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Impact of riders' lifestyle on their risky behavior and road traffic accident risk

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Abstract

Previous studies have identified several factors that contribute to the accident risk of motorcyclists: sex, age, experience, personality traits, etc. It is for sure that motorcycling represents more than just a mode of motor transportation or sport. It could be a part of riders' personal lifestyle which with other components can contribute to their risk behavior and greater traffic accidents involvement. The main aim of the study was to determine how lifestyle dimensions of male motorcyclists influence the risky behavior of motorcyclists and their involvement in traffic accidents. The set of questionnaires about lifestyle, risky behavior and demographic data were sent by mail to three hundred motorcyclists and two hundred and six participants completed material and sent it back. Results showed that there is a significant correlation between lifestyle and risky behavior of the riders and their involvement in traffic accidents. Also, lifestyle predicts the large amount of the variance of risky behavior and traffic accidents of motorcyclist. We can conclude that life style has an important impact on motorcyclists' risky behavior and traffic accidents involvement.

Keywords: motorcyclists, lifestyle, risky behavior, traffic accidents

1. Introduction

The problem of safety in road traffic represents a major challenge at the global level. Despite different approaches to the solution of this problem and funds that certain countries invested into the improvements, the danger and risk are still very much present in traffic. However, not everyone is at equal risk of being killed in traffic. It is widely recognized that motorcyclists

represent a group of road users with a particularly high accident risk (Elliott et al. 2003; Huang and Preston 2004). Considering the risk of death in traffic, the World Health Organization (WHO) has estimated that riding a motorcycle is 10 times more dangerous, per kilometer, than driving a passenger car, and nearly 20 times more dangerous, per driven hour, than driving a passenger car (WHO 2004.). Per vehicle mile traveled, motorcycle riders have a 34-fold higher risk of death in a crash than people driving other types of motor vehicles, and they also are eight times more likely to be injured (NHTSA 2007). In 2009, this group of road users represented 16% of the total number of fatalities in road accidents in the EU-24 countries (Yannis et al. 2011). In Serbia, data show that in 2016 the number of registered motorcycles and mopeds was less than three percents of total number of registered vehicles, while number of killed riders of those vehicles was about 10 percent of total number of killed in traffic accidents (RTSA 2017). Problem of casualties of motorcyclists in traffic can be larger because there has been a large growth in motorcycling in many developed and developing countries in the last decade (Haworth 2012).

Previous studies have identified several factors that contribute to the accident risk of motorcyclists. Male motorcyclists are more involved in accidents than female motorcyclists. However, this is the result of the fact that most of the motorcycle owners are males and therefore they are more exposed to risk (see, Sexton et al. 2004; MAIDS 2009). The age of motorcyclists is also associated with greater involvement in traffic accidents. Namely, research shows that young riders are greatly over-involved in crashes (Hurt et al. 1981; Mullin et al. 2000; Lardelli-Claret et al. 2005; Zambon and Hasselberg 2006; MAIDS 2009; Bjørnskau et al. 2012). Also, older motorcyclists are more likely to be involved in severe injury crashes due to (i) decreased physical resiliency to motorcycle crashes and (ii) slow reaction time and reduced sensory and

perceptual ability (Cunto and Ferreira 2017; Pai and Saleh 2007; Savolainen and Mannering 2007; Nunn 2011; Vlahogianni et al. 2012). However, when it comes to inexperience, the results of the studies are inconsistent; in a few studies inexperience was identified as a factor that contributes to greater involvement of motorcycle riders in traffic accidents (Wong et al. 1990; Lin et al. 2003; Sexton et al. 2004), whilst in other studies that was not the case (e.g. Rutter and Quine, 1996; Haworth et al. 1997). It seems that youth has more important role than experience when it comes to involvement of motorcycle riders in traffic accidents (Shinar 2007). For instance, Rutter and Quine (1996), conducted a study which was directly focused on relative contributions of youthful age and inexperience, and tried to statistically control the effects of both variables. Results have clearly shown that youth has greater role in causing the crashes compared to inexperience.

In addition to demographic factors, studies have identified other factors that contribute to risky behavior and involvement of motorcyclists in crashes. Wong et al. (2010) demonstrated that personality attitudes, such as sensation seeking, amiability and impatience may influence risky driving behaviors. Theofilatos and Yannis (2014) found that motorcyclists who have dangerous attitudes and behaviors are more likely to be involved in an accident. Bjørnskau et al. (2012) obtained that risky behavior is closely linked to “unsafe” attitudes, heavy bikes, sport bikes, speeding and brands. Together, affective attitude and perceived controllability accounted for a significant proportion of the variance in motorcyclists’ speeding intentions (Elliott, 2010). Regarding the external factor that influence riders’ behavior, studies have shown that alcohol is an important factor that contributes to reduction of riding abilities of motorcyclists (Huang and Preston 2004; Kasantikul et al. 2005; Lin and Kraus, 2009).

Generally, motorcycle riders are not prone to riding under the influence of alcohol, but when this is the case the crash risk is significantly increased, especially risk of fatality (Hurt et al. 1981; MAIDS 2004).

Rider behavior is a very complex variable which can be expressed via various actions while riding but even before riding (e.g. alcohol consumption) (Theofilatos and Yannis 2014). One of possible contributors to increasing of accident risk is a lifestyle. Majority of studies that associate lifestyle with health are based on conceptual framework of the 'problem-behavior theory', which supports the idea that people engaged in risky lifestyle are more predisposed to risky behaviors (including road traffic behaviors), and therefore to traffic accidents (Donovan et al. 1991; Jessor and Jessor 1977).

This conception has been extended by motor vehicles accidents (Beirness and Simpson 1991; Simpson and Beirness 1992). This extended theory considered that lifestyle factors directly influence the likelihood of crash involvement. This was confirmed in several studies which results suggest that lifestyle predicts drivers' risky behavior (Møller 2004; Chliaoutakis et al. 2005; Møller and Sigurðardóttir 2009) and greater involvement in traffic accidents (Simpson and Beirness 1992; Chliaoutakis et al. 1999).

Being a motorcyclist is associated to social context. Namely, three main reasons are primarily identified as underlying a person's decision to start riding: friends, family and a feeling that motorcyclists are a source of both romance and exhilaration (McDonald-Walker 2000). Today, motorcycling represents more than just a mode of motor transportation or sport. It is also leisure activity and numerous lifestyles have evolved around the use of motorcycles. Although mainly a solo activity, motorcycling can be very social and motorcyclists tend to have a strong sense of community with each other which is expressed in many idiosyncratic manners (Broughton and

Walker 2009; Pierson 2011). They often organize their own associations with the aim of organizing gathering, parties, sharing experiences, to protect their rights or to fight against the discrimination of motorcyclists.

The basic aim of the study is to determine how lifestyle dimensions of male motorcyclists influence the risky behavior of motorcyclists and their involvement in traffic accidents. The study is focused on male motorcyclists since they comprise the greater part of riding population and the frequently get injured in traffic accidents.

2. Method

2.1 Participants and procedure

The data for this study were collected by mail. The names and addresses of 300 male persons with valid driving licenses were obtained from a registry of motorcycle owners.

In Serbia, the Law on road traffic safety defines motorcycle as a motor vehicle with two or three asymmetrical wheels (with or without a side car, respectively) with the maximum possible speed higher than 45 km/h, regardless of the type of transmission, with the maximum engine operating capacity, if a vehicle has an internal combustion motor, exceeds 50 cm³, or with an engine whose maximum lasting nominal power exceeds 4 kW if the vehicle is electric-powered.

A set of research materials that contained the questionnaires and a cover letter that explained the purpose and objectives of the research was sent to each member of the aforementioned sample group. We also included a prepaid envelope that could be used to return the completed

questionnaires. We received 206 completed questionnaires. The demographic characteristics of the sample can be found in Table 1.

Insert Table 1 here

2.2 Measures

2.2.1 Demographics

The socio-demographic questionnaire consists of 4 items, as follows: age, data on one's riding experience and exposure (the amount of time one has possessed a driving license and the number of kilometers one ride in a year) and accident involvement during the previous 3 years.

2.2.2 Lifestyle

The Life Style Questionnaire was consisted of 41 items and was based on questionnaires used in some earlier research (Gregersen and Berg, 1994; Chliaoutakis et al., 1999). The items used in previous research were modified in order to be more appropriate for motorcyclists and Serbian culture, as well. The concept of lifestyle was measured by the frequency of the participation of respondents to various activities, e.g., going to a bar or to a cafeteria, doing sports, going to church, maintaining/repairing the motorcycle, exposure of aggression, going to a cultural manifestations etc. The responses ranged from 1 = never to 6 = always.

The means, standard deviations, skewness and kurtosis of the Life Style Questionnaire items are reported in Appendix 1.

2.2.3 Risk behavior

The Risk Behavior Scale included 15 items for measuring self-reported acts of risk-taking in traffic: speeding, tailgating, not stopping when the traffic light turned red, and so on (Rundmo

and Ulleberg, 2000; Ulleberg and Rundmo, 2003). The respondents were asked to indicate how often they participated in various occurring forms of risky riding. The responses were recorded on a 5-point Likert scale (1 = never, to 5 = very often).

The means, standard deviations, skewness and kurtosis of the Risk Behavior Scale items are reported in Appendix 2.

2.3 Statistical analysis

The Statistical Package for the Social Sciences (SPSS) version 22 was utilized in the analysis of the data. Initially, an exploratory factor analysis (EFA) using principal components extraction was undertaken to identify the best factor structure for Life Style Questionnaire and Risk Behavior Scale. The main steps performed during this statistical procedure are the following: (1) assessment of the suitability of the data for factor analysis; (2) factor extraction; (3) factor rotation and interpretation (for more details, see Tabachnick and Fidell 2007). Sampling adequacy and sphericity of the extraction was tested using the Kaiser-Meyer-Olkin (KMO), the recommended value is at least 0.6, and the Bartlett's test (presence of significance is recommended). Hair et al. (1998) recommended a minimum sample size of 5 observations per variable for an accurate EFA. Since the requirement of minimum sample size was met with 206 participants, the EFA was then conducted. Internal consistency of extracted factors was evaluated through Cronbach's alpha. An alpha coefficient of 0.7 or above is considered acceptable (Field 2005).

Relations between demographic variables, life style, risky behavior, and traffic accidents were examined using Spearman's rank correlation. In order to assess effect of life style on variables of

interest (traffic accidents and risky behavior), two sets of regression analyses were conducted. To predict the number of accidents binary logistic regression was used by recoding “number of accidents” variables in binary variables (the subjects with no accidents were recoded as “0”, and the subjects with one or more accidents were recoded as “1”). Hierarchical regression analyses were used for predicting rider`s risky behavior.

3. Results

3.1 Factor structure of Life Style Questionnaire and Risk Behavior Scale

The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett’s test of sphericity were used to examine the appropriateness of using EFA for Life Style Questionnaire. The KMO was 0.64 and Bartlett’s test of sphericity was significant (<0.001), suggesting that the data were appropriate to factor analysis. Therefore, EFA using Principal Component Extraction was performed on the forty-one lifestyle items. The factors were rotated using the varimax method, because correlations between factors in oblimin solution were small.

The criteria used to determine the number of factors were the Kaiser criterion of eigenvalues over 1.0, the Cattell Scree plot, parallel analysis, and the interpretability of factors. Initially, eleven factors had eigenvalues over 1.0. However, the Scree plot and parallel analysis suggested the eight-factor solution to be the most interpretable. The factor analysis was then rerun specifying eight factors. Eight sets of items with factor loadings >0.30 were then interpreted (Table 2).

The first factor is named “sports activity” and encompasses items relevant for doing and watching sports.

The second factor is named “motorcycle as a hobby” and its items are about activities such as maintaining motorcycle, reading the magazines and watching programs about motorcycles, as well as riding with friends.

The third factor is named “aggression” and encompasses items related to both general and riding aggression.

The fourth factor is related to cultural events (theatre, art manifestation, concerts etc.) and could be named “culture”.

The fifth factor (named “motorcycle addiction”) is related to extra motives riders could have while riding.

The sixth factor (named “alcohol and drugs”) encompasses items about using alcohol and drugs, as well as activities which might be accompanied with such behavior (going to the clubs, bars, parties).

The seventh factor (named “religiousness”) includes items about fasting and going to the church.

Finally, eighth factor (named “amusement”) includes items about spending time with friends and family. It should be noted that this factor is mostly about close relationships with family and friends and not about phenomenon of fun which characterizes young people.

Insert Table 2 here

The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett’s test of sphericity were used to examine the appropriateness of using exploratory factor analysis (EFA) for Risk

Behavior Scale. The KMO was 0.82 and Bartlett's test of sphericity was significant (<0.001), suggesting that the data were appropriate to factor analysis. Therefore, EFA using Principal Component Extraction was performed on the 15 risk behavior items. The factors were rotated using the varimax method, because correlations between factors in oblimin solution were small. The criteria used to determine the number of factors were the Kaiser criterion of eigenvalues over 1.0, the Cattell Scree plot, parallel analysis, and the interpretability of factors. Initially, four factors had eigenvalues over 1.0. However, the Scree plot and parallel analysis suggested the two-factor solution to be the most interpretable. The factor analysis was then rerun specifying two factors. Two sets of items with factor loadings >0.30 were then interpreted (Table 3). The first factor is named "Rule violations and speeding" and the second factor is named "Self-assertiveness".

Insert Table 3 here

3.2 Lifestyle as predictor of risk behavior and traffic accident

The associations among the demographic data, the life style, risky behavior and traffic accidents were analyzed using Spearman's rank correlation. The results are presented in Table 4.

Insert Table 4 here

The correlations that we obtained showed that age was positively correlated with Culture and Amusement, and negatively correlated with Sports activities, Religiousness, Self-assertiveness and Traffic accidents.

Life style variables such as Motorcycle as a hobby, Aggressiveness, Motorcycle addiction, and Alcohol and drugs were positively correlated with Rule violations and speeding. Similar relations we found with second factor of Risky behavior, i.e., Self-assertiveness, which was significantly positively correlated with Aggressiveness, Motorcycle addiction and Alcohol and drugs. Religiousness was negatively correlated with Rule violations and speeding, while Culture was negatively correlated with Self-assertiveness. Also, we can see that there were positive correlations between Aggressiveness, Motorcycle addiction and Using alcohol with traffic accidents. The Culture was negatively correlated with Traffic accidents.

To test the relationship between life style, risky behavior in traffic, and traffic accidents, we conducted two hierarchical and one binary logistic regression analyses, controlling for the effect of demographic variables.

In the first hierarchical regression analysis, the dependent variable was the Rule violations and Speeding. In the first block were entered demographic variables (age, driving experience, and annual mileage) and variables of life style were entered in the second block.

In the second hierarchical regression analysis, the dependent variable was the Self-assertiveness. In the first block were entered demographic variables (age, driving experience, and annual mileage) and variables of life style were entered in the second block.

In the third logistic regression analysis, the dependent variable was amount of traffic accidents. Demographic variables (age, driving experience, and annual mileage) were entered in the first

block and life style variables were entered in the second block. The results are presented in Table 5.

Insert Table 5 here

In first regression analyses, variables of life style explained additional 49% of variance in Rule violations and Speeding. In the final model, statistically significant contribution was made by Sports activity, Aggressiveness, Motorcycle addiction and Religiousness.

In the second regression analyses, variables of life style explained additional 40% of variance in Self-assertiveness. In the final model, statistically significant contribution was made by Sports activity, Motorcycle as a hobby, Aggressiveness, Culture, Motorcycle addiction, Alcohol and drugs and Religiousness.

In the third regression analyses, life style variables explained additional 24% (Nagelkerke R squared) of variance in traffic accidents. In the final model, statistically significant contribution was made by Culture, Motorcycle addiction and Alcohol and drugs.

4. Discussion

Motorcyclists belong to the most vulnerable category of road users, which does not have a significant impact on the occurrence of the traffic accidents but has an impact on the severity of the consequences. Serbia is among the countries where the use of motorcycles is small, but the number of fatalities is significant (about 10%) (WHO 2013; RTSA 2017). The situation is similar in the region. For example, according to the World Health Organization, the number of registered motorized 2- and 3- wheelers in 2013 compared to the total number of registered

vehicles was 1,43% in Romania, 1.74% in Bosnia and Herzegovina , 2% in Macedonia and 4,35% in Hungary (WHO 2015). On the other hand, the participation of riders of motorized 2- or 3-wheelers in the total number of people killed in traffic accidents was significantly higher: 5% in Romania, 9% in Bosnia and Herzegovina, 11% in Macedonia, and 14% in Hungary (WHO, 2015).

Compared to the number of research dealing with the drivers of passenger vehicle, only the small number of research has been devoted to the causes of motorcycle accidents. Although some of the results obtained in research of the behavior of the drivers of passenger vehicles could be applied to the behavior of motorcyclists, the riding of motorcycle is however specific and requires specific approach. This study may contribute to better understanding of the background of risky behavior and involving of motorcyclists in traffic accidents.

The main aim of this study was to investigate whether the lifestyle of motorcyclists is an important predictor of their riding behavior and involvement in traffic accidents on sample of adult men aged 18 to 68 years. Results show that there is a significant connection between lifestyle and risky behavior of the riders and traffic accidents. Namely, lifestyle predicts 49% of the variance of Rule violations and Speeding, 40% of the variance of Self-assertiveness and 24% of variance of Traffic accidents of motorcyclist. It seems that the phrase ‘man drives as he lives’ (Tillman and Hobbes 1949) is quite accurate when it comes to motorcyclists.

Considering lifestyle variables, motorcycle addiction showed to be the most significant predictor of the riders` risky behavior, and is also an important predictor of the traffic accidents.

Motorcycle addiction is a lifestyle variable that suggests that a person uses the motorcycle not as a means of transportation, but for other motives, such as relaxing, sensation seeking and standing out. Chliaoutakis et al. (2005) also found that the driving without a destination, which is

conceptually similar to our variable of motorcycle addiction, was related to making errors, ordinary or aggressive violations. These results are also in accordance with Nääätänen and Summala (1976) statement that the extra motives are the most important predictors of risky behavior.

Aggressiveness is also associated with riders' risky behavior (both factors). It seems that those motorcyclists who are generally prone to act aggressively transfer their behavior in traffic. Results are in accordance with the results of previous studies (e.g. Arnett et al. 1994; Lajunen and Parker 2001; Sümer 2003; Bina et al. 2006; King and Parker 2008), showing that emotions like anger and aggression may be a risk factors due to negative influence on decision making while driving.

Interestingly, involvement in sports is associated with risky behavior (both factors). It is possible that the 'athlete' is confident in his abilities of ably managing the motorcycle. Such riders can overestimate their abilities and therefore are more involved in risky riding and traffic accidents. In addition, it might be that athletes are accustomed to more dynamic life style, so they don't have enough patience to ride safe. Also, it might be that they are more sensation seeking oriented and have greater need for experiencing excitement and fun. It seems unusual that someone who is dedicated to healthy activities participates in risky riding; however, Chliaoutakis et al. (2005) obtained similar results showing that sports activity is an important predictor of committing intentional violation in drivers of a car.

Lifestyle variable Alcohol and drugs is not associated with Rule violations and Speeding, but is associated with Self-assertiveness and Traffic accident. This is an interesting result that shows that consumption of alcohol and substances is much more associated to risky behavior involving self-assertiveness behavior. This can be concluded on the basis of data that shows correlations

between Alcohol and drugs and Self-assertiveness are significantly greater than correlation with Rule violations and speeding. Alcohol and drugs also influence on increased traffic accidents involvement. As we have found, alcohol and drugs lead to certain risky behavior that can further lead to traffic accident. These results are consistent with other researches which have provided evidence that alcohol use remains a significant factor in road traffic accidents and can be considered as an important area for injury prevention efforts (e.g. Christophersen and Gjerde 2015; de Carvalho et al. 2016; Lin & Kraus 2009; Missoni et al. 2012). For example, 49% of motorcycle crash deaths in US police reports were related to alcohol use, in contrast to 26% of other motor-vehicle crash deaths (Villaveces et al. 2003). In addition, alcohol influences on rider's perception, time of reaction, concentration and other psychomotor abilities, diminution of which could be step forward to accident.

It also may be noted that the Culture is negatively correlated to Self-assertiveness and traffic accidents, and Religiousness to Rule violations and speeding. These results show that motorcyclists who have the sense of traditional, cultural and religious values are characterized by safe behavior in the traffic. These results have been quite expected and other studies have confirmed the connection between these variables and risky behavior in traffic (Chliaoutakis et al. 1999; Chliaoutakis et al. 2005; Gnardellis et al. 2008).

