

University of Public Service
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Thesis summary of doctoral dissertation

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**The driving abilities of traumatized drivers due to causing road accidents with respect
to the passage of time**

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Conceptualising the scientific problem

Ascertaining the capabilities of those who caused fatal accidents is a natural, self-evident question. Evaluating the abilities and personality of those who caused fatal accidents has long been a challenge. Their results can only be compared with those who did not cause fatal traffic accidents. Individual differences can result in serious differences even within a group of people who caused fatal accidents. It is of great importance to assess and prove whether causing an accident induces a significant difference in abilities and personality.

The driving assessment – in the absence of pre-accident results – is basically about the present and the future. It is important to find out what effect causing a fatal accident has on the driver's abilities and personality, taking into account the time that has passed since the event. If those who bring about fatal accidents show an inevitable, irreversible decline in performance and personality, denying them the right to drive is in the interest of traffic safety. After the traumatic event, the reaction to it will differ from person to person. The development of serious symptoms is determined by how the person interprets the event itself (in this case, the fatal accident), its circumstances, and their own responses. Some may even develop depression as a response. Over time, however, the severity of the symptoms may decrease, for which no quantitative measuring device has been used in the field of road safety tests. I made an attempt to verify whether I would find similar results during the road safety test to those published in therapeutic research in clinical settings by including two questionnaires (Posttraumatic Stress Disorder Diagnostic Scale, Beck Depression Questionnaire) and the analysis of text elements which the participants wrote.

The traumatic experience at the time of the road safety test, in the phase when the court proceedings are still ongoing, affects the psychodynamic process of those involved, i.e. the relevant characteristics of the personality, as well as the cognitive abilities. Reactions triggered by traumatic events, such as a fatal road accident, are classified into three major categories.

1. In the first phase, there is an immediate acute stress reaction accompanied by psychophysiological changes. The individual develops a state of readiness that lasts up to one month after the trauma. This is where the "fight or flight" reaction appears.¹ The individual reacts to the situation with defensive aggression or with disengagement. The acute stress reaction is influenced by the individual's vulnerability.²
2. Long-term effects of traumatic distress - post-traumatic stress reactions. The integrated functioning of the mind is endangered by the fact that there is a psychological reaction in

¹ Fonyó (2011)

² Kiss, & Makó (2015)

the long term, for example with persistent memory intrusions, which results in a continuous state of readiness.³ Consciousness basically provides the experience of the continuity of existence, however, the traumatic experience breaks this and control efforts become dysfunctional. The presence of stimuli considered threatening becomes constant and the stress reaction remains as an adequate response.

3. The evaluation of the trauma as an unrealistic event appears, and the post-traumatic stress disorder (hereinafter PTSD) develops.⁴ People diagnosed with PTSD have an acute stress reaction (hit or run reaction), which leads to an acute stress disorder. If there are no protective and supportive factors around individuals, the feeling of continuous readiness increases. 13-21% of traffic accident survivors suffer from acute stress disorder. The onset of the disease is twice as common in women. PTSD has a high comorbidity with depressive and anxiety symptoms.⁵ 20-90% of the population experiences traumatic events, but not everyone develops PTSD. That is why it is a big question what factors play a role in the development of PTSD. The incidence rate of PTSD is 46,5% among road traffic accident victims.⁶ According to a Hungarian study, 10-50% of accident victims develop PTSD.⁷

The human body follows the changes in the brain, so the effect of post-traumatic stress disorder is slowly reflected in all segments of the person's life: in the self-image, in personal relationships, and even in basic functions such as sleep or driving a car. The latter requires various basic cognitive abilities (e.g. memory), so in this area the symptoms of PTSD become especially clearly visible. The effect of PTSD lasts for a long time - and since we are responsible not only for ourselves but also for others in traffic - it is especially important to treat the disorder. The goal is to have healthy, mentally functional drivers in the vehicles who can assess their own abilities, who can evaluate traffic situations and are aware of the consequences of their decisions, respect other traffic participants, and cooperate with them.

