

Fatal Road Accident Causer's Driving Aptitude in Hungary

A. Juhász, M. Fogarasi

Abstract—Those causing fatal traffic accidents are traumatized, which negatively influences their cognitive functions and their personality. In order to clarify how much the trauma of causing a fatal accident affects their driving skills and personality traits, the results of a psychological aptitude and a personality test of drivers carelessly causing fatal accidents and of drivers not causing any accidents were compared separately. The sample ($N = 354$) consists of randomly selected drivers from the Transportation Aptitude and Examination Centre database who caused fatal accidents (Fatal group, $n = 177$) or did not cause accidents (Control group, $n = 177$). The aptitude tests were taken between 2014 and 2019. The comparison of the 2 groups was done according to 3 aspects: 1. Categories of aptitude (suitable, restricted, unsuitable); 2. Categories of causes (ability, personality, ability and personality) within the restricted or unsuitable (altogether: non-suitable subgroups); 3. Categories of ability and personality within the non-suitable subgroups regardless of the cause-category. Within ability deficiency, the two groups include those, whose ability factor is impaired or limited. This is also true in case of personality failure. Compared to the control group, the number of restricted drivers causing fatal accidents is significantly higher ($p < .000$) and the number of unsuitable drivers is higher on a tendency-level ($p = .06$). Compared to the control group in the fatal non-suitable subgroup, the ratio of restricted suitability and the unsuitability due to ability factors is exclusively significantly lower ($p < .000$). The restricted suitability and the unsuitability due to personality factors are more significant in the fatal non-suitable subgroup ($p < .000$). Incapacity due to combination of ability and personality is also significantly higher in the fatal group ($p = .002$). Compared to the control group both ability and personality factors are also significantly higher in the fatal non-suitable subgroup ($p < .000$). Overall, the control group is more eligible for driving than drivers who have caused fatalities. The ability and personality factors are significantly higher in the case of fatal accident causers who are non-suitable for driving. Moreover the concomitance of ability and personality factors occur almost exclusively to drivers who caused fatal accidents. Further investigation is needed to understand the causes and how the aptitude test results for the fatal group could improve over time.

Keywords—Aptitude, unsuitable, fatal accident, ability, personality.

I. INTRODUCTION

PSYCHOLOGICAL examinations can reveal the mental and psychological health of those driving, and the screening of those whose involvement in road transport would pose a high accident risk [1]. Furthermore, it is a goal to keep

those drivers off the roads, who are not prepared mentally or physically to show correct driving behaviour, thereby endangering road safety.

Driving safely requires a variety of skills as well as an appropriate level of personality and attitude. This issue is particularly true concerning those who are suspects or those already found guilty of fatal accidents. It is the responsibility of psychologists to determine whether the person allegedly causing the fatal accident is fit to drive or not.

II. BACKGROUND

A. Psychological Aptitude Test for Drivers

In Hungary, a government decree (326/2011, XII.28) was enacted in 2011 that a mandatory psychological aptitude test needs to be taken by anyone suspected of causing a fatal road traffic accident.

Driver's classifications according to the results of the test:

- Suitable for an indefinite period of time.
- Suitable for specified (1-5 years) time period. In this case, either the person under investigation accepts the decision or appeals or may bring an action for judicial review.
- Not suitable. If the person accepts the decision, it may initiate a new examination in the same or higher career competence category after the date indicated in the decision. Anyone in a lower and higher category can apply for a retest at any time. If they do not accept the decision, they can also appeal or bring an action.

If a person is not qualified or is qualified for a limited period of time, the reasons are given in the decision [22].

B. Effect of Trauma on Psychodynamic Processes and Abilities

Traffic accidents are also among those traumatic events that are the most intense sources of stress because they occur unpredictably [2]. Individuals surrounding the driver who caused a traffic accident have an important role in helping the processing. Vágnerová et al. [3] have shown that if the victim can handle their situation realistically, it will not significantly affect their personality structure.

Research [4] has shown that post-traumatic anxiety and depression have usually decline after 12 months. During the post-treatment period, one tenth of the patients developed post-traumatic stress disorder (PTSD). Besides that, later on mood disorders developed. No prior neurotic attitudes were associated, besides the traumatic memory of the accident. In addition generally phobic travel anxiety occurred either as a driver or as a passenger.