Although the research of the effect of lifestyle on risky behavior is mainly focused on young people, it seems that such research can be applied on elder population. Namely, our results showed the connection of lifestyle and risky behavior on the sample of motorcyclist aged 18 to 68 years. Møller and Sigurðardóttir (2009), also, concluded that regardless of age, driving style reflects more general aspects of the driver's lifestyle.

If results are more freely interpreted, two profiles of motorcyclists prone to risk in traffic could be determined. First profile includes riders whose ride is encouraged by extra motives (relaxation, entertainment, feeling of power, etc), they are generally aggressive and probably prone to alcohol consumption. Namely, all these variables are the important predictors of risky behavior or traffic accidents, and their mutual significant correlations are evident. The second type could be the athlete type who is probably prone to risk due to confidence in his own abilities and underestimation of risk.

5. Conclusion

To sum up, it seems that life style has an important influence on motorcyclists' behavior and traffic accidents involvement. Sports activities, motorcycle as a hobby, aggression, motorcycle addiction, and alcohol are significant life style aspects related to motorcyclists' taking risk in traffic. On the other hand, it seems that culture, religion and amusement could be protective factors. The obtained results are in accordance to 'problem-behavior theory'.

These results, also, could have important practical implications. The knowledge about motorcyclists' life style could help in the creation of population-specific public campaigns. It is not enough to target on specific risky behaviors if we know that such behaviors are part of wider life style concept. Preventive efforts could be aimed on promoting protective aspects of life style: taking care about close friendship, family, cultural and religious values; assertiveness instead of aggression; fun without substances, etc. Such programs could be supported with programs aimed on increasing consciousness about health compromising behaviors, anger management, etc.

Corrective courses need to encompass reduction of compromising behaviors and offering health and safe alternative.

Despite the attempt to conduct methodologically accurate research, this study has certain limitations. The main limitation is the sample which included only men so it limits the generalisability of the results to the whole population of riders. Furthermore, the data presented in this study were based on self-report techniques alone. Such a method of data collecting can lead to distortions in the data because of socially desirable responding. Although the subjects were ensured of the anonymity and confidentiality of their data, they may still have been wary to fully disclose personal information.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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Appendix 1. The means, standard deviations, skewness and kurtosis of the Life Style Questionnaire items

	M	SD	Skewness	Kurtosis
Concerned with sports	3,82	1,57	-0,14	-1,05
Doing physical exercises	3,93	1,48	-0,19	-0,96
Concerned with an individual sport	3,17	1,62	0,32	-1,01
Concerned with a joint sport	3,23	1,69	0,09	-1,23
Caring about the body	4,68	1,56	-0,93	-0,27
Going to a football (or other sport) match	2,65	1,58	0,64	-0,64
Not staying at home	3,57	1,39	-0,04	-0,75
Mending own motorcycle	4,23	1,79	-0,51	-1,12
Repairing own motorcycle	3,68	1,69	0,02	-1,16
Watching TV programs about motorcycles	4,12	1,57	-0,35	-0,98
Reading magazines about motorcycles	3,94	1,39	0,02	-1,01
Driving with friends	4,44	1,18	-0,37	-0,89
Clashing with enemies	2,49	1,45	1,02	0,29
Bullying	1,42	1,03	3,06	9,56
Doing illegal stuff	1,60	1,19	2,37	5,29
Punishing other people for several reasons	1,42	0,98	3,09	10,06
Getting annoyed while driving	3,35	1,27	0,42	-0,72
Doing indecent gestures/swearing at other drivers	3,13	1,56	0,46	-0,84
Going to the theatre/ cinema	3,10	1,46	0,20	-1,02
Going to the cultural and art events	2,69	1,47	0,65	-0,49
Reading literature	2,90	1,33	0,44	-0,56
Going to concerts	3,01	1,52	0,42	-0,79
Driving to feel powerful	2,33	1,59	0,94	-0,30
Driving to feel free	3,90	1,95	-0,38	-1,39

