicle Drivers in Slovenia

Peter Pungartnik[1], Matevž Bren[2], Peter Umek[3]

The statistical data available on the events that have occurred on Slovenian roadways to date reveal that road transport has become a crucial part of our everyday lives. Moreover, since it shapes our way of life, values and actions, it has become an integral part of modern society. The state can assist improving the behaviour of drivers and this can, in turn, help increase traffic safety in many ways. During the period 1998–2013, Slovenia introduced stricter legislation in the field of road transport, which confirms the recent increase in punitivism and punitive populism. Therefore, questions are being raised regarding the effectiveness of higher fines and punishments for drivers when it comes to improving road traffic safety. The answers to these questions represent an important contribution to the understanding of punishment for the purpose of improving road user's behaviour.

In the first part of this article, definitions are provided for some of the psychological aspects of human action (behaviour) in road transport, the impact of views regarding the response and behaviour of road users, and punishment for road traffic violations as an important aspect of the implementation of traffic law. In doing so, the importance of studying the human element, a crucial factor in traffic safety owing to the plethora of psychophysical processes and personalities involved, is presented. Attention is drawn to the lack of any scientific studies or research conducted on the influence of punishment on improving the views held by and behaviour of road users. There is a clear need for extensive research to be conducted on Slovenian motor vehicle drivers in order to fill the gaps identified in studies completed thus far. In the second part, results of research conducted are presented, on the basis of which the key thesis that punishment has an influence on the views held by Slovenian motor vehicle drivers and, as a result, improves their behaviour on the roads cannot be accepted or confirmed due to weak correlations between the variables.

Keywords: punishment, behaviour, road traffic, traffic safety, punitivity, penal populism

UDC: 656.1(497.4)

1 Introduction

Road traffic has become an important part of our everyday lives, and according to data from the World Health Organisation, approximately 1.4 million people die every year as a result of road traffic accidents. In the EU Member States, around 30,000 people are killed in about 1.1 million traffic accidents (European Comission, 2001), which indicates that we are at risk of being involved in a car accident, irrespective of our role in road transport. For the purpose of maintaining order on the roads, the state usually opts to increase penalties for violations of traffic rules and enforces them more or less consistently.

Punishment for violations of road traffic regulations is the most dynamic area of criminal law, and Slovenia is no exception (Petrovec, 1998). Since 1998, there have been frequent changes made to road traffic legislation, the exception being 2012, when the penalties for certain road traffic offences were reduced, higher penalties were always imposed. The argument being that stricter sanctions increased safety, which corroborated the findings (Flander, 2014; Flander & Meško, 2013) on increasing punitive punishments and penal populism. The doctrine of law and order and the related trend of increasing criminal penalties, which has recently become commonplace in Slovenia, is confirmed by the data on the increasing punitive attitudes held by the people and the stricter criminal and misdemeanour legislation in place.

Despite this stricter road traffic legislation, statistics show that the multiple increases in penalties imposed during the pe-

[1] Peter Pungartnik, Doctoral Student, Faculty of Criminal Justice and Security, University of Maribor, Slovenia. E-mail: peter.pungartnik@policija.si

[2] Matevž Bren, Ph.D., Professor, Faculty of Criminal Justice and Security, University of Maribor and a Researcher at the Institute of Mathematics, Physics and Mechanics, Slovenia. E-mail: matevz.bren@fvv.uni-mb.si

[3] Peter Umek, Ph.D., Professor Emeritus, Faculty of Criminal Justice and Security, University of Maribor, Slovenia. E-mail: peter.umek@fvv.uni-mb.si

riod 1998–2013 did not affect the number of road traffic fatalities significantly, declining slowly and for a short time period. There was a significant decrease after 2008, when there were less than a hundred road traffic fatalities per million inhabitants in Slovenia. Nevertheless, the number of road traffic fatalities in Slovenia is still above the average of the safest countries in the European Union (European Commission, 2013).

Based on the statistical data on the number of traffic accidents and their consequences on Slovenian roads in the period 1998–2013 (Ministry of Interior, Police, n. d.), it would be reasonable to conclude that the severity of penalties does not influence the views and behaviour of Slovenian drivers or potential violators of road traffic regulations to a significant extent. However, even though this reasoning has been confirmed by long-term comparisons of the changes and complementarity of road traffic legislation with statistics on the number of traffic accidents and their consequences, it is all too simplistic. Additional evidence is required in order to confirm the effect or lack of effect of these penalties.

This article addresses the central question about the impact of sanctions on changing the attitudes held by and behaviour of motor vehicle drivers in Slovenia. To accomplish this, the bases were the emphasised role of people and their behaviour in road traffic situations and the findings of various authors (Frey & Stahlberg, 1990; Gergen & Gergen, 1986; Justinek, 2007; Nastran Ule, 1997; Polič, 2007; Wegman, 2007; Wilde, 1994) who are rather unanimous in their view that the changes in attitude along with the internalisation of the motivation for safety conscious behaviour are necessary to change human behaviour.

2 The Psychological Aspects of Human Behaviour in Roadways

Since human error and/or violations of rules contribute significantly to the occurrence of accidents, humans represent a vital link in the transport system. If the focus is devoted to the person as a driver on the roadways, there are at least three tasks that this person performs while driving: (1) maintaining course and speed control, (2) manoeuvring (changing direction, overtaking, etc.), and (3) route selection (Riemersma, 1979). These tasks are arranged hierarchically in terms of performance level, as shown in Figure 1 below.

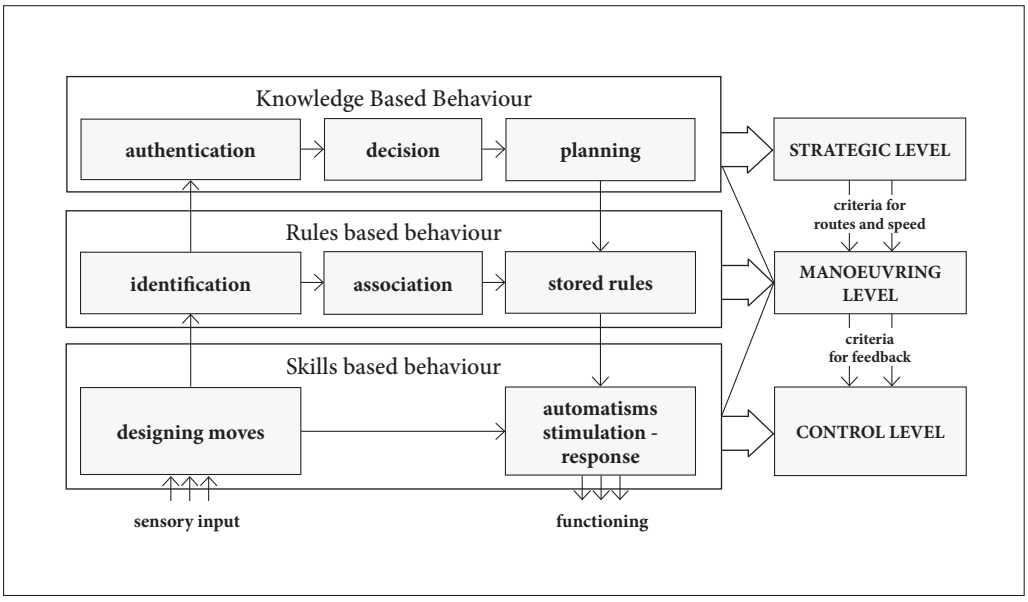

Figure 1: Model of performance levels according to Rasmussen (1987) and the hierarchic model of driving according to Michon (1985), Weller et al. (2006), and Oppenheim and Shinar (2011)

Rasmussen (1987) and Michon (1985) define their model of driving functions within hierarchically ordered levels, to which Panou, Bekiaris, and Papakostopoulos (2007) also add another behavioural level, based on lifestyle. Driving is an integral part of life and people drive like they live (Shinar, 1978). People who are frequently involved in road accidents usually have a "colourful" criminal record, and risky driving is just one of their unadjusted forms of lifestyle (Shinar, 1978). Therefore, it is also necessary to put driving functions in a broader context, taking into account that they are not static, but evolve over time. The issue of safe driving therefore requires a comprehensive approach, since it is obvious that this is a complex process which is subject to the influence of many factors.

A distinction can be drawn between direct and indirect human causes of traffic accidents. In the first case, the driver performs the action or inaction directly before the accident, which increases the likelihood of a collision, (e.g. inappropriate observation, not paying attention). The second cause is the driver's state or conditions that adversely affect the driver's ability to drive safely and also needs to be taken into account in punitive policy. Although any driver in such a state may be incapable of making reasonable assessments due to impaired cognitive processes, he should be aware of these states and take them into account when deciding to drive (e.g. the influence of alcohol, fatigue, stress, inexperience, etc.). The various factors at play do not operate in isolation and are often related in an accident, and can be seen as the final outcome of „a process of accidents", following causally related events, conditions and behaviours (Shinar, 1978).

It is not surprising from daily experiences that the researchers found a close link between intense anger (road rage) and aggressive behaviour on the road. It is seen constantly (Dahlen & White, 2006; Deffenbacher, Richards, & Lynch 2004; Parker, Lajunen, & Summala, 2002), that aggressive drivers differ from non-aggressive drivers by way of a higher anger level. In order to reduce violent behaviours of drivers, it is especially necessary to explore those social situations which provoke risky emotional responses criminologically, while endeavouring to create social conditions that are conducive to encouraging a different culture of behaviour on the roads (Muršič & Peršak, 2011). The deficiencies identified cannot be rectified unless intensive work which focuses on the individual's personality traits and behavioural patterns is undertaken (Petrovec, 2011).

2.1 Impact of Attitudes on the Behaviour of Road Users

An attitude represents the overall assessment of an object (a phenomenon, person, product, etc.). Although it is learned, relatively permanent and affects behaviour, it does not guarantee it. The relationship between the two is explained by the Ajzen model of planned behaviour (Ajzen, 1985), which is based on the assumption that people act primarily on the basis of their intentions, i.e. commitments to themselves or to others. According to this model, the primary factor that causes changes in behaviour is the individual's intent, which depends on the individual's attitude to (change) their behaviour, on the subjective norm, which he/she follows or takes into consideration, and on the behavioural control perceived.

It is true that attitudes can influence behaviour, but they can also have the opposite effect; behaviour may have an influence on how a certain attitude is attained. Ajzen and Fishbein (1977) concluded the following:

— The greater the coherence between the activity that is the subject of the attitude and the behaviour, the greater the likelihood that the attitude will affect the behaviour (action).
— The closer that the target behaviour is to the attitude, the greater the likelihood of changing the attitude (target).
— The environment in which the attitude and behaviour are related must be as similar as possible (situation).
— The connection between the attitude and behaviour must be as close as possible in time, so that the effect will emerge (time frame).

In this attitude–behaviour relationship, the levels at which attitudes and behaviours are shaped must also be considered. These range from consent, when the person adopts the impact of another person in order to achieve a positive response, to identification, when he/she adopts the behaviour of others because of identifying with them, to internalisation, when he/she adopts a behaviour due to its functional value or because it is in accordance with his/her own system of beliefs. We aspire to achieve this level, especially in terms of attitudes towards traffic behaviour (Petty & Cacioppo, 1986).

2.2 The Role of Penalties in Ensuring Road Safety

Since all aspects of police punishments are interconnected and function in relation to each other, penalising traffic violations is an important aspect of traffic rule enforcement. The first link in the chain is legislation, which lays down the rules of conduct for driving, the possibility of pursuit and punishment, and contains commitments and programmes of activities. If road users are aware of an inevitable punishment for their inappropriate, dangerous and ultimately illegal activity, they will try to avoid such behaviour (Goldenbeld, 2005).

It should be noted that punishment as a mechanism for achieving compliance with rules has a much greater impact

when it is compatible with the norms, values and a sense of responsibility of the individual for his conduct. In this context, we are talking about the need for consistency of formal (regulations) and social (dominant behaviour) rules in traffic. When the rules are consistent, the penalty presents a social condemnation, which usually transforms the penalty into a psychological punishment and tends to have more effect on a person than would be the case with a formal penalty. In this aspect of punishment, the emphasis is devoted to social support and the positive approach taken by society towards established laws and the proper conduct of individuals in relation to established rules (Berkhout, 2002).

Social and political discussions often focus on the severity of the penalty. The penalty must be effective and be perceived as such, but it must also be lawful, fair and justified in complex real situations. According to instrumental theory (Andenaes, 1974), the following are important factors that determine the effect of penalties:

— Immediacy;
— Determination/certainty;
— Strictness/severity.

Although all three factors must function in mutual interaction, they are not equally important. The strictness/severity of the penalty is effective to a certain extent, but more important is the perceived likelihood that a violation has been detected and will be sanctioned. From the aspect of punishment and the security of society, it is understandable that penalties are becoming stricter for serious offences (Houten & Rademaker, 2005).

A positive effect is expected when the penalty has an influence on the violator and his awareness of his wrongful behaviour. The objective of the punishment must be to change unwanted behaviour of violators on the road, while punishing the violators must consequently affect all road users (Wegman & Aarts, 2006).

Findings of a number of studies (Broughton, 2007; Mathijssen, 2005; Moffat & Poynton, 2007) show that road users commit fewer breaches when faced with the fact that their misconduct will be caught and punished. The constant threat of penalties and punishment reduces unwanted behaviour, but this is not a sufficient factor in and of itself to reduce violations. Permanent pressure of the enforcement of sanctions as a mechanism for compliance with the rules which has a much greater effect when combined with norms, values and a sense of responsibility of an individual for their own conduct, must be increased by a factor of two, three or even four in order to achieve the desired behaviour of the participants and, consequently, increase road safety. Previous studies (Goldenbeld, 2005; Wegman & Aarts, 2006) show that punishment promotes responses of avoidance, and unfortunately, the possibilities of rewarding road safety behaviour are limited and less feasible (Bjørnskau & Elvik, 1992).

We can see that a number of international research efforts (Bjørnskau & Elvik, 1992; Briscoe, 2004; Elvik, 2005; Elvik & Christensen, 2007; Houten & Rademaker, 2005; Nochajski & Stasiewicz, 2006; Redelmeier, Tibshirani, & Evans, 2003) show that a further tightening of the penalties has little or no impact on improving road safety, therefore increasing the need to develop new alternative forms of punishment that would have a greater impact on improving road safety. Among the new punishment forms the authors of several studies (Berkhout, 2002; Broughton, 2007; Goldenbeld, 2005; Wegman, 2009; Wegman & Aarts, 2006) mention most frequently is personalised punishment, and caution that without preventive measures and continuous education and training, which should begin very early, there will certainly be no good traffic safety.

3 Description of Methods, Instruments and Sample

The basic research question we addressed was: "What is the impact of penalties on changing the attitudes and behaviour of road users in Slovenia in terms of improving road traffic safety, as in the period after 1998 led to the adoption and multiple modifications of road traffic laws with which higher penalties for traffic violations were enacted?" From this key research question, the central thesis of this research arose: "The penalties affect the changing of attitudes of motor vehicle drivers in Slovenia in terms of them behaving more safely."

3.1 Methods used

We used both univariate and multivariate analyses and descriptive statistics. The central thesis of the research was examined using regression analysis, the Pearson correlation coefficient, one-way analysis of variance, and post-hoc tests.

3.2 Description of the Data Collection and the Questionnaire

The data collection was performed in four different ways, allowing for the identification of the effect of survey execution on the responses of the participants:

1. Online survey published between 30 May 2013 and 7 September 2013 on the MojaAnketa.si website (http://www.mojaanketa.si/surveys/edit/257079606/).

2. Personal survey administered on weekend mornings between 4 May 2013 and 14 July 2013 in front of shopping centres in major cities across Slovenia (Ljubljana, Domžale, Koper, Izola, Nova Gorica, Novo Mesto, Celje, Velenje, Maribor, Ptuj, Murska Sobota, Lendava and Slovenj Gradec).

3. Interviews at the Centre for Safe Driving AMZS Vransko as a part of seminars for drivers for the purpose of retracting penalty points. The survey was conducted on 24 October 2013.

4. A telephone survey by the agency Ninamedia. The survey was carried out with a Computer-Assisted Telephone Interviewing (CATI) method.

The questionnaire contained closed questions, with participants responding using a five-point Likert scale, where 1 means that the respondent disagrees with the statement, and 5 means that the respondent fully agrees with it. The questionnaire was pre-tested by twenty experts in the field of research and traffic safety (Marko Polič, Matevž Bren, Peter Umek, Branko Lobnikar, Bojan Žlender, Vinko Gorenak, Irena Gorenak, Ljubo Zajc, Miroslav Žaberl, Robert Sušanj, Ivan Kapun, Zdravko Praunsseis, Srečko F. Krope, Franc Virtič, Aljoša Krivec, Boris Raj etc.), and their comments and suggestions were taken into account when amending and supplementing the questionnaire, followed by a pilot test of the questionnaire.

The questionnaire consisted of 115 questions, divided into five parts and fifteen sets of questions:

— In the first part of the questionnaire (20 questions), we obtained information about the sense of security, of the characteristics/weaknesses of drivers in Slovenia, and the reasons for the occurrence of traffic accidents,

— In the second part (28 questions), we collected data on the impact of penalties on changing their attitudes and behaviour on the road, on the importance and value of compliance with laws, on the importance and value of the introduction of penalty points, on the effectiveness of penalties, and on the measures for improving traffic safety,

— In the third part (28 questions), data on the behaviour of the participants and the behaviour of other road users was collected and on the factors that affect changing the attitudes and behaviour of participants in road traffic,

— In the fourth part (19 questions), we collected data on the sustainability of penalties, the value of serial installation of some additional devices into vehicles and on the value of some additional measures to improve road safety in Slovenia, and

— In the final part (20 questions), we obtained demographic and general information, containing a control question.

The questionnaire was used in the online survey, face-to-face interviews, and the interviews conducted at the Safety Driving Centre AMZS Vransko.

For the telephone survey, we constructed a questionnaire which consisted of only 13 questions, due to time constraints stemming from the long duration of the telephone survey. At least one question was taken from each of the five parts of the questionnaire, and the answers provided the following information:

— Concern over the state of road safety in Slovenia.

The contribution of higher penalties to improvement of road safety in Slovenia.

— The impact of higher penalties for road traffic violations on changing the attitudes and, consequently, safer road behaviour of the participants.

— The importance of individual penalty adjustments for the violator, familiarity with the road traffic legislation in Slovenia since 1998.

— The degree of probability that the participant is stopped by police officers after committing a violation while driving on Slovenian roads.

Survey participants were also asked four demographic questions (gender, age, education and place of residence) and three questions about their driving status (holder of a valid driver's licence, the driver's experience and average mileage per year).

The reliability of the questionnaire (the four sets which we addressed for the purposes of this article) was tested by employing factor analyses first (method of main components) and thus we obtained a smaller number of variables (factors) to analyse further. In all cases, we ended up with one-factor structures, with the maximum amount of explained variance at 65.8 % (minimum at 43 %) and the maximum sampling coefficient (KMO) of 0.873 (minimum 0.604). According to the amount of explained variance, the sampling (KMO) and reliability coefficients (α), individual variables (factors) can be classified and explained using the following results:

— The importance and value of higher penalties explain 65.8 % of the variance, KMO equals 0.674, and the reliability coefficient is 0.825,

— The importance and value of introducing penalty points explain 58.6 % of the variance, KMO equals 0.604, and the reliability coefficient is 0.763,

— The factors affecting changes in attitudes and behaviour of road traffic users explain 49.2 % of the variance, KMO equals 0.873, and the reliability coefficient is 0.885, and

— The strongest actors affecting changes in attitudes and behaviour of road traffic users explain 43.1 % of the variance, KMO equals 0.660, and the reliability coefficient is 0.663.

3.3 Sample Description

The basic population of the survey (both online and field) consisted of all 723,444 holders of a valid driving licence in Slovenia (SURS, 2013), with a final sample of 2,044 representing 0.15 % of all holders of valid driving licences, namely:

— The web survey was answered by 1,108 participants, all of whom completed the questionnaire fully,

— 403 participants took part in the personal interviews, and

— 20 participants were involved in the Centre for Safe Driving survey.

In the Ninamedia telephone survey, a representative sample of the population of Slovenia was used, and a total 629 people were surveyed. A total of 2,160 people were surveyed, of whom 2,044 were holders of valid driving licences. This non-random sample was selected from the Slovenian driving population, while the Ninamedia ad hoc sample was selected from the Slovenian population.

3.3.1 Comparison of demographic data for all samples with the population of Slovenia

To determine the significance of the differences between the distributions of demographic data of the online and infield survey samples, as well as the Ninamedia survey sample, we used a chi-square test. The data are shown in Table 1 below.

Table 1: Demographic data for the online and infield surveys, the Ninamedia investigation and the population of Slovenia (Source: Ninamedia, 2013; SURS, 2014)

Demographic data	Our research		Ninamedia		Slovenia	
	$n = 1531$		$n = 629$		$n = 1741500$	
	f	%	*f*	%	*f*	%
Age structure (χ^2= 377,853; p = 0.000)						
16 – 25 years	95	6.2	48	7.8	216713	12.4
26 – 35 years	281	18.4	74	11.9	294927	17.0
36 – 45 years	394	25.7	76	12.3	300484	17.2
46 – 55 years	430	28.1	85	13.7	308228	17.8
56 – 65 years	282	18.4	155	25.0	284610	16.3
66 years +	49	3.2	182	29.4	336538	19.3
Holder of a driving licence (χ^2= 217,632; p = 0.000)						
Yes	1519	99.2	525	83.5	1330444	76.4
No	12	0.8	104	16.5	411056	23.6
Driver experience (χ^2= 225,025; p = 0.000)						
No data / Does not have a DL	12	0.8	104	16.5	/	/
Less than 3 years	19	1.2	15	2.4	/	/
Between 3 and 10 years	164	10.7	47	7.5	/	/
Over 10 years	1340	87.3	463	73.6	/	/
Average mileage per year (χ^2= 283,979; p = 0.000)						
No data (no DL)	12	0.8	104	16.5	/	/
Less than 10,000 km	347	22.5	217	34.5	/	/
Between 10,000 and 30,000 km	873	56.6	238	37.8	/	/
Over 30,000 km	311	20.2	70	11.1	/	/

From Table 1 it can be seen that in all surveys, the p-values of demographic data are less than 0.05, i.e. the samples are statistically significantly different to the whole population in all cases.

3.4 Study Limitations

The limitations of the study arise from its concept that represents innovation in scientific research. The results obtained on the basis of the non-random sample do not allow any reliable generalisation to *the entire population of Slovenian motor vehicle drivers or the comparison between drivers of the EU countries as no similar international research has been conducted.* The results are based on (self-) reported behaviour of drivers regarding their risks in road traffic. In our study, we were limited to examining the effect of penalties on views held by and behaviour of motor vehicle drivers, disregarding other social any psychological factors. The scope of the questionnaire should.

4 Presentation and Interpretation of Research Results

4.1 Analysis of the Questionnaire Structure

First, the normal distribution for all variables was checked (where the value of the kurtosis and asymmetry exceeded the values of −3 and 3, the variable was excluded from further analysis), and the reliability of the variables was also checked (with Cronbach's α coefficient) according to individual factors, KMO values and the percentage of the total explained variance. A single factor structure was mostly obtained after a set of questions and, in some cases where a theoretical variable was examined with a several measured variables, a multifactor structure was also obtained. Those variables with a low communality (below 0.3) were also eliminated from the analyses. By using the principal component method, a small number of latent variables–components were attained, which were included in further analyses. Of the seventeen latent variables (components), four were used for the purposes of this research.

Table 2: Latent variables (components) and results of the analyses

Components	*KMO*	*α*	Explained variances (%)	Weights
C1: The importance and value of higher penalties	0.674	0.825	65.8	
Higher penalties result in fewer dangerous traffic situations in general				0.835
Higher penalties help to improve road safety in Slovenia				0.824
The higher penalties in place prompted me to become a safer participant in road traffic				0.817
The higher penalties in place mean that I follow the road regulations to a greater extent				0.766
C2: The importance and value of introducing penalty points	0.604	0.763	58.6	
The introduction of penalty points makes me worried about the possibility of my driving licence being revoked				0.835
The introduction of penalty points makes me worried about the complexity and cost of re-obtaining a driving licence				0.824
The introduction of penalty points has increased my awareness of risks in road traffic				0.817
Due to the introduction of penalty points I have greater respect for traffic regulations				0.766
C3: Factors affecting changes in attitudes and behaviour of road traffic users	0.873	0.885	49.2	
The option to pay half of the fine				0.778
A programme of further training for safe driving and retracting four penalty points once every three years				0.76
The option to pay the fine in instalments				0.759
The introduction of penalty points for serious road traffic offences				0.715

Components	*KMO*	*α*	Explained variances (%)	Weights
Rehabilitation programmes in cases where the termination of the driving licence is suspended				0.707
Reduction of fines for less severe violations of road traffic rules				0.701
Height of the incurred penalty for committing road traffic violations				0.672
Legislating alternative measures for punishment				0.67
Suspension of enforcing termination of the driving licence				0.662
Fear that I will be stopped and punished after committing an offence				0.571
C4: The strongest factors affecting changes in attitudes and behaviours of road traffic users	0.66	0.663	43.1	
Traffic control				0.743
Fear of causing a traffic accident				0.723
Severe punishment				0.622
Preventive advice				0.617
My internal conviction (attitude)				0.556

Table 2 shows that "The importance and usefulness of higher penalties" has the highest value regarding the proportion of explained variance. "The importance and value of introducing penalty points" and "Factors affecting changes in attitudes and behaviour of road traffic users" have a slightly lower value, and "The strongest factors affecting the changes in attitudes and behaviours of road traffic users" has the lowest value. The values of the weights suggest that the survey participants rated traffic control to have a somewhat higher impact (0.743) in the component "The strongest factors affecting changes in attitudes and behaviours of road traffic users", while they rated their internal conviction (attitude) to be somewhat lower (0.556).

4.2 Interrelation of Punishment Factors and Changing Attitudes

In order to answer the key research question and check the central thesis of this research, "The penalties affect the changing of attitudes of motor vehicle drivers in Slovenia, in terms of them behaving more safely", a correlation analysis was conducted between the components. We discovered that the components are positively and mostly statistically significantly associated, as the established covariance varies from low to moderate levels of linear relationships (0.2 – 0.4 and 0.4 – 0.7). The results are shown in Table 3.

Table 3: Correlations between components

Components	C1	C2	C3	C4
The importance and value of higher penalties	1			
The importance and value of introducing penalty points	0.419**	1		
Factors affecting changes in attitudes and behaviour of road traffic users	0.291**	0.463**	1	
The strongest factors affecting changes in attitudes and behaviours of road traffic users	0.366**	0.350	0.367**	1

* $p < 0.05$; ** $p < 0.01$

Table 3 shows that those survey participants who have given a largely positive assessment of **the significance and value of higher penalties (C1)** also assessed the importance and value of introducing penalty points positively (e.g. the possibility of my driving licence being revoked, the complexity and cost of re-obtaining a driving licence, etc.) and they also support the strongest factors affecting changes in the attitudes and behaviours of drivers (e.g. traffic control, fear of causing a traffic accident, etc.).

We can also see that those participants who assessed **the importance and value of introducing penalty points (C2)** largely positively, i.e. those who also rated the usefulness of introducing penalty points higher, also highlight, to a greater extent, the importance and value of higher penalties (e.g. due to higher penalties, there are generally less dangerous situations in road traffic, higher penalties help to improve road safety in Slovenia, etc.). They also support the strongest factors (e.g. traffic control, fear of causing a traffic accident, etc.).

The participants who assessed the **factors affecting changes in attitudes and behaviour of drivers (C3)** largely positively, i.e. those who largely agree with the factors of impact (e.g. the option to pay half of the fine, a programme for further training and retracting penalty points, etc.), also assess the importance and value of introducing penalty points largely positively.

Lastly, we can see that those participants who assessed **the strongest factors affecting changes in attitudes and behaviours of drivers (C4)** largely positively, i.e. those that largely agree with the strongest factors affecting changes in attitudes and behaviours of drivers (e.g. traffic control, fear of causing a traffic accident, etc.), also assessed the importance and value of higher penalties (e.g. due to higher penalties, there are generally less dangerous situations in road traffic, higher penalties help to improve road safety in Slovenia, etc.).

4.3 Impact of Penalties on Changing Attitude and Behaviour

In order to check the central thesis of the research, "The penalties affect the changing of attitudes of motor vehicle drivers in Slovenia in terms of them behaving more safely," the correlation between the two components was calculated, followed by a multiple regression analysis.

The thesis used to determine the impact and interdependence of individual components identified throughout the study of theory of changing views and behaviour and the impact of penalties was tested using multiple regression (Field, 2009). The Pearson correlation coefficient was applied to establish correlations between the variables.

The results of the correlation analysis confirm that the penalties in place for road traffic violations make motor vehicle drivers in Slovenia behave more safely. However, their impact is very low as the variability of the dependent variable, "Factors affecting change of attitudes and behaviour of road traffic users," was explained $R^2 = 0.084$ (8 %), and the remainder (92%) can be attributed to other factors.