Examining people with PTSD using CPI and Big Five tests

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it was found that not only the well-being (Wb) factor, as one of the most prominent factors in traumatic exposure, was strongly correlated with neuroticism (-0.45), but other factors like good impression (Gi; -0.48) and independence (In; -0.42) also. Besides this, self-control (Sc), which indicates traumatic stress symptoms, is also correlated (-0.37) with neuroticism [5].

Trauma processing can rarely be completed in less than a year, as court proceedings and testimonies intensify the feelings caused by the trauma. Survivors of motorcycle accidents have experienced this also [6]. The legal process strongly affects the appearance of symptoms. More specifically, many believe that litigation is the driving force behind PTSD.

Tranah and Farmer [7] found that 30-40% of London's underground drivers involved in fatal accidents were still suffering from stress one month after the accident, but a year later their symptoms decreased significantly.

Intensive symptoms generally abate within 1 to 3 months in those not developing PTSD. Regardless of the duration, trauma is considered to be processed if all the characteristics of adaptation unitedly exist, meaning, that the individual living with his or her memories is able to adaptively continue his or her life [8]. On the other hand among those diagnosed with PTSD there is a clear decline in the speed of attention and information processing [9]. The slow processing speed is due to the fact that cognitive efforts are directed towards coping with psychological distress [10]. PTSD symptoms correlate with persistent and selective attention deficits [11]. Esterman et al. [12] report that traumatized individuals show a significant decrease in the ability of resisting distractions. Gilbertson et al. [13] hypothesize that attention disorder leads to dysfunctional coding functions. The results regarding the relationship between auditor attention and working memory are less convincing. It is not clear if the problematic functions of attention and of the working memory are caused by the difficulty of excluding external (e.g., sounds) or internal (e.g., emotions) distractors. Furthermore the development of PTSD also impairs the efficient functioning of executive functions [14]. Especially in the field of inhibitory processes, malfunctioning has been shown. The inhibition of automatic or inadequate responses is hindered [15]. Maladaptive functions also appear in switching tasks, in cognitive flexibility, and in working memory, but to a lesser extent than in inhibitory functions [16]. High arousal level and flash back symptoms can act as distractions when trying to focus on a particular task, as they interfere with working memory, attention, and inhibitory functions. Furthermore, it is also possible that primary inhibitory dysfunctions not only impair performance in cognitive tasks but also prevent the suppression of emotional memory [17].

Overall when the psychodynamic characteristics are disturbed, they can influence the personality traits needed for driving. In some people trauma leads to the development of PTSD. In their case, some of the abilities essential for driving are impaired, like attention functions, information processing and executive functions. Therefore, we expect poorer

personality and ability scores among those who caused fatal accidents.

This study compares the results of psychological aptitude testing of drivers accused of carelessly causing a fatal accident and of drivers not causing any accidents revealing the underlying causes of incompetence. Data obtained can help us see how trauma affects the personality and ability factors required for driving.

III. METHODS

A. Sample

The sample (N = 354) consists of randomly selected drivers causing road fatalities (Fatal group, n = 177) and of those not causing any accidents (Control group, n = 177) selected from the Transport Aptitude and Examination Centre database, who passed the Aptitude test between 2014 and 2019.

The average age of drivers causing fatal accidents is 42.5 years; standard deviation is 13.31. The youngest participant is 21 and the oldest is 73 years old.

The average age of drivers who did not cause an accident is 35.1 years, standard deviation is 9.74. The youngest driver is 19 years old, while the oldest is 63.

Protocol-compliant tools were used to collect data and information about abilities and personality factors.

B. Ability Tests

Tests were carried out using the ART2020 technique, developed by experts from the Austrian Road Safety Council (see Table I).

TABLE I
CAPABILITY TESTS

Measuring instruments	Abilities and skills
Proximity-specific tachistoscope (TT15)	traffic overview ability, peripheral detection
Reactive load tester (RST3)	performance under pressure, reaction ability
Conflict meter	decision ability
Sensometer	sensorimotor coordination

The advantage of computerized laboratory psychological driving tests lies in standardization, rapid data processing and data storage. However, the question arises whether, in the experimental situation, people behave in the same way as on the road, or whether they are driven by a desire to comply. They feel safe, because there can be no accidents or collisions. The creators of ART2020 [18] scored the driving performance of drivers in traffic, then took them into the test position and left only those tasks in the test series that correlated with driving in traffic.

