

Neuropsychological Preventive Treatment of Emotional Burnout among University Students

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Abstract: *The article is dedicated to the problem of theoretical study and development of methodical recommendations on neuropsychological preventive treatment of emotional burnout among students of higher education establishments. The concept of neuropsychological symptom complex of emotional burnout syndