DOI: 10.7251/JTTTP2502115P
UDC: 656.1.08-053.81:612.776.1(497.11)
PROFESSIONAL PAPER

Behaviour of Young Drivers in Traffic in the Republic of Serbia

Miloš Pljakić
Prof. Dr Traffic Engineer, Faculty of Technical Sciences, Kosovska Mitrovica, Serbia, milos.pljakic@pr.ac.rs

Miloš Arsić
Prof. Dr Traffic Engineer, Faculty of Economics and Engineering Management, Novi Sad, Serbia, milos.arsic@fimek.edu.rs

Marina Leovac
Engineering Student, Faculty of Economics and Engineering Management, Novi Sad, Serbia, leoovac@gmail.com

Predrag Stanojević
Asst. Prof. Dr, Traffic Engineer, Faculty of Technical Sciences, Kosovska Mitrovica, Serbia, stanojevicpredrag@yahoo.com

Received: December 1, 2025
Accepted: December 18, 2025

Abstract: Young drivers represent one of the highest-risk categories of traffic participants. Characteristic of this group is the presence of specific behavioral patterns and attitudes that often do not comply with safety standards. The aim of this study is to analyze the behavior of young drivers in traffic in the Republic of Serbia. The data collection method was conducting a survey via an electronic questionnaire. The Behaviour of Young Novice Drivers Scale was used. The questionnaire contains 44 items grouped into five categories examining different aspects of risky behavior. The categories include transitional violations, fixed violations, misjudgment, exposure to risk, and the influence of driver mood. An additional 13 questions used for analysis examine demographic characteristics of the respondents, such as gender, age, type of driver's license, etc. The sample consisted of 404 respondents aged 17-30 years (M = 22.95), of both genders. The obtained data were processed using the SPSS statistical package. The research results indicate significant differences in the behavior of young drivers who possess a probationary driving license compared to those who possess a full driving license. Respondents with a full driving license exhibited a higher level of risky behavior in the subscales of transient violations and risk exposure, compared to respondents who possess a probationary driving license.
Key words: young drivers, behaviour, traffic safety.

INTRODUCTION

The participation of young people in traffic, particularly as drivers, raises numerous questions regarding their safety, driving habits, and responses in everyday traffic situations. This category includes drivers aged 15 to 30. A lack of driving experience, combined with personality traits such as a tendency towards risky behaviour, susceptibility to peer influence on driving style, and the need to prove oneself, as well as physiological and developmental characteristics, overestimation of driving abilities, and limited awareness of the consequences of their actions, makes young drivers an exceptionally vulnerable group. [1] [2]

The issue of young driver casualties is a global concern, and summarising data from a wide range of sources is essential for understanding the problem as a whole. According to the Road Safety Report published by the European Commission, young drivers account for 18–30% of all traffic fatalities. [3] The relative mortality rate for young people aged 15–17 is 1.3, and for those aged 18–24 it is 3 per million inhabitants. [3] Research from the Netherlands indicates that, out of every 10 young drivers who lose their lives, as many as 6 of their passengers also die, and more than 7 other road users are killed in the same traffic accidents. [1]

The Governors Highway Safety Association (GHSA) analysed data from the Fatality Analysis Reporting System (FARS) over a 20-year period to determine whether the rates of all fatal traffic crashes involving drivers, particularly fatal crashes among drivers aged 15–20, decreased from 2002 to 2021. Unlike older drivers (aged 21 and over), young drivers are nearly four times more likely to be involved in a fatal crash, even though they drive less. [2] In Serbia, during the period 2019–2021, with regard to the role in traffic accidents, young people were most at risk as drivers and passengers in passenger vehicles and motorcycles. Of all fatally injured motorcyclists, 54% were young, while of all fatally injured passenger vehicle occupants, 34% were young passengers, and 21% of drivers of passenger vehicles were young. [4] In 2022, the number

of fatally injured young people was 25.7% higher than in 2021, with the majority of fatalities (61.1%) and injuries (51.5%) occurring among drivers. [5] According to 2023 data, the number of young casualties decreased by 29.1% compared to 2022, with most fatalities (55.6%) and injuries (52.0%) occurring among drivers. [6]

The age range of 15–30 years is characterised by life-course dynamics that contribute to an increased risk of involvement in traffic accidents. Anatomical and developmental factors, including the incomplete maturation of the prefrontal cortex responsible for reasoning, self-control, risk assessment, and decision-making, influence changes in young drivers' behaviour, particularly in the mid-twenties, which falls within the domain of mental maturation and personality formation. [2] Consequently, the main factors contributing to traffic accidents evolve over time for each individual.

