

Psychophysiological and psychological characteristics of young drivers

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Abstract. The empirical analysis of the psycho-physiological and psychological qualities of young drivers was carried out. 49 students of Yelabuga Institute of Kazan (Volga Region) Federal University aged 18 to 24 were asked to take part in the research. During analysis such personal traits as strength of the nervous system, the lability of the nervous system; precision reaction to a moving object; development of eye estimation, psychological and emotional stability, the stability of psychomotor activity in an extreme situation, propensity to risk, self-regulation of mental and emotional state were identified as characteristics and problems specific to young drivers.

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Introduction

In modern Russia improvement of standard of life has increased the number of automobiles on the roads. This fact has brought such problems as growth of extreme situations in city driving mode, low awareness of drivers about their psycho-physiological and psychological capabilities, affecting both the underestimation and reevaluation abilities of driving safely.

The problem of reliability of a driver is fundamental in the system of measures aimed at the prevention of traffic accidents, the number of which is increasing every year in Russia. Despite government efforts to disciplining road users through such measures as: enhancing penalties for traffic violations; toughening penalties for drunk driving; increasing hours to prepare candidates for drivers; introducing enhanced control of the State Traffic Safety on the road and improving the quality of roads, encouraging people to buy modern safe vehicles through recycling programs dilapidated cars. The death toll on the roads of Russia compared to the previous year has increased from 1214 to 24380 people.

Studying the causes of road accidents given in the statistics shows that most of these reasons are in so called "human factor." Many researchers such as Kenna, F.P. [1], Miller, D. [2], Park, K.S. [3], Bellamy, L.J. [4], Kotick, M.A., A.M. Yemelynov [5], Kozlov, E.V. [6] studied the problem of human factor's influence on the work of an operator.

However in modern usage the term "human factor" has become too blurred to cover range of psychological and social consequences, which are expressed in an operator's error, reducing his or her reliability. Physiological and mental qualities of a driver are foundation of his or her reliability. In their

works of the nature of the human operator's error M.A. Kotick and A.M. Emelyanov underline four professional important qualities: the strength of the nervous system, emotional stability, sensor motor coordination, attention indicators. According to these authors the absence of any of these qualities is a testament to the unsuitability of the person as a driver [5].

The questions of the structure of reliability in extreme situations of a driver were also considered in YA Tsagarelli's works who established a systematic approach to psychological diagnosis and correction by means of apparatus-programme complex "Aktivatsiometr" [7].

In their research these authors studied professional drivers, as key participants in traffic. However, the current reality shows that the number of motorists is increasing in arithmetic progression on the roads every year. You can draw a clear relationship between the increasing number of motorists on the roads and the number of accidents.

The main share of mistakes of drivers, as practice shows, is connected with the psychological aspects of their activities that require additional study of psycho physiological and psychological qualities that motorists need for safe traffic.

Nowadays in preparing drivers of category "B" physiological and psychological quality of future drivers are not considered for safe operation of the vehicle in extreme situations [6].

The main goal of our psychological research consists in studying of psychophysiological and mental qualities of young drivers. The research of above-mentioned qualities of young drivers was conducted in Yelabuga's Institute of Kazan (Volga Region) Federal University. Students of 1 - 4 courses at the age of 18 - 24 with the experience of 1 to 4

years took part in the experiment. The number of respondents was 49 people (27 men and 23 women).

The diagnosis of drivers was performed using the system of psychological diagnosis developed by YA Tsagarelli with the help of the instrument Aktivatsiometr - 9.

We investigated the following physiological and psychological qualities: strength of the nervous system, lability of the nervous system, precise reaction to a moving object, development of eye estimation, psycho-emotional stability, stability psychomotor activity in an extreme situation, propensity to risk, self-regulation of mental and emotional state.

The results of the research were as following. Only 12 people out of 49 have strong nervous system, which is only 25 % of the participants. M.A. Kotick and A.M. Emelyanov pointed out that for a reliable driving of the car a person must have a strong type of nervous system [5]. This innate component is used to denote the endurance and performance of nerve cells. Our research has only confirmed the fact that in today's world less people are born with strong nervous system [8]. Thus, young people with a weak nervous system can be referred to the risk group of road users.