In particular, there is a need to examine the impact of trauma on the capability to drive. In the case of a person who has experienced trauma, it may happen that for a long time he tries to stay away from any situation that may remind him of the accident he suffered. This can reach a level that makes it impossible to regain the ability to drive. Coupled with long-term sick pay, unemployment, medical treatment, and the absence of a supportive family, the living space and

³ Herman (2003)

⁴ Kiss, & Makó (2015)

⁵ Kessler, Sonnega, Bromet, Hughes, & Nelson (1995)

⁶ Fekadu, Mekonen, Belete, Belete, & Yohannes (2019)

⁷ Kuch, Cox, & Evans (1996)

quality of life for oneself is becoming narrower and narrower, and thus unprepared for safe transportation. It is important for lawyers, accident experts and police officers involved in criminal proceedings to understand how much the time since the accident happened plays a significant role and can therefore influence the outcome of the driving assessment test. Psychologists decide whether the driver is fit to drive or not, based on their current psychological state.

Research hypotheses

I formulated the following hypotheses and put them at the centre of my thesis:

(H1) Due to the traumatic experience, drivers who caused a fatal road accident are less suitable for driving than drivers who were not involved in an accident.

(H2) The post-traumatic (PTSD) symptoms that appear after a fatal road accident decrease over time, which has an impact on the assessment of fitness to drive.

(H3) Motor vehicle drivers who cause fatal road accidents show a statistically detectable difference in both driving skills and personality traits compared to the control group.

(H4) A high score (over 26) on the Life Event Impact Survey (RIES) is associated with more symptoms typical of post-traumatic stress disorder.

(H5) Resilience is associated with fewer post-traumatic (PTSD) symptoms.

(H6) Experiencing an increased value of life (Posttraumatic Growth Feeling Questionnaire, PTGI scale) correlates with posttraumatic (PTSD) symptoms.

Research objectives

Methodological objectives:

- In the course of my research, by comparing **the results of motor vehicle drivers accused of negligently causing a fatal accident and those who did not cause the accident, but who participated in a psychological driving assessment test.** I would like to verify whether there is a difference between the two groups in terms of personality and driving-related ability characteristics.
- I will examine the influencing effect of the **trauma that may occur during the assessment of the psychological suitability for traffic as a function of the passage of time.** In more than one accident, a family member or relative was injured or died. As a result of serious trauma, a crisis situation develops, even post-traumatic stress disorder can occur within a year after the accident. Processing depends partly on the personality,

socialization, and coping methods of the causer, as well as on how much time and what method is appropriate.

- With scientifically proven data, I support the professional conviction that **the trauma caused by the accident negatively affects the result in the aptitude tests**. This applies to the results of both the performance and personality tests and contributes to the assessment of suitability for driving.

Goals of applying these methods:

- With my research results, **I aim to make the interpretation of the results of the tests used in the aptitude test, the drawing of conclusions and the determination of actions more precise**, which helps colleagues in making decisions based on real foundations.
- The materials I have collected form the **basis of further research** on one hand, and on the other hand, I intend for the Transportation and Aptitude Examination Centre (Közlekedési Alkalmassági és Vizsgaközpont Nonprofit KAV) to benefit from them. It can be seen in the statements, that the exploration of the differences in attitude, coping, and attitude of individual people is a vital piece of information because of the freshness and topicality of the documents, and the fact that they originate from domestic motor vehicle drivers.
- By applying additional tests to the protocol of the psychological aptitude test, my goal is to recommend reliable, **quantitative measuring tools tailored to those who cause fatal accidents**.
- My contribution, via processing **international literature** serves as introductory reading for new psychologists joining Közlekedési Alkalmassági és Vizsgaközpont Nonprofit Kft. (KAV). I consider the publication and wide distribution of Hungarian-language studies and research results to be vital in order to fill the gaps of knowledge in the service of traffic safety.
- I make suggestions regarding the **ways various fields of study can use the knowledge of traffic psychology and the results of my research to its advantage**. It must be taken into account that anyone can have negative behavioural symptoms, such as excessive risk-taking or reaction tendency, lack of sense of responsibility, too low level of reaction ability, or increased reaction time, etc., which - even if they do not make the individual completely unfit for driving - already it would be worthwhile to filter it out before issuing a driving license, to avoid causing an accident. Such persons can