Gender differences are also evident, largely due to physiological characteristics. Research shows that male drivers aged 18–24 are three times more likely to be involved in fatal traffic accidents than female drivers. [7] These results reflect real-world traffic activity, however, it should be noted that male drivers participate more frequently as drivers of motor vehicles, and are proportionally more exposed to risks. [3] The influence of testosterone on male behaviour in this age group is crucial for understanding the behavioural patterns to which this group of drivers is prone. [1] Overall, 77% of all traffic fatalities involve male drivers. The percentage of fatalities is slightly lower among young people aged 15–17 (74%) and slightly higher among those aged 18–24 (82%). [3]

The first step in addressing this problem is identifying its causes, followed by an in-depth understanding. In the case of young drivers, understanding the causes of their behaviour, the origins of formed attitudes, and reasoning dynamics reveals a complex network of interconnected factors. In this study, in addition to the collected data on young drivers' everyday behaviour in traffic, which serves as key indicators of knowledge, awareness, and responsibility, the correlation between different behavioural patterns and the influence of demographic characteristics was also examined. Specifically, differences in behaviour between young drivers holding provisional licences and those holding full licences were investigated. This approach allows for the identification of young drivers' behaviour patterns based on self-reported actions. Understanding these patterns is a necessary condition for designing effective preventive measures that can significantly improve young driver safety and reduce the incidence of traffic accidents in this age group.

Identification of Young Drivers' Behaviour

Survey-based research represents a methodological approach that allows the examination of risky behaviours that increase the possibility of traffic accidents. Self-report instruments, such as the Driving Behaviour Questionnaire (DBQ), the Multidimensional Driving Style Inventory (MDSI), the Careless Driving Habits Scale, and the Behaviour of Young Novice Drivers Scale (BYNDS), have been applied among young drivers worldwide. [8]

Research on driver risk-taking behaviour led to the development of tools such as the DBQ, which is used to examine violations, errors, and lapses in driving. Although the DBQ was primarily developed for experienced and older drivers, it has occasionally been used in studies on young and novice drivers due to the lack of specific instruments. [9] The BYNDS was developed by Scott-Parker and colleagues in 2010 in Australia with the aim of providing a reliable and valid instrument for measuring risky behaviour specifically among young and novice drivers. [10]

Unlike the DBQ, which contains only three factors: errors, lapses, and violations, the BYNDS scale contains five factors: misjudgements (corresponding to the "errors" factor in the DBQ), transitional and fixed violations (both encompassed by a single factor in the DBQ), risk exposure (specific to young drivers), and driver mood. [9] The standardised BYNDS questionnaire has been validated and used to collect data on risky behaviour among young drivers in various countries, including Australia, New Zealand, and Colombia. [8]

Given that the BYNDS is one of the few instruments specifically designed to assess risky behaviour among young drivers and has already seen wide application in research, it was used as the primary instrument for assessment in this study.

METHODOLOGY

The data collection method involved conducting a survey via an electronic questionnaire. The Behaviour of Young Novice Drivers Scale [9] was used. The questionnaire contains 44 items, grouped into five categories examining different forms of risky behaviour. An additional 13 questions used for analysis investigate the demographic characteristics of the respondents, such as gender, age, type of driving licence, etc. The original version of the questionnaire was translated into Serbian and adapted to the specific characteristics of the area in which the research was conducted (e.g., driving on the right-hand lane is typical for Serbia, whereas the questionnaire assumes driving on the left-hand lane as the default model, etc.).

The BYNDS was developed out of the need for a tool specifically designed to measure self-reported behaviour of young novice drivers. The items in the original, and consequently in the revised BYNDS, were derived from the literature on traffic safety and Graduated Driver Licensing (GDL) restrictions. The original scale and its subscales demonstrated very high internal consistency. [10]

Measures

The Behaviour of Young Novice Drivers Scale, used to measure risky behaviour among young drivers, comprises five subscales within a total of 44 items. The subscales are:

- Transitional Violations (13 items; e.g., "You drove up to 10 km/h over the speed limit," or "You were talking on a mobile phone that you were holding in your hand").
- Fixed Violations (10 items; e.g., "You drove knowing that your blood alcohol level exceeded the legal limit," or "You did not use a seatbelt").
- Misjudgements (9 items; e.g., "You misjudged the speed of an oncoming vehicle when overtaking," or "You missed an exit or turn").
- Risk Exposure (9 items; e.g., "You drove at night," or "You drove while feeling fatigued").
- Driver Mood (3 items; e.g., "You drove fast when feeling in a bad mood," or "Your driving was influenced by negative emotions such as anger or frustration").