The correlation between the two components, "The importance and value of higher penalties" and "The strongest factors affecting changes in attitudes and behaviours of drivers," is statistically significant and positive ($\rho = 0.291$), which means

Table 4: Summary of multiple regression for the components of the factors that change the attitudes and behaviour of motor vehicle drivers

Dependent variable: Factors affecting change of attitudes and behaviour of motor vehicles drivers	***B***	***T***	***VIF*[4]**
Constant		25.218*	
The importance and value of introducing penalty points	0.414	16.705*	1.213
The importance and value of penalties	0.117	4.737*	1.213
Adjusted R^2	0.23		
***F* statistics**	222.991*		

* $p < 0.001$

[4] When the highest VIF (Variance Inflation Factor) is above 10, some authors (Bowerman & O'Connell, 1990; Myers, 1990) claim there is cause for concern regarding the model limitations. Bowerman and O'Connell (1990) emphasise that the average value of VIF that is significantly higher than 1 may result in biased regression. In our case we approached the average value of VIF 1, indicating a relatively high level of unbiased regression.

that those who believe that the state of traffic safety is better due to higher penalties also believe, to a greater extent, that the attitudes and the resulting behaviour in road traffic are also affected by internal factors and other factors of punishment. Linear regression was also used to test the central thesis of this research, where the impact of traditional and alternative forms of punishment and higher penalties were tested on changing the attitudes and, consequently, making the behaviour of the motor vehicle drivers safer. The results are shown in Table 4.

It is evident from Table 4 that the model is statistically significant ($p = 0.001$ and $F = 222.991$). The predictive variables, "Importance and value of introducing penalty points" and "Importance and value of higher penalties," can explain the $R^2 = 0.23$ (23%) variability of the dependent variable, "Factors affecting change of attitudes and behaviour of motor vehicles drivers", and the remaining portion (77%) can be attributed to other factors not covered by our analysis.

The table also shows that both predictive variables are statistically significant ($p = 000$), while the variable Importance and value of introducing penalty points has a greater impact ($\beta = 0.414$), which confirms that alternative forms of punishment have a slightly greater impact than traditional forms of punishment.

The results of the regression analysis confirm that alternative forms of punishment are not only more effective, they also have a greater impact on changing attitudes and, consequently, on safer behaviour of motor vehicle drivers in Slovenia than traditional forms of punishment.

In summary, based on the results of the correlation and multiple regression analyses, we have established that the central thesis of this research, i.e. that penalties impact the views held by Slovenian motor vehicle drivers in terms of safer behaviour, cannot be completely accepted as the correlation between the variables that confirms their impact is very weak.

5 Discussion and Suggestions for Practice

Among the key findings of our study, the results of the correlation analysis stand out. From this, we can conclude that the penalties for road traffic offences affect the attitudes and behaviour of motor vehicle drivers in Slovenia, as the correlations between the variables are statistically significant and positive. However, we only explained 0.084 or 8% of the variance of the strongest factors affecting changes.

Low impact of fines is also confirmed by the results of the correlation between the two variables: "the importance and value of higher penalties" and "the factors affecting changes in attitudes and behaviour of motor vehicle drivers," which is statistically significant and positive ($\rho = 0.291$), which means that those who believe that the state of traffic safety is better due to higher penalties also believe that the attitudes and the resulting behaviour in road transport is also affected by internal factors and other factors of punishment.

In addition, the results of the regression analysis show that, in the statistically significant model ($p = 0.000$ and $F = 222.991$), the variable "importance and value of introducing penalty points" has greater impact ($\beta = 0.414$) than the "importance and value of higher fines" ($\beta = 0.117$, which confirms the finding that alternative forms of punishment are more effective and have a greater impact on changing the attitudes of motor vehicle drivers in Slovenia in terms of their safer behaviour than traditional forms of punishment.

Based on these findings, we designed templates with sustainable aspects to improve road safety in Slovenia, found in a number of good practices in European countries. Among these, special mention should be given to the following:

In order to regulate and better control road traffic, the presence of traffic patrols should be increased (establishing special police units for traffic control) on highways and express roads and a higher level of permanent (regular) police control on the most dangerous sections of state and municipal roads should be provided. In this survey, this was in particular noted by motor vehicle drivers in Slovenia.

When amending road traffic legislation, the process for punishing violators of traffic regulations and those causing traffic accidents should be conducted more swiftly and with greater consistency. However, the purpose of the punitive policy imposed should not be to increase penalties and penal populism, but should instead be adapted to the EU average and, above all, to the financial state of the population.

On a broader level, it would be advisable to put alternative forms of punishment into practice (e.g. a system of penalty points, customised penalties for violators, rehabilitation programmes for re-obtaining a driving licence, educational workshops, educational programmes for suspending driving licence termination, work for humanitarian organisations and local communities, seminars for retracting penalty points, etc.) and to begin establishing awards for safe behaviour in road traffic.

The findings that alternative forms of punishment influence the attitudes held by road users towards safety more than traditional forms of punishment represent an innovation in the field of scientific research that needs to be taken into consideration when designing future transport strategies in Slovenia.