potentially pose a serious danger in traffic. A decision on the existence of the appropriate skills could be made in the context of a later examination. In this way, it would be possible to avoid the ability test to take place after the accident, since not everyone can drive safely despite their driving experience. However, this does not come to light until the more serious rule violation occurs, and there is no follow-up research that would reveal how capable these persons are of reintegration, how they coped with the traumatic event and its legal consequences.

Research methods

The research covers the objective facts of their traffic history, the subjective background and life events, the relevant skills in traffic psychology, the foundations of personality and traffic-specific traits, as well as the investigation into the impact of the traumatic event.

The following constitute the applied methodology:

- I. Conclusions that can be drawn from exploration and the document material.
- II. Capability tests: traffic-specific overview ability (TT15), reactive load capacity (RST3), sensorimotor skill (SENSO), sensorometer (SR-80), conflictometer (KR).
- III. Personality tests with self-report questionnaires: general personality inventory (CPI ÁSZVEK,); traffic-specific tests (VPT.2, FRF.2, VIP.2).
- IV. Retrospective interviews revealing traumatization: extracting the analysed text elements.
- V. Self-report questionnaires revealing traumatization: Posttraumatic Stress Disorder Diagnostic Scale (PTSD), Beck Depression Questionnaire (BDI), Life Event Impact Assessment (RIES), Connor–Davidson Resilience Questionnaire (CD-RISC), Posttraumatic Growth Questionnaire (PTGI), Coping with a Stressful Event (CISS-48), Psychological Immune System Survey (PISI).

In addition to the descriptive statistics for the subjects included in my sample, I take into account the main characteristics of the methodological tools according to the following aspects:

- a) description of the results of those who cause fatal accidents, presenting the specific characteristics of the group;
- b) comparison of the results of those who caused a fatal accident according to classification (still fit to drive, fit with a time limit, unfit);
- c) comparing the results of those who caused a fatal accident with that of the control group (those who did not commit a road accident involving either material damage or personal injury).

Concise description of the performed examination per chapter

In the first seven chapters of the dissertation, I summarized the most important theoretical background material related to my research topic.

In Chapter 1 (Historical overview), I conducted a historical overview of the birth of the motor vehicle and the science of psychology. I mentioned the earliest fatal road accidents.

At the beginning of Chapter 2 (Traffic Safety), I listed the measures to improve road traffic safety at the domestic and international level. I organized the description of traffic safety around three approaches. From the policing aspect, I focused on official control and the efficiency shown in traffic policing. The legal aspect refers to the criminal procedure related to the road accident. Within the psychological approach, I specifically covered traffic psychology. During the practical use of my scientific results, I also kept this triple division in mind.

In Chapter 3, I defined fatal traffic accidents. After revealing the causes, I also illustrated the domestic and European accident statistics with figures.

Chapter 4 focused on driving, while Chapter 5 focused on the psychological fitness test of drivers.

Chapter 6 contains 10 theories that explore the factors that influence driving. In summing up the chapter, I mentioned the common features and the criticisms of the models.

In Chapter 7, I set out to map the psychological consequences of road accidents. I provided comprehensive insight to understand the background of the traumatized state.

Chapters 8 and 9 focus on the interpretation of the results of the empirical research, based on which my hypotheses were either confirmed or not.