Driving to become (more) attractive	2,12	1,32	1,07	0,52
Driving to relax	4,32	1,68	-0,73	-0,72
Driving to express feelings/emotions	3,32	1,67	0,22	-1,11
Driving without a destination	3,37	1,54	0,23	-0,94
Everyday alcohol consumption	1,64	0,95	1,60	2,18
Alcohol consumption during the weekends	2,23	1,26	0,78	-0,23
Use of addictive substances	1,26	0,76	3,42	12,80
Going to a party	3,47	1,48	0,09	-0,83
Going to a club/bar	3,67	1,51	0,16	-1,00
Alcohol while enjoying oneself	1,43	0,99	3,49	13,25
Alcohol consumption before going out	1,17	0,46	2,83	7,44
Observe fast-days	2,45	1,51	1,07	0,38
Praying	2,27	1,45	1,05	0,16
Going to the church	3,02	1,40	0,44	-0,38
Visit friends and family	4,13	1,30	-0,18	-0,65
Amusement at home with relatives, friends, etc	3,94	1,23	-0,01	-0,56
Going to restaurants, taverns, etc.	3,68	1,47	0,05	-0,96

Appendix 2. The means, standard deviations, skewness and kurtosis of the Risk Behavior Scale items

Items	M	SD	Skewness	Kurtosis
Exceed the speed limit in build-up areas (more than 10 km/h)	3,48	1,21	-0,39	-0,81
Exceed the speed limit on country roads (more than 10 km/h)	3,86	1,16	-0,64	-0,73
Bend the traffic rules in order to get ahead in traffic	2,83	1,31	0,36	-1,02
Overtake the car in front when it is driving at the speed limit	3,06	1,21	0,17	-0,86
Ignore traffic rules to in order to get ahead in traffic	2,55	1,30	0,48	-0,87
Drive on a yellow light when it is about to turn red	2,67	1,30	0,45	-0,87
Drive too close to the car in front	2,19	1,23	0,91	-0,08
Break traffic rules because they are too complicated to follow	1,85	0,95	0,92	0,31
Drive fast to show others I can handle the car	1,30	0,61	2,01	3,25
Drive recklessly because others expect me to do it	1,42	0,74	1,69	2,03
Drive fast to show others that I am tough enough	1,35	0,76	2,66	7,48
Drive fast because the opposite sex enjoys it	1,73	1,18	1,54	1,25
Disregard red light on an empty road	1,39	0,82	2,46	6,05
Break traffic rules due to peer pressure	1,34	0,81	2,54	6,27
Drive the wrong way down a one-way street	1,52	0,88	2,04	4,26

Table 1. Demographic variables

<i>Age</i>	
Range	18-68
Mean (S.D.)	34.04 (11.48)
<i>Riding experience in years</i>	
Range	0-45
Mean (S.D.)	12.46 (11.32)
<i>Annual mileage in km</i>	
Range	500-50000
Mean (S.D.)	8873 (8008)
<i>Number of accidents</i>	
Range	0-6
Mean (S.D.)	0.86 (1.30)

Table 2. Factor pattern and loadings of 41 items of the Life Style Questionnaire using varimax rotation

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
<i>Sport activity</i>								
Concerned with sports	.902							
Doing physical exercises	.887							
Concerned with an individual sport	.737							
Concerned with a joint sport	.724							
Caring about the body	.558							
Going to a football (or other sport) match	.514							
Not staying at home	.356							
<i>Motorcycle as a hobby</i>								
Mending own motorcycle		.829						
Repairing own motorcycle		.795						
Watching TV programs about motorcycles		.647						
Reading magazines about motorcycles		.647						
Driving with friends		.633						
<i>Aggression</i>								
Clashing with enemies			.738					
Bullying			.708					
Doing illegal stuff			.608					
Punishing other people for several reasons			.564					
Getting annoyed while driving			.558					
Doing indecent gestures/swearing at other drivers			.486					
<i>Culture</i>								
Going to the theatre/ cinema				.794				

Going to the cultural and art events									.782
Reading literature									.767
Going to concerts									.746
<i>Motorcycle addiction</i>									
Driving to feel powerful									.823
Driving to feel free									.701
Driving to become (more) attractive									.655
Driving to relax									.589
Driving to express feelings/emotions									.444
Driving without a destination									.398
<i>Alcohol and drugs</i>									
Everyday alcohol consumption									.762
Alcohol consumption during the weekends									.677
Use of addictive substances									.563
Going to a party									.500
Going to a club/bar									.479
Alcohol while enjoying oneself									.459
Alcohol consumption before going out									.448
<i>Religiousness</i>									
Observe fast-days									.666
Praying									.619
Going to the church									.589
<i>Amusement</i>									
Visit friends and family									.760
Amusement at home with relatives, friends, etc									.698
Going to restaurants, taverns, etc.									.520
Eigenvalues	6.59	4.74	3.42	3.11	2.46	2.08	1.87	1.51	
Cronbach's alpha	0.82	0.82	0.77	0.83	0.77	0.75	0.65	0.64	

Variance (%)	16.08	11.56	8.34	7.59	6.01	5.08	4.56	3.68
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Note: Factor loadings below .30 were omitted for the sake of clarity.