6 References

1. Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In J. Kuhl, & J. Beckman (Eds.), *Action control: From cognition to behaviour* (pp. 11–39). Berlin: Springer.
2. Ajzen, I., & Fishbein, M. (1977). Attitude-behaviour relations: A theoretical analysis and review of empirical research. *Psychological Bulletin, 84*, 888–918.
3. Andenaes, J. (1974). *Punishment and deterrence.* Ann Arbor: University of Michigan Press.
4. European Comission. (2001). *White Paper on European transport policy for 2020: Time to decide*. Ljubljana: European Commission.
5. Allport, G. H. (1954). *The nature of prejudice*. Massachusetts: Addison-Wesley.
6. Berkhout, R. (2002). De stappen van duurzame handhaving. *Verkeersknooppunt, 29*(4), 20–21.
7. Briscoe, S. (2004). Raising the bar: Can increased statutory penalties deter drink-drivers? *Accident Analysis and Prevention, 36*(5), 919–929.
8. Broughton, J. (2007). The correlation between motoring and other types of offence. *Accident Analysis and Prevention, 39*(2), 274–283.
9. Bjørnskau, T., & Elvik, R. (1992). Can road traffic law enforcement permanently reduce the number of accidents? *Accident Analysis and Prevention, 24*(5), 507–520.
10. Bowerman, B. L., & O'Connell, R. T. (1990). *Linear statistical models: An applied approach.* Belmont: Duxbury.
11. Dahlen, E. R., & White, R. P. (2006). The Big Five factors, sensation seeking and driving anger in the prediction of unsafe driving. *Personality and Individual Differences, 41*(5), 903–915.
12. Deffenbacher, J. L., Richards, T. L., & Lynch, R. S. (2004). Anger, aggression, and risky behaviour in high anger drivers. V J. P. Morgan (Ed.), *Focus on aggression research* (pp. 115–156). Hauppauge: Nova Science.
13. Elvik, R. (2005). *Has progress in improving road safety come to a stop?* (TØI report 792/2005). Oslo: Institute of Transport Economics.
14. Elvik, R., & Christensen, P. (2007). The deterrent effect of increasing fixed penalties for traffic offences: The Norwegian experience. *Journal of Safety Research, 38*(6), 689–695.
15. European Commission. (2013). *Road safety evolution in EU: Community database on accidents on the roads in Europe.* Retrieved from http://ec.europa.eu/transp ort/road_safety/pdf/observatory/historical_evol.pdf.
16. Field, A. (2009). *Discovering statistics using SPSS: Introducing statistical method* (3rd ed.). London: Sage.
17. Flander, B. (2014). Kaznovanje v Sloveniji (quo vadis) [Punishment in Slovenia (quo vadis)]. In I. Areh, M. Jere, & B. Flander (Eds.), *Qou vadis: nadzorovanje in kaznovanje v Sloveniji: 15. slovenski dnevi varstvoslovja* [Qou vadis: control and sanctions in Slovenia: 15th Slovenian Days of Criminal Justice Science] (pp. 37–49). Ljubljana: Fakulteta za varnostne vede.
18. Flander, B., & Meško, G. (2013). Punitivnost in kaznovalni populizem v Sloveniji [Punitive punishment and penal populism in Slovenia.]. *Revija za kriminalistiko in kriminologijo*, *64*(4), 330–344.
19. Frey, D., & Stahlberg, D. (1990). Erwartungsbildung und Erwartungswanderung bei Borsenaktueren. In P. Maas, & J. Weibler (Eds.), *Börse und Psychologie: Plädoyer für eine neue Perspektive* (pp. 102–139). Köln: Deutscher Instituts-Verlag.
20. Gergen, K. J., & Gergen, M. M. (1986). *Social psychology*. Berlin; New York: Springer.
21. Goldenbeld, C. (2005). *Verkeershandhaving in Nederland* (Report R-2004/15). Leidschendam: Swov Institute for Road Safety Research.
22. Houten, M., & Rademaker, J. (2005). *Nederlandse verkeersboetes in internationaal perspectief: Verkennend onderzoek in twaalf Europese landen.* Den Haag: Wetenschappelijk Onderzoek-en Documentatiecentrum (WODC).
23. Justinek, A. (2007). Vzgoja in usposabljanje problematičnih voznikov [Education and training of problematic drivers]. In V. Zabukovec (Ed.), *Psihološki vidiki preventivnih dejavnosti v prometu* [Psychological aspects of preventive activities in traffic] (pp. 78–90). Ljubljana: Znanstvenoraziskovalni inštitut Filozofske fakultete.
24. Mathijssen, M. P. (2005). Drink-driving policy and road safety in the Netherlands: A retrospective analysis. *Transportation Research Part E: Accident Analysis and Prevention, 41*(5), 395–408.
25. McGuire, F. L. (1976). Personality factors in highway accidents. *Human Factors, 18*(5), 433–442.
26. Michon, J. A. (1985). A critical view of driver behaviour models: What do we know? What should we do? In L. Evans, & R. C. Schwing (Eds.). *Human behaviour and traffic safety* (pp. 485–520). New York: Plenum Press.
27. Ministrstvo za notranje zadeve, Policija [Ministry of Interior, Police]. (n. d.). Prometna varnost: statistika [Road safety: Statistics]. Retrieved from http://www.policija.si/index.php/statistika/promet na-varnost
28. Moffat, S., & Poynton, S. (2007). The deterrent effect of higher fines on recidivism: Driving offences. *Crime and Justice Bulletin, 106*. Retrieved from http:// www.bocsar.nsw.gov.au/Documents/CJB/cjb106.pdf
29. Muršič, M., & Peršak, N. (2011). Varnost cestnega prometa [Road safety]. In D. Petrovec (Ed.), Čustvenost nasilnega ravnanja v cestnem prometu [Emotionalism of violent conduct in road traffic] (pp. 57–78). Ljubljana: Inštitut za kriminologijo pri Pravni fakulteti.
30. Myers, R. (1990). *Classical and modern regression with applications*. Boston: Duxbury.
31. Nastran Ule, M. (1997). *Temelji socialne psihologije* [Basics of Social Psychology]. Ljubljana: Znanstveno in publicistično središče. Ninamedia. (2013). *Prometna varnost – javnomnenjska raziskava (21–23 May2013)* [Road safety – opinion poll (21–23 May 2013)]. Ljubljana: Ninamedia.
32. Nochajski, T. H., & Stasiewicz, P. R. (2006). Relapse to driving under the influence (DUI): A review. *Clinical Psychology Review, 26*(2), 179–195.
33. Oppenheim, I., & Shinar, D. (2011). Human factors and ergonomics. In B. E. Porter (Ed.), *Handbook of Traffic Psychology* (pp. 193–211). Amsterdam: Elsevier.
34. Panou, M., Bekiaris, E., & Papakostopoulos, V. (2007). Modelling Driver Behaviour in European Union and International Projects. In P. C. Cacciabue (Ed.), *Modelling driver behaviour in automotive environments* (pp. 3–25). London: Springer.
35. Parker, D., Lajunen, T., & Summala, H. (2002). Anger and aggression in three European countries. *Accident Analysis and Prevention, 34*(2), 229–235.
36. Petrovec, D. (1998). Nova država – nova kaznovalna ideologija in praksa? [New state – New punishment ideology and practice?] *Revija za kriminalistiko in kriminologijo, 49*(3), 238–244.
37. Petrovec, D. (2011). Varnost cestnega prometa [Road safety]. In D. Petrovec (Ed.), *Preprečevanje nezaželenega vedenja s kaznijo in/ali drugimi ukrepi* [Prevention of the unwanted conduct through punishment and/or other measures] (pp. 29–43). Ljubljana: Inštitut za kriminologijo pri Pravni fakulteti.

38. Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. *Advances in experimental social psychology, 19,* 123–205.
39. Polič, M. (2007). *Človek* – dejavnik prometne varnosti [Man – a road safety factor]. In V. Zabukovec (Ed.), *Psihološki vidiki preventivnih dejavnosti v prometu* [Psychological aspects of preventive activities in traffic] (pp. 23–77). Ljubljana: Znanstvenoraziskovalni inštitut Filozofske fakultete.
40. Rasmussen J. (1987). The definition of human error and a taxonomy for technical system design. In J. Rasmussen, K. Duncan, & J. Leplat (Eds.). *New technology and human error.* Chichester: Wiley.
41. Redelmeier, D. A., Tibshirani, R. J., & Evans, L. (2003). Traffic-law enforcement and risk of death from motor-vehicle crashes: A case-crossover study. *The Lancet, 361*(9376), 2177–2182.
42. Riemersma, J. B. (1979). Perception in traffic. *Urban Ecology, 4*(2), 139–149.
43. Shinar, D. (1978). Aggressive driving: The contribution of the drivers and situation. *Transportation Research Part F: Traffic Psychology and Behaviour, 6*(1), 137–160.
44. Statistični urad RS [Statistical Office of the RS] (SURS). (2013). *Letopis 2013* [Yearbook 2013]. Pridobljeno na http://www.stat.si/statweb/glavnanavigacija/podatki/publikacije/statisti%C4%8Dni-letopis
45. Wegman, F. (2007). *Road safety in a European perspective.* Leidschendam: SWOV Institute for Road Safety Research.
46. Wegman, F. (2009). *Penalties in traffic.* Leidschendam: SWOV Institute for Road Safety Research.
47. Wegman, F., & Aarts, L. (Ed.) (2006). *Advancing sustainable safety: National road safety outlook for 2005–2020.* Leidschendam: SWOV Institute for Road Safety Research. Retrieved from http://www.swov.nl/rapport/DMDV/Advancing_Sustainable_Safety.pdf
48. Weller, M., Krautler, N., Mantei, N., Suter, U., & Taylor, V. *(2006).* Jagged ablation results in cerebellar granule cell migration defects and depletion of Bergmann glia. *Dev Neurosci, 28,* 70–80.
49. Wilde, G. J. S. (1994). *Target risk.* Toronto: PDE Publications.

Vpliv kazni na stališča in vedenje voznikov motornih vozil v Sloveniji

Peter Pungartnik, doktorski študent, Fakulteta za varnostne vede Univerze v Mariboru, Slovenija.
E-pošta: peter.pungartnik@policija.si

Dr. Matevž Bren, redni profesor, Fakulteta za varnostne vede Univerze v Mariboru in raziskovalec, Inštitut za matematiko, fiziko in mehaniko, Slovenija. E-pošta: matevz.bren@fvv.uni-mb.si

Dr. Peter Umek, zaslužni profesor, Fakulteta za varnostne vede Univerze v Mariboru, Slovenija.
E-pošta: peter.umek@fvv.uni-mb.si

Statistični podatki o dogajanju na slovenskih cestah potrjujejo, da je cestni promet zelo pomemben del našega življenja. Za današnjega človeka je značilno, da je njegova udeležba v cestnem prometu postala vse bolj prostor življenja sodobnega časa, saj izraža in (so) oblikuje njegov način življenja, vrednote in ravnanje. K vedenju prometnih udeležencev in s tem k večji prometni varnosti lahko na več načinov pripomore tudi država. V Sloveniji smo bili v obdobju 1998–2013 deležni zaostrovanja zakonodaje na področju cestnega prometa, kar pritrjuje ugotovitvam o naraščajoči punitivnosti in kaznovalnem populizmu. Tako se pojavljajo vprašanja o učinku kazni in kaznovanja voznikov motornih vozil z nameni doseganja boljše cestnoprometne varnosti. Odgovori na zastavljena vprašanja predstavljajo pomemben prispevek k razumevanju kaznovanja s ciljem spreminjanja človekovega vedenja v cestnem prometu.

V prvem delu avtorji članka opredelijo nekatere psihološke vidike človekovega vedenja v cestnem prometu, vplive stališč na odzivanje in vedenje udeležencev cestnega prometa ter kaznovanja kršitev v cestnem prometu kot pomembnega člena izvajanja prometnega zakona. Pri tem pokažejo na pomen preučevanja človeka, ki je s svojimi psihofizičnimi procesi in osebnostjo odločilen dejavnik varnosti cestnega prometa. Izpostavijo, da med številnimi raziskavami ni mogoče najti znanstvenih preučevanj in raziskav o vplivu kazni na spreminjanje stališč in vedenja udeležencev cestnega prometa. Poudarijo, da obsežna raziskava med večjim številom slovenskih voznikov motornih vozil želi zapolniti ugotovljeno vrzel na področju znanstvenega raziskovanja. V drugem delu predstavijo rezultate obsežne raziskave, na podlagi katerih ni mogoče v celoti sprejeti in potrditi osrednje teze, da kazni vplivajo na spreminjanje stališč in posledično varnejše vedenje v cestnem prometu, ker obstajajo šibke povezave med spremenljivkami.

Ključne besede: kazen, vedenje, prometna gneča, prometna varnost, punitivnost, kaznovalni populizem

UDK: 656.1(497.4)