Respondents were asked to indicate how frequently they engaged in such behaviours. Responses were recorded on a five-point Likert scale ranging from 1 to 5 (1 – never, 5 – always). The respondents remained anonymous.

Statistical Data Analysis

The data obtained in this study were processed using the SPSS statistical package. The following procedures were applied:

- Descriptive statistics (frequencies, percentages, arithmetic mean, and standard deviation) were used to determine the degree of expression of variables in the sample.
- One-way analysis of covariance (ANCOVA) was employed to identify differences between young drivers holding a provisional driving licence and those holding a full driving licence.
- Chi-square test (test) was applied to identify risks in traffic accidents between drivers with a provisional licence and those with a full licence.
- Correlation analysis was conducted to determine the direction and strength of the relationships between variables.

Sample

The characteristics of the sample are presented in **Table 1**.

Table 1. Characteristics of the sample

Age	
Range (minimum – maximum)	17-30
Mean	22,95
Standard deviation	3,54
Gender	
Male (%)	227 (56,2)
Female (%)	177 (43,8)
Provisional driving licence	
Yes (%)	169 (41,8)
No (%)	235 (58,2)
Annual distance driven (km)	
Range (minimum – maximum)	0 – 100.000
Mean	12.444
Standard deviation	23.572
Traffic accidents in the past year	
Range (minimum – maximum)	0 - 3
Mean	0,08
Standard deviation	0,33
Risky situations in the past three months	
Range (minimum – maximum)	0 - 7
Mean	0,78
Standard deviation	1,27
Engine capacity of the vehicle	
Range (minimum – maximum)	900 – 3.500
Mean	1.506
Standard deviation	409

The sample comprised a total of 404 respondents, of whom 56.2% were male, thus constituting the majority. The age of the respondents ranged from 17 to 30 years. Most of the sample held a full driving licence (58.2%). Although the average annual distance driven was 12,444 km, the high standard deviation (23,572 km) indicates considerable variability among drivers, meaning that some respondents drove significantly more or less than the average. The mean number of traffic accidents in the past year was 0.08, showing that most respondents had not been involved in any accidents, with minimal deviation (standard deviation 0.33). On average, respondents reported 0.78 risky situations in the past three months, with a standard deviation of 1.27, indicating that such situations were generally rare, though some individuals experienced them more frequently. The mean engine capacity of the vehicles was 1,506 , with a standard deviation of 409 , reflecting moderate variability in engine size among the drivers.

RESULTS

The items within each factor of the scale were summed and comprised five subscales (transient violations, fixed violations, misjudgements, risk exposure, and driver mood). All subscales were reliable, demonstrating good internal consistency, with Cronbach's alpha ranging from 0.73 to 0.87.

Data from 2023 indicate that young people were most frequently involved in traffic accidents as drivers,

Table 2. Differences between young drivers holding a provisional driving licence and those holding a full driving licence

BYNDS	Provisional driving licence		Full driving licence		F(1, 400)	η^2
	M	SD	M	SD		
Transient violations	28.24	0.71	30.36	0.60	**5.01***	.012
Fixed violations	22.88	0.29	22.67	0.24	0.33	.001
Misjudgements	16.42	0.29	16.21	0.25	0.26	.001
Risk exposure	30.50	0.55	34.74	0.46	**33.83****	.078
Driver mood	5.74	0.22	6.05	0.19	1.19	.003

Means were adjusted for gender and mileage. M – mean, SD – standard deviation. *p < .05; **p < .001.

with the highest unique risk indicator (URI = 72.0) compared to other age categories of drivers, reflecting their high exposure to severe traffic outcomes. [6] The aim of the study was to determine the impact of holding a provisional driving licence on the behaviour of young drivers (Table 2). A comparison between young drivers with provisional licences and those with full driving licences was conducted using various driver behaviour patterns measured by the BYNDS scale.