Summary conclusions

The psychological suitability test was carried out more than 8 weeks after the accident, when the crisis stages had already ended. The traumatic event hit the examined drivers unexpectedly and unprepared, and their traumatic events continue to live on, taking a toll on them on a physical and mental level. Everyone behaves differently after a fatal accident, using different coping strategies. The event does not affect their performance in the same way, but my results confirm what is described in the literature, the damage to the perceptual and cognitive capacity. Drivers who cause fatal accidents become passive due to helplessness, and respond to stimuli late and inadequately. They cannot integrate their experiences, the event plays out in them again and again. Anxiety overwhelms them, which activates coping mechanisms (e.g. denial, shirking responsibility). The effects of the traumatic experience at the time of the fitness test, in the phase when the court proceedings are still ongoing, have a decisive

effect on the psychodynamic processes of those involved, i.e. the relevant characteristics of the personality.

For those who are in a worse physical or mental state, even the simplest tasks proved to be more difficult. Especially in terms of load capacity, they are unable to perform as well as their physically and mentally healthy peers. My results are in line with the conclusions of the study conducted with drivers with distinctive markings. There is no concrete stress-specific test tool available for drivers who cause fatal accidents, and it is not part of the fitness test. Without this, it is impossible to filter out the individual level of stress tolerance. Even the self-knowledge of the control group does not reach the average level of the Austrian population, which also draws attention to its lack. With a better knowledge of our body's signals, one could react more effectively to situations that occur on public roads. By having self-control and being aware of the sources of stress, you can control your emotions.

In retrospect, it is difficult to identify real mistakes from the statements of those involved in the accident. They have difficulty remembering the details of the accident and what happened immediately after. Traumatic memories are not encoded in the memory in the usual way. There may also be a conscious effort to suppress and forget painful memories. Due to the possible negative consequences (imposed prison sentence, fine), there is less willingness to admit one's mistakes during the aptitude test.

Trauma stories are difficult to put into words, so during the investigation I supplemented the text analysis with questionnaires with the secondary goal that the test batteries can be used later on in the aptitude test. Informative narratives highlight the emotional significance of the impact of trauma, and faithfully reflect the uniqueness and shocking drama of the cases.

Most of them reported that they rely on their supportive environment after the accident. The social support network can provide them with physical protection and psychological security. Part of the trauma processing for drivers is to accept their role in the accident. By integrating it into their life story, the event no longer threatens their world. At the time of the examination, the intact self of all motorists is not yet stable enough to be able to reach or exceed the next levels of development and post-traumatic growth. Psychology plays a major role in crisis intervention, as the relatives - who are also affected - often do not even know what tools are available. Effective psychological interventions applied to PTSD can reduce the negative effects of the disease on the person and society. By developing a holistic model of driver behaviour, a joint interpretation of both personality characteristics and environmental influences - friends and family - would become available.

Two of my six hypotheses were confirmed, two partially and two not at all. Due to the traumatic experience, drivers who caused a fatal road accident are less suitable for driving than drivers who did not cause an accident. Compared to the control group, the group that caused the fatal accident had a significantly higher proportion of drivers with limited ability to drive and those who were certified as unfit. The differences related to the abilities and personality traits of those who cause fatal accidents, as well as the fact that they received a ban from driving for a certain period of time or completely, corroborated by poorer results in tests, prove that they are different from those who do not cause accidents. After the traumatic events, several drivers had difficulties in learning and controlling the inhibitory functions. Drivers who caused fatal road accidents show a statistically demonstrable difference in terms of driving skills (reactive workload, conflict reaction, visual-motor coordination, sensorimotor skills) and personality traits (openness of self-evaluation, expressiveness-confidence, emotional availability, self-control, self-awareness), compared to the control group.

The severity of the symptoms of post-traumatic stress disorder in terms of frequency and intensity was the mildest in the members of the fit with a time limit group, while the symptoms were most severe in the fit and unfit group. According to this, my hypothesis was partially confirmed. On average, the longer the time that passed between the accident and the examination, the less severe PTSD symptoms could be identified, but the effect on the qualification of fitness was not confirmed for those with limited fitness, compared to those who were not fit.

