

THESIS OF DOCTORAL (PHD) DISSERTATION

NATIONAL UNIVERSITY
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Author's summary and official reviews of PhD
dissertation titled

Research of stressors, symptoms of stress and coping mechanisms among firefighters

Budapest
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Research of stressors, symptoms of stress and coping mechanisms among firefighters

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DEFINING THE SCIENTIFIC PROBLEM

Based on my observer experiences in the catastrophe-psychology specific scanner area for the firefighter daily activity over many years, I have concluded that it is not dealt with in sufficient depth concerning intervening corps. In my research topic I investigated the activity of first responder, narrower terms, the operative firefighters. Relevant publications of national and international literature deal with multitude of topics on stress management, psychological immune system and the development of identity in armed forces and law enforcement agencies, but among the listed systems of relations and relationships the intervening operative firefighters staff group is not covered in sufficient depth.

The under-representation of psychological research topics on the operative firefighting corps have particularly high level of profession-specific psychological support which justifies that the psychological aspects of firefighter activity and expansion of the study of the knowledge on part of specific area happen within the scientific field of psychology.

I believe that the firefighter's physical and mental preparation with sustainable action ability and psychological support have great importance in order to protect people's lives and property effectively.

I have targeted to expand the knowledge of stress connected to firefighter-specific activity, its sources, and its treatment.

I have used examination of contact system with theoretical collection creation, instrumental measurements and questionnaires.

If we use applied methods and tools of other areas of law enforcement agencies during examining the firefighters, then based on the data obtained by their emotional expressions, psychological and physiological reactions, in short their conditional trait can easily get extreme ratings. Observing in the context of their own milieu and norms, the same features can be evaluated as general within a framework of interpretation during their standby service and off-duty.

AIMS OF RESEARCH

I defined the aims of my research as follows.

1. My first and foremost aim was to **create a collection** of possible stress related factors specific to firefighters using my previous experience, research, and the publications available.
2. For my thesis I choose to use NEO-PIR **personality test to prove** the following; I found that the personality of new recruits of firefighters resemble conscientiousness and the factor of neuroticism reasonable lower, with years in service these characteristics change, become converse.
3. By using the collection of possible stress related factors specific to firefighters, I **created a questionnaire to prove** that those in operation are prone to degrade the amount of stress they go under.
4. In a pre-planned exercise I **measured** each individual's pulse before, during and after the exercise to **analyze** how they dealt with the arising stress, comparing the results according to the years spent in service.

APPLIED RESEARCH METHODS

During academic education I **have attended** several conferences, professional gatherings and **followed** all related publications national and international. These included professional publications, periodicals, essays, monographs, assay of real stories, on-line and off-line lectures. I also took the opportunity to **discuss** my thesis with experts.

I created the **theoretical basis** for the collection of studies and investigations with participant observation in national and international fire departments and the help of existing literature and analysis.

I used **reliable and valid personality test** to explore the structure and characteristics of firefighter's personality.

I used a **self-made questionnaire** to prove that those in operation are prone to degrade the amount of stress they go under.

In a pre-planned exercise I **measured** each individual's pulse before, during and after the exercise to **analyze** how they dealt with the arising stress, comparing the results according to the years spent in service.

Processing of my research has resulted in a **database** of mathematical and statistical methods. After analysis and scientific evaluation **I drew my conclusions and I formulated the new scientific results.**

STRUCTURE OF THE THESIS

In the **first chapter** I have introduced the main tasks and structure of the fire department. I have stated the attributes of the three major service teams, and the fire fighter divisions. I have described the daily routine items on the agenda of the immediate response team. I have explained the structure and operations included in the duty list of immediate response service, the specifics of intervention, and the different roles within the fire squad on the scene.

In the **second chapter** I have introduced the concept of stress, its effects and definition. I have analyzed the phenomenon of workplace-related stress, its distinguished types using both Hungarian and foreign literature as sources, aligning the workplace-related stress models from a fire department service sector aspect.

Fire fighting activity - as a profession - is classified as a high-stress working environment according to these models. It is defined by high requirement and low control, conforming to highly regulated standards (requirement-control model). We can therefore ascertain that sustained effort for low reward, joined with the aspect of overexertion is also an inherent trait of the profession (effort-reward inequity).

I have established that on the basis of published literature, there is a methodical difficulty in the analysis of civilians and uniformed officials concerning the tackling of quality-quantity matters.

In the **third chapter** I have compiled the theoretical patterns pertaining to fire fighters both domestic and foreign, with regards to stress sources, stress symptoms and stress-relieving mechanisms. The stress sources are divided into two categories: one which is inherent to the fire department sector, and one which is independent from the actual field of profession. The stress symptoms and stress-relieving mechanisms are categorized by their definitive traits into acute and chronic groups. The individual analysis of these stress sources, stress symptoms and stress-relieving mechanisms were made with the help of domestic and foreign literature and publications, as well as using excerpts from my own previous studies.

I have proved that a **fire department sector-specific compilation of theoretical patterns** can be generated for stress sources, stress symptoms and stress-relieving

mechanisms, which help identify targeted stress sources, stress symptoms and stress-relieving mechanisms typical to large groups of fire fighters. From 93 items, I was able to differentiate 25 stress sources, 33 stress symptoms and 35 stress-relieving mechanisms.

The stress-relieving mechanisms were analyzed with regard to instrument use, realization potential, financial demand, specialist presence, adaptability, emotional- and problem focus. In majority, neither the acute nor chronic stress-relieving mechanisms require any instrument use, but possess high realization potential, have low financial demand, are adaptive and emotionally focused, and do not require the presence of a specialist.

In the **fourth chapter** I have documented the theoretical background, execution and results of the three utilized tests. These were the following: a Big Five type personality psychology questionnaire (NEO-PIR), pulse monitoring in real-life fire fighting situations, and a self-compiled test suitable for studying fire department sector-specific stress sources, stress symptoms and stress-relieving mechanism patterns, including two methods of filling out the form - one pertaining to their opinion of themselves, the other to their opinion of fellow colleagues.

By means of the **NEO-PIR personality test** I have proven the hypothesis regarding firefighters showing generally high values in empathy factors and low values in neuroticism to be true. However, these values tend to change in an inversely proportional manner with the passing of years in service, meaning that while the dimensions of the empathy factor show a steady decline, the values of neuroticism will gradually increase. My results have shown that this tendency is less likely to take effect following the first years of taking up service, and more likely in the last years of service, before discharge.

By means of the **self-designed** fire department sector-specific stress source, stress symptom and stress-relieving mechanism pattern questionnaire results, I was able to conclude that my hypothesis - that the firefighters display a tendency to answer the questionnaire about themselves with lower values in stress sources and stress symptoms, and higher values in stress-relieving mechanisms than the answers they give when asked about fellow firefighters - is also true. Hence, there is conclusive proof that the self-perception and self-admission of the extent of stress is distorted: firefighters will tend to diminish the extent and importance of stress in their environment.

By analyzing the results from **instrumental pulse monitoring** through calculation, I have concluded that the physiological and psychic consolidation and regeneration phase after

a mission fails to occur in senior firefighters. Their constantly increasing pulse indicates that they are unable to process and address the stress-situation in a proper manner. While their younger colleagues are glad that they have dealt with the task at hand, the older, more experienced firefighters work with less elevated levels of stress during the operation, but their thoughts tend to stay focused on the task, analyzing and evaluating their own performance in the field. They re-live the scene, appraising their and their teams' role in the situation with scrutiny, within the confines of group ventilation, according to proprieties. What we can deduce from the results, however, is that this mental practice which takes place immediately after a mission does not in fact decrease the state of stress; it actually prolongs it. The fact that their pulse is a lot more elevated during these sessions than when they are preparing for the mission, or the levels measured *during* the mission itself seems to confirm this. This phenomenon may cause proneness to acute stress symptoms, which may later lead to chronic stress symptoms and psychosomatic disorders.

According to my recent studies, the stress-relieving mechanisms and resources of the more experienced firefighters do not serve to enhance the efficiency of adaption. Rather, we can measure physiological parameters which reflect a process of increased sensitivity (with pulse elevation levels, and augmented tests such as measurement of cortisol content in the saliva, blood pressure, or skin resistance).

It would be beneficial to further research whether this supposition is sound; whether we can consistently measure similar pulse levels with experienced firefighters, or if it can only be induced in a simulated test environment.

SUMMARY OF THE CONCLUSIONS

- **I have had proved** the hypothesis set up at the beginning of my research. According that a big number of different stress sources, stress symptoms and stress resolving mechanism which are relevant for the fireman can be separated: out of 93 items I could differentiate 25 stress sources, 33 stress symptoms and 35 stress resolving mechanism. With that I have established a theoretical collection.
- **I had analyzed** these according the usage of the equipment, potential realization, financial demand, presence of experts, adaptivity, and also according emotional or problem focus.

- **I have proved** the hypothesis set up according the NEO-PIR personal test, which states that the firemen show a high average value in the factor of conscientiousness and a low one in the factor of neuroticism. This values indicate inversely proportional after passed years of service, so the dimensions of the conscientiousness factor show a lower value and the values of neuroticism become higher and higher. According the results **I have pointed out** that this change is less in the years after of the apparel than in the years close to the disarmament.
- **I have proved** the research hypothesis, that the average of the completed questionnaires, which the firemen filled in about themselves, show a lower value in terms of stress sources and stress symptoms, furthermore higher in terms of stress resolving mechanism than the average of the questionnaires about the other firemen. **I have proved**, that in terms of self-detecting and self-admitting of stress there is a deformation: the firemen under my research decrease the evidence of the measurement and symptoms of stress.
- According the results of the instrumental pulse measure **I came to the conclusion**, that the firemen with more years of service can not process better the stress, meaning in the years their stress resistency does not become better, rather they become more sensitive.

NEW SCIENTIFIC ACHIEVEMENTS OF THE THESIS

1. Due to my participant observation and my previous examinations **I created** a collection of possible stress related factors be specific to firefighters which include stress resource, stress symptoms and coping mechanism.
2. **I showed** with psychometric testing (NEO-PIR personality questionnaire) that the conscientiousness factor has high, and the neuroticism factor has low value in intervening firefighters personality profile. The conscientiousness factor has reduction, and the neuroticism factor has growth the increase in the number of years of service, which is a major change in late years of service.
3. **I demonstrated** by using the collection of possible stress related factors specific to firefighters, that those in operation are prone to degrade the amount of stress. This distortion of the phenomenon proves that the self-assessment of respondents exhibited

a significantly lower average point sources of stress and stress symptoms in relation to the assessment of the relative firefighter colleague wrote about, while a higher score average stress relief mechanisms.

4. With multi-stage (pre-task situation, in job status and after), continuous instrumental pulse measurements **I proved** that the stress-sensitive physiological response to the pulse value process curve inverted outcome is shown in comparison with the results of more than 5 years experienced and novice firefighters (V and inverted V-shaped curve). The phenomenon can be possibly interpreted as the number of years spent in service markedly increases sensitivity to stress load. I evaluated this in the light of the study of the physiological effects of stress by using as detector a heart rate monitor. Within the framework of future research, more advanced testing tools can be used (eg. salivary cortisol measurement, telemetry blood pressure, galvanic skin resistance measurement).

USABILITY OF RESEARCH RESULTS IN PRACTICE, RECOMMENDATIONS

I recommend the use of the firefighter-specific theoretical collection of the studied, systematic and developed stress sources, stress symptoms and stress relief mechanisms:

- by the process of the rookies quick and professional integration as well as by the suitability verification of candidates
- by the curriculum of the training system for the firefighting staff, taking into consideration the enhancement of the psychic fitness, stress tolerance and to minimize sick days due to psychological reasons as well as the fluctuations by the body.