The individual lability of the nervous system was selected as the next investigated quality. In modern psychology, it is understood as a functional mobility of the nervous system at the level of neurons and neural circuits. It characterizes the rate of speed and cessation of neural processes. Lability and its sustainability were subjects of interpretation.

Distribution of the respondents was as following: 11 people have a high level of lability of the nervous system, 13 people have an average level, 25 people possess a low level. From the data it is clear that high and average lability have 49% of respondents and 51% have a low level. It can be assumed that it is quite difficult to drive a car for individuals with low lability in extreme situations, which are often found in city traffic management regime [9], [10].

Studying the accuracy of reaction to a moving object it was found 100% accuracy of the reaction of the whole sample. This can be explained by the age of respondents. According to this indicator reliability of young drivers is at a high level. According to Y. Tsagarelli this quality weakens when a person becomes older [7].

After studies of development of eye estimation, as one of the necessary mental qualities of reliability in extreme driving situations, it was revealed that 39 respondents observed a high level, representing 79.6% of the sample. 10 respondents (20.4%) showed an average level. Indicators of

development of eye estimation which are below average were not shown by young drivers. So the reliability of young drivers is normal.

Diagnosing psycho-emotional stability of young drivers, we obtained the following results: 41 respondents (83.7%) possess the high psycho-emotional stability characteristics, five respondents (10.2%) have an average psycho-emotional stability, and three respondents have the lowest one (6.1%). It indicates that young drivers have a substantially stable emotional state, which is necessary for safe driving.

Stability of psychomotor activity in an extreme situation is one of the important factors in the psychic structure reliability of drivers. This concept is collective from the point of view of mentally adjustable motor actions providing search and operational activity of the driver in extreme situations. The results were as following: 38 people (77.6 %) have a high psychomotor reliability have, 9 people (18.4%) have shown an average level and 2 persons (4.1%) have a low level. In general, young drivers possess a stable psychomotor activity, indicating that their psychomotor reliability in extreme situations on the roads.

Maturity of the psycho-physiological and psychological characteristics of young drivers help to judge that the optimal level of the lability of the nervous system, precise reaction to a moving object, the development of eye, psychological and emotional stability, the stability of psychomotor activity in an emergency situation allows young drivers (with the best level of health compared to older age groups of drivers) have reliability in extreme situations. They need to take into account, first of all, the weakness of the nervous system that can cause decrease in reliability of a driver.

Due to the specificity of age characteristics it is typical for young people to have a high risk tolerance, ambition, perfectionism. All these things reflect the low culture of young drivers' behavior. These factors are supported by the results of the research. 41 respondents (83.7%) have a high level of risk, 4 respondents (8.2%) have an average level, and 4 respondents (8.2%) have a low level of risk.

Ability to self-regulation allows an individual to control the parameters of his or her functioning: behavior, activity, interaction with others. That is, despite the disadvantages of developing of any psychological quality, which is necessary for reliable control of the car, the driver is able to mobilize his or her resources for safe driving in extreme situations for the required period of time.

After diagnosing an indicator of formation of self-regulation in young drivers there were the following results: 11 respondents (22.4%) possess a

high level, three respondents (6.2%) have an average level, 35 respondents (71.4%) have a low level.

Described personality traits of young drivers show their readiness for risk, low maturity of self-regulation. We can assume that this is due to social immaturity of young drivers and maximalism, the desire for adrenaline during extreme driving.

One of the objectives of our study was to identify the differences of psychophysiological and psychological qualities between men and women. The significance of differences was tested in calculations of the statistical analysis of program SPSS 11.5 for Windows using Student's test.

Statistically significant differences at the level of $p < 0.05$ were found only in the reaction to a moving object. Men react better. The remaining parameters do not have statistically significant differences.

Summing up the result of our research, we can draw the following conclusions: firstly, the reliability problems of young drivers associated with the peculiarities of their psycho-physiological and psychological qualities: strength of the nervous system, the lability of the nervous system; propensity to risk, self-regulation of mental and emotional state. All these qualities should be diagnosed and then recommendations can be given to future drivers. Secondly, psychological diagnostics system can prevent accidents on roads and reduce risks of all participants of traffic.

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