For positive psychological changes, it is essential that the traumatized person is open to development and tries to understand the meaning of the whole event. Those with unfit qualifications have not yet fully reached this level. Repeating the test can help them to be able to report on what they experienced during their intrapsychic work for the second time, which is also reflected in the performance provided during the driving assessment test.

New scientific results

- 1) I was the first in Hungary to deal with the traffic psychology approach in the field of policing by reviewing and summarizing the international research results of traumatization and coping and resilience, which can be considered a protective factor, in the light of the psychological aptitude test.** I examined the positive and negative psychological consequences of traumatic stress among those who caused fatal accidents. So far, neither clinicians nor researchers have been interested in this group. On the one hand, people tend to empathize with victims and distance themselves from

those who harm others. There are many stereotypes associated with homicide, even if it is a negligent crime. Perpetrators usually do not recognize the symptoms they experience as a result of feeling unwell, and shame and guilt prevent them from seeking any help. However, such a situation can cause problems related to traffic safety affecting the entire society, since persistent and untreated symptoms of post-traumatic stress disorder or other anxiety disorders can negatively affect driving behaviour. On the other hand, access to the results of the aptitude test for research purposes requires a separate permit.

- 2) **In the case of motor vehicle drivers exposed to extreme stress situations and the possibility of traumatization, I proved with the help of empirical research what is behind the unfitness to drive a motor vehicle.** Drivers who caused fatal road accidents show a statistically demonstrable difference in terms of driving skills (reactive workload, conflict reaction, visual-motor coordination, sensorimotor skills) and personality traits (openness of self-evaluation, expressiveness-confidence, emotional availability, self-control, self-awareness) compared to the control group.
- 3) **With the involvement of the control group, I pointed out the validity and reliability of the psychological aptitude test for those who committed a fatal road accident, as well as its significance and its shortcomings as well.**
- 4) **My research experiences are scientifically based on evidence for measuring the effect of the increased psychological on the psychological components important in terms of performance. Based on my results, the test batteries are suitable as independent, complex investigation tools for groups that cause fatal accidents.**
- 5) **By processing a significant number of foreign-language specialist literature, I made the knowledge of traffic psychology available in Hungarian as well. By reviewing the theories that reveal the factors that influence driving, I performed theoretical work that filled the gap.**

I was the first to undertake the investigation the positive and negative psychological consequences of traumatic stress among those who cause fatal accidents. So far, neither clinicians nor researchers have been interested in this group. On the one hand, people tend to empathize with victims and distance themselves from those who harm others. There are many stereotypes associated with homicide, even if it is a negligent crime. Perpetrators usually do not recognize the symptoms they experience as a result of feeling unwell, and shame and guilt prevent them from seeking any help. However, such a situation can cause problems related to traffic safety affecting the entire society, since persistent and untreated

symptoms of post-traumatic stress disorder or other anxiety disorders can negatively affect driving behaviour. On the other hand, access to the results of the aptitude test for research purposes requires a separate permit.

Recommendations for the practical applications of research results

I primarily recommend the results formulated in my thesis for professionals conducting traffic safety research. Accident investigators often rely on engineering knowledge and theories of forensics but know less about the psychology of driving. The theoretical concept and methodological background I have collected can serve as a guide for the development and implementation of accident prevention, as well as for rethinking the test batteries used for driving assessment testing of drivers who caused fatal accidents.

The theoretical background summarizing psychological knowledge can be a useful aid for professionals who can get to know the mental and physical consequences of an accident on the individual and the factors affecting driving, which all play an important role in the occurrence of the accident. My dissertation can form a basis for those participating in specialized higher education training and continuing education, primarily in the field of traffic policing and traffic safety studies.

I recommend my thesis for further research, as it can serve as a starting point for the analysis of the psychological phenomena revealed during the driving assessment test.

I recommend my writing to all those who already drive, and it is also instructive for those who are yet to obtain their driver's license.

The use of research results in law enforcement

My research results contribute to improving the efficiency of accident prevention activities.