Table 2 shows that, after adjusting for gender and mileage, there were significant differences between young drivers holding a provisional driving licence and those holding a full driving licence in transient violations and risk exposure. Specifically, drivers with a full driving licence engaged in transient violations to a greater extent (e.g., "Driving up to 10 km/h over the speed limit" or "Driving at high speed on poorly lit roads").

Furthermore, a chi-square test (test) – where individuals who had not been involved in traffic accidents and had not committed violations were coded as "0", and individuals who had been involved in one or more traffic accidents and had committed violations were coded as "1" – showed no significant differences in traffic accidents between young drivers with a provisional licence and those with a full licence ((1, N = 404) = 1.53, p = 0.22).

The relationship between age, annual mileage, vehicle engine capacity, violations, participation in risky situations, and traffic accidents among young drivers was examined using Pearson's linear correlation coefficient. The results are presented in Table 3.

The results from Table 3 indicate significant correlations between drivers' age, fixed violations, and risk exposure. Additionally, there is a significant correlation between annual mileage on one hand and transient violations, fixed violations, misjudgements, risk exposure, participation in risky situations, and traffic accidents on the other hand. A significant positive correlation was observed between driver mood and transitional violations, fixed violations, misjudgements, and risk exposure. A positive correlation was also found between vehicle engine capacity and transitional violations, fixed violations, risk exposure, and involvement in traffic accidents.

All these forms of risky behaviour among young drivers, as measured by the BYNDS subscales, positively correlate with participation in risky situations. There is a significant positive correlation between transitional violations, fixed violations, and risk exposure on the one hand, and involvement in traffic accidents on the other.

DISCUSSION

The results of this study showed a significant difference in the behaviour and attitudes of young drivers holding a provisional driving licence compared to those holding a full driving licence. In conclusion, participants with a full driving licence exhibited higher levels of risky behaviour in the subscales of transitional violations and risk exposure, compared to participants with a provisional licence. These results indicate that the provisional driving licence, as a mechanism of control and restriction, has an

Table 3. Correlation between age, annual mileage, engine capacity, violations, risky situations, and traffic accidents.

Variable	1	2	3	4	5	6	7	8	9	10
1. Age	-									
2. Annual mileage	.20**	-								
3. Engine capacity	.20**	.26**	-							
4. Transitional v.	.06	.20**	.28**	-						
5. Fixed v.	-.12*	.12*	.11*	.25**	-					
6. Misjudgements	-.01	-.11*	-.04	.10*	.20**	-				
7. Risk exposure	.15**	.22**	.21**	.53**	.19**	.04	-			
8. Driver mood	.05	.07	.06	.43**	.19**	.34**	.30**	-		
9. Risky situations	-.09	.10*	.07	.21**	.12*	.22**	.18**	.24**	-	
10. T. accidents	.02	.15**	.18**	.14**	.19**	-.04	.10*	.08	.08	-

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

extremely significant influence on the adoption of more responsible behavioural patterns during the early phase of acquiring driving experience. Upon transitioning to a full driving licence, these restrictions disappear, creating room for greater freedom, confidence, and lower discipline in driving behaviour.

Contrary to the differences observed across the subscales between these two categories of young drivers, the number of traffic accidents among them did not differ significantly. Given these data, it can be concluded that the presence of a provisional driving licence alone is not sufficient to reduce the number of traffic accidents, but it occupies a significant place within behavioural restriction mechanisms for young drivers and effectively reduces levels of risky behaviour among them, which may have a preventive effect in the long term.

Correlation analysis demonstrated significant associations between factors such as driver age, the number of kilometres driven, and engine capacity with various forms of risky behaviour and involvement in traffic accidents. The impact of age can be explained by the fact that the sample includes only young drivers (aged 17 to 30), among whom older participants tend to drive more independently and intensively, which may lead to a greater propensity for risky behaviour.

A higher number of kilometres driven means more time spent in traffic, but it may also lead to increased confidence or even an irrational assessment of one's driving skills. Additionally, young drivers operating vehicles with larger engine capacities during the early phase of driving experience, according to the data, are more prone to risky behaviour. Vehicles with larger engine capacities, and therefore higher power, allow for greater acceleration in a shorter period, which in young drivers can provoke a tendency towards aggressive and/or negligent driving behaviour.