My results regarding the tool use, potential for implementation, financing needs, the presence of a specialist, adaptivity, and the system making of the emotional and focus problem stress relief mechanism can be built into the theoretical knowledge of the trainings which aim to improve on stress load and on the coping potential of firefighting staff. (e.g. teaching relaxation and meditation techniques, mental health help and/or providing opportunity for spiritual care, or EMDR technique use by trauma processing)

Due to the strengthening of sensitivity to stress conditions depending on the service period which is supported by instrumental psychological tests I recommend the expansion of recreational opportunities for firefighting staff.

Due to my research results the support demand of operative firefighting staff is high so I recommend the employment of qualified firefighter psychologists who are able to assist at different stages of tasks.

I recommend the use of my dissertation as a resource of education in the training system for firefighters in leadership roles.

PUBLICATIONS

Reviewed publications in Hungarian

1. Rabovszky Dóra: **A tűzoltók instabilitásáért felelős hatások.** Védelem 2011. XVIII. évfolyam 2. szám. 41-42. ISSN: 1218-2958
2. Rabovszky Dóra: **Kompetenciaalapú tűzoltó kiválasztás.** Védelem Online. ISSN 1218-2958 www.vedelem.hu/letoltes/tanulmany/tan333.pdf
3. Rabovszky Dóra: **Szállodatűzek oltásának tervezése és végrehajtása.** Védelem Online. ISSN 1218-2958 www.vedelem.hu/letoltes/tanulmany/tan316.pdf
4. Rabovszky Dóra: **A katasztrófapszichológia jelentősége a futball huliganizmus kezelésében.** Védelem Online. ISSN 1218-2958 <http://www.vedelem.hu/letoltes/tanulmany/tan362.pdf>
5. Ruzsa Dóra: **Tűzoltó stressz és oldása – Mi a legjobb gyakorlat?** Védelem Online. ISSN 1218-2958 www.vedelem.hu/letoltes/tanulmany/tan493.pdf
6. Ruzsa Dóra: **A kezdő tűzoltótól a szakértőig.** Védelem Online. ISSN 1218-2958 <http://vedelem.hu/letoltes/tanulmany/tan502.pdf>
7. Ruzsa Dóra: **A tűzoltóidentitás pszichoszociális fejlődésmélete Erikson nyomán.** Védelem Online. ISSN 1218-2958 <http://www.vedelem.hu/letoltes/tanulmany/tan521.pdf>

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1. Bilkei Pál-Rabovszky Dóra: **A munkahelyi pszichoterror.** in: Huszár András és Tibold Antal (szerk.): Foglalkozás-egészségügyi szakorvosok és szakorvosjelöltek kézikönyve, Kiadó: Baranya megyei Kormányhivatal Munkaügyi Központja, Pécs, 2011. 170-176. ISBN 978-963-7187-33-9.

Unreviewed publications in Hungarian

1. Rabovszky Dóra-Nagy Lajos: **Sokadszor a Regionális Tűzoltó-kiképző Központok létrehozásának igényéről.** Florian Press. 2009/9. 392-396. ISSN 1215-492X.

2. Rabovszky Dóra: **A gyász túlélése.** http://www.langlovagok.hu/lelektan/21_a-gyasz-tulelese
3. Rabovszky Dóra: **Laktanyapszichológia: az épület belülről.**
http://www.langlovagok.hu/lelektan/19_laktanyapszichologia-az-epulet-belulrol
4. Rabovszky Dóra: **Néhány szembeötlő különbség a svéd és a magyar rendszer között.**
http://www.langlovagok.hu/lelektan/27_nehany-szembeotlo-kulonbseg-a-sved-es-a-magyar-rendszer-kozott
5. Rabovszky Dóra: **Pavlov kutyái és a tűzoltóstressz.**
www.langlovagok.hu/html/lelektan/3.shtml
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