Table 3. Factor pattern and loadings of 15 items of the Risk Behavior Scale using varimax rotation

	Factor 1	Factor 2
<i>Risk behaviour scale 1: Rule violations and Speeding</i>		
Exceed the speed limit in build-up areas (more than 10 km/h)	,873	
Exceed the speed limit on country roads (more than 10 km/h)	,856	
Bend the traffic rules in order to get ahead in traffic	,851	
Overtake the car in front when it is driving at the speed limit	,806	
Ignore traffic rules to in order to get ahead in traffic	,773	
Drive on a yellow light when it is about to turn red	,560	
Drive too close to the car in front	,544	
Break traffic rules because they are too complicated to follow	,314	
<i>Risk behaviour scale 2: Self-assertiveness</i>		
Drive fast to show others I can handle the car		,838
Drive recklessly because others expect me to do it		,824
Drive fast to show others that I am tough enough		,814
Drive fast because the opposite sex enjoys it		,772
Disregard red light on an empty road		,666
Break traffic rules due to peer pressure		,531
Drive the wrong way down a one-way street		,419
Eigenvalues	5.57	2.63

Cronbach's alpha	0.87	0.83
Variance (%)	37.15	17.55

Note: Factor loadings below .30 were omitted for the sake of clarity.

Table 4. The correlations among demographic characteristics, life style, risky behavior and traffic accidents

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	-													
2. Driving experience	,83**	-												
3. Annual mileage	,26**	,36**	-											
4. Sport activity	-,26**	-,22**	,03	-										
5. Mot. as a hobby	,01	,05	,30**	,19**	-									
6. Aggression	-,03	,12	,13	,03	,22**	-								
7. Culture	,37**	,38**	,08	,29**	,06	,03	-							
8. Mot. addiction	,02	-,05	,08	,12	,33**	,29**	-,01	-						
9. Alcohol and drugs	-,12	-,01	,28**	,13	,24**	,54**	,12	,30**	-					
10. Religiousness	-,15*	-,14*	-,20**	,36**	,10	-,07	,24**	,03	-,05	-				
11. Amusement	,15*	,06	,25**	,14*	,09	-,11	,22**	-,01	,17*	,10	-			
12. Rule violations	,15*	,09	,15*	,11	,23**	,32**	,02	,65**	,17*	-,22**	-,04	-		
13. Self-assertiveness	-,16*	-,23**	-,20**	,10	,11	,44**	-,16*	,47**	,31**	-,01	-,18*	,45**	-	
14. Traffic accident	-,18**	-,11	,14*	,11	,04	,24**	-,18*	,30**	,30**	-,08	-,13	,29**	,28**	-

Note: * $p < .05$, ** $p < .01$.

Table 5. Regression analyses for three dependent variables – Rule violations and speeding, Self-assertiveness and traffic accident

Variables	Rule violations		Self-assertiveness		Traffic accident	
	ΔR^2	β	ΔR^2	β	Nagelkerke ΔR^2	Wald test B (z-score)
Step 1	.04		.02		.09	
Age		.24		-.04		2,12
Driving experience		-.12		-.10		,06
Annual mileage		.13		-.03		5,83
Step 2	.49		.40		.24	
Sport activity		.19**		.20**		,04 1,63
Mot. as a hobby		-.02		.18**		-,06 3,00
Aggression		.18**		.26***		-,00 ,00
Culture		-.02		-.27***		-,12 7,43**
Mot. addiction		.61***		.30***		,13 18,14**
Alcohol and drugs		.09		.28***		,10 4,33*
Religiousness		-.24***		-.10		-,02 ,08
Amusement		-.04		-.14*		-,05 ,50
Total R ²	.53		.42		.33	

Note: * $p < .05$, ** $p < .01$, *** $p < .001$, ΔR^2 - Incremental increase in the model R² resulting from the addition of a predictor, or set of predictors, to the regression equation.