- Propaganda for a targeted group, primarily for young people. Propaganda aimed at preventing accidents must be tailored to the specific target group.
- Examples against prejudices and beliefs serve as deterrence, which should be taken into account during accident prevention activities.
- The Diagnostic and Statistical Manual (DSM-V) specifically mentions that professionals performing emergency tasks (firemen, policemen, paramedics) are at risk for acute stress and PTSD involvement. For law enforcement employees, education could take the form of training.

- The transfer of information could be achieved by incorporating psychological knowledge - both in the field of traffic psychology and topics related to traumatization - into police training.

The significance of the research results for the legislator

- The legal system protects other road users by investigating, possibly establishing, and disqualifying the driver from driving. A person who does not even reach the performance of an average person is considered to be unfit to drive a motor vehicle during a traffic psychology examination. The correctness of the classification can be ensured by involving more thorough methods.
- Based on my research experience, some of the persons under investigation referred to the fact that they do not comment on the accident at the suggestion of their lawyers, fearing that the information given could be used in criminal proceedings. The legislation on driving assessment testing would guarantee that they would still divulge their accident experience.
- The need for a two-stage psychological aptitude test: general screening, and in case of results that are different from the average, an individual test - is justified before the granting of a driver's license, which can be implemented by introducing legislation.
- With traffic safety in mind, many other traffic rule changes seem necessary, which Dr Róbert Major already recommended to experts in 2009. New transport systems must be built, and the development of appropriate safety elements for the existing transport systems must be considered.
- In view of the fact that after the accident, even during expert examination, it cannot be clearly determined whether the skills and personality deficiencies are of a stable, individual origin, or the consequences of the trauma. The uncertainty related to this could be legally bridged by postponing the imposition of the penalty, possibly by ordering probation (in addition to withholding the driver's license). After one to two years, or according to the probation officer's opinion, after processing the trauma, a new examination could be conducted to examine the person's characteristic and stable ability and personality. This would enable a more nuanced and precise application of the final ban.

The use of research results in the field of psychology

- The promotion and relevance of traffic psychology (handling problems affecting all members of society) is necessary.
- Advertising a grief processing group for the relatives of those who caused a fatal accident would make professional assistance attainable for more people.
- Acquainting those involved with various trauma processing methods (e.g. EMDR, brainspotting, Peter A. Levine: Healing trauma in 12 steps) could also be accomplished via written material, summarised and provided by the psychologist doing the examination during the driving assessment test.
- A more pronounced presence of psychologists in driver training would be useful.
- By standardizing the recorded tests, a lot of missing data can be avoided (half-filled exploration sheet, lack of driving experience and other useful information).
- Based on the research results, it may be worthwhile to reconsider the test battery of the PÁV examination. The general personality test is not mandatory for drivers who do not cause accidents.
- At the end of the examination, the psychologist can propose a solution in order to restore psychological well-being as soon as possible, which is a condition for safe driving. With adequate information (about the typical symptoms of PTSD, therapeutic options), drivers could also be psychologically supported.

The list of publications on the topic of the submitter of the doctoral dissertation

- Juhász Anikó; Molnár Melinda Sára: A gépjárművezetés közbeni mobiltelefonhasználat hatása a figyelemre. *Belügyi Szemle* 70:6 pp. 1177-1192, 2022.
- Juhász Anikó: Halálos kimenetelű közúti balesetet okozó rendőr járművezetési alkalmasságára irányuló vizsgálat tapasztalatai. *Belügyi Szemle* 69:2 pp. 48-65, 2021.
- Juhász Anikó; Major Róbert: A közúti ellenőrzés pszichikai hatása és a szabályszegő magatartások háttere. *Magyar Rendészet* 20:4 pp. 155-170, 2021.
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- Juhász Anikó: A baleset-megelőzés jogi és pszichológiai oldalai. *Belügyi Szemle* 68:6 pp. 123-136, 2020.

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