C. Personality Tests

People with poor abilities are more careful on the road. The well-able are looking for challenges to suit their abilities [19]. Zuckerman [quoted by Hole, 20] believes that searching for sensory experience can result in a higher level of risk-taking and riskier behavior.

TABLE II
PERSONALITY TESTS

Measuring instruments	Personality factors
Transport-specific test (VPT.2)	driving style
Self-specific test (CPI)	general personality factors

A face-to-face conversation with a psychologist, known as exploration, was conducted about the following topics: jobs, education and training, driving history, family and health status, lifestyle, hobby, criminal record. The details of the accident were shared by the driver, which was compared with the police report, witness statements and with the results of the two personality questionnaires.

Data Analysis

The comparison of the two groups (Fatal group and Control Group) was done according to 3 aspects:

1. Categories of aptitude (suitable, restricted, unsuited).
2. Categories of causes (ability, personality, ability and personality) between the suitable and the restricted or unsuited (together called: non-suitable) subgroups.
3. Categories of ability and personality within the non-suitable subgroups regardless of the cause-category.

Within ability deficiency, the two groups include those, whose ability factor is impaired or limited. This is also true in case of personality failure.

For pair comparisons Chi square and Fischer exact tests were used.

IV. RESULTS

In the fatal group compared to the control group, there was a significantly higher proportion of drivers with restricted ability to drive ($\chi^2 = 17.54$, $p < .000$) and a higher proportion of unsuitable drivers ($\chi^2 = 3.54$, $p = .06$, see Fig. 1).

Aptitude	Fatal group	Control group
suitable	99	140
restricted	61	29
unsuited	17	8

Fig. 1 Number and qualification of drivers

Compared to the control group, the proportion of those in the fatal group who received restricted or unsuited qualification due to ability factors alone was significantly lower ($\chi^2 = 181.72$, $p < .000$). On the other hand restricted or unsuited aptitude due to personality factors alone is significantly higher ($p < .000$) in the fatal group, than in the control group.

Causes	Fatal group	Control group
Ability	12	35
Personality	45	1
Ability and personality	21	1

Fig. 2 Number of non-suitable drivers and causes

The combination of ability and personality factors is also

significantly higher ($p = .002$, see Fig. 2) within the unsuited Fatal group drivers compared to the Control group.

Compared to the control group, both ability and personality factors were significantly higher in the non-suitable subgroup ($p < .000$, see Fig. 2).

V. DISCUSSION

The control group is better suited to driving than the fatal group.

In the fatal group both personality and ability factors were found to be significantly more frequent causing drivers to be restricted or unsuited compared to the control group. So much so that the combined ability and personality deficits occurred almost exclusively in those who caused fatal accidents.

Based on these results, aptitude tests done during the on-going trial show that the effects of the traumatic experience appear to have a decisive influence on the psychodynamic process of the individuals involved, that is, on their relevant personality characteristics as well as on their cognitive abilities.

Further investigation is needed to understand the causes and how the aptitude test results for the fatal group could improve over time. According to our assumption, after trauma processing, the controlled personality and ability variables of the fatal group would not deviate from the control group.

VI. CONCLUSION

"Think Global, Act Local!" campaign is very apt for road safety. In fact, everyone can do something to prevent traffic accidents. The members of the Association of Transport Sciences intend to take steps to promote the common goal through the dissemination of transport science publications, specialized journals and events. They want to put their dedication in the service of increasing road safety. They are confident that they will find cooperative partners in their efforts, both in the civil and governmental spheres and in society at large both in Hungary and throughout Europe [21].

It is the responsibility of work and organizational psychologists to determine who is allowed on the roads, whether they are fit for driving, and whether their abilities and personality characteristics are appropriate. This is especially true for those that have already had a fatal accident.

It should be kept in mind that there may be negative conditions of behaviour, such as excessive risk-taking or responsiveness, lack of responsibility, too low a level of reactivity, or increased response time, etc., which, even if the individual is not rendered permanently unfit for driving, it would be better to filter out before granting their driving permit to avoid any possible accidents. Such individuals may pose a potentially serious threat to the social community. Decisions on the existence of adequate abilities could be made in a secondary examination. With this the need for an Aptitude test after an accident could be avoided, since, as the results show, not everyone is able to drive safely despite of their driving experience. Presently, driving disability is not revealed until a serious violation. Furthermore more follow-up research

is needed to determine the ability of those causing fatal accidents to reintegrate, and if they are able to cope with the traumatic event and its legal consequences.

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