The data also indicate that driver mood has a positive correlation with transitional violations, fixed violations, misjudgements, and risk exposure. This confirms that driving safety is influenced by psychological factors, not solely by technical vehicle-handling skills, which in itself is challenging for drivers in the early stages of driving experience. The category of young drivers is particularly emotionally sensitive and more prone to mood changes compared to other categories. Driving under the influence of negative emotions (e.g., borderline anger) induces a tendency to exceed the maximum permitted speed, while intense positive emotions (e.g., borderline euphoria) provoke the need for sensation-seeking while driving.

CONCLUSION

The original BYNDS scale contains five factors, while some previous studies, using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), have allocated the items into six or seven factors, showing variability in the factor structure across different samples and contexts. Although the sample in this study and previous research have a different number of factors, correlations between relevant factors show similar patterns, indicating consistency in the relationships of risky behaviour among young drivers.

A study conducted in Lithuania [11] on a sample of young drivers showed that, although the factor structure is different, correlations between the "Exposure to Risk" factor and the "Transitional Violations", "Misjudgements" and "Driver Mood" factors reflect similar patterns as in the sample of this study. A moderate correlation between the "Driver Mood" and "Exposure to Risk" factors is observed in both samples, indicating that negative emotions affect risky behaviour similarly across different cultural contexts. The "Misjudgements" and "Exposure to Risk" factors in both samples show a weak correlation, which also confirms a consistent pattern of behaviour. [11]

Comparing the results of research whose factor structure matched the structure of this study [9], a recurring pattern of correlations between factors is observed. The correlation with the highest value between the "Transitional Violations" and "Exposure to Risk" factors corresponds to the results of previous research. Additionally, a strong correlation is observed between transitional violations and driver mood, confirming the interrelation of these aspects of risky behaviour and indicating that the emotional state of the driver can be a significant predictor of transitional violations while driving. The type of driving licence has a significant correlation with the "Exposure to Risk" factor, which corresponds to the results of this study and indicates that young drivers with a full driving licence are more exposed to risks while driving. [9]

Limitations

Although the study included a relatively large number of participants, existing limitations should also be considered. Primarily, the results rely on participants' self-assessment, which carries the risk of poor self-evaluation and idealisation of responses. Participants were selected via the internet, which may lead to response bias (e.g., more precise answers from those particularly interested in the topic). Considering the shortcomings of this study, it would be highly valuable to also take into account objective data sources, such as police reports and data on actual driving behaviour obtained through continuous monitoring. Tracking young drivers over a specific period could provide detailed insight into the further development of driving habits after obtaining a full driving licence.

REFERENCES

[1] OECD, "Young Drivers: The Road to Safety," in *European Conference of Ministers of Transport*, 2006.

[2] GHSA, "Young drivers and traffic fatalities: 20 years of progress on the road to zero," Governors Highway Safety Association, Washington, DC, 2023.

[3] European Commission, "Facts and figures young people," European Road Safety Observatory, Directorate General for Transport, Brussels, 2021.

[4] АБС, "Прегледни извештај, Безбедност младих учесника (15-30 година) у саобраћају,» Агенција за безбедност саобраћаја, 2022.

[5] АБС, "Статистички извештај о стању безбедности саобраћаја у Републици Србији 2022," Агенција за безбедност саобраћаја, 2022.

[6] АБС, "Статистички извештај о безбедности саобраћаја у Републици Србији 2023," Агенција за безбедност саобраћаја, 2023.

[7] World Health Organization, "Youth and road safety," World Health Organization, 2007.

[8] Bride Scott Parker, Oscar Oviedo-Trespalacios, "Transcultural validation and reliability of the Spanish version of the behaviour of young novice drivers scale (BYNDS) in a Colombian young driver population," *Transportation Research Part F,* pp. 188-204, 2017.

[9] Scott-Parker et al., "The risky behaviour of young drivers : developing a measurement tool," in *20th Canadian Multidisciplinary Road Safety Conference*, Hilton Niagara Falls, Ontario, 2010.

[10] Scott Parker et al., "Confirmatory factor analysis of the Behaviour of Young Novice Drivers Scale (BYNDS)," *Accident Analysis and Prevention,* vol. 49, pp. 385-391, 2012.

[11] L. Šeibokaite˙ et al. , "The self-reported driving behaviour of young drivers in Lithuania: An application of the behaviour of young novice drivers scale – Lithuania (BYNDS-Li)," *Transportation Research Part F,* pp. 311-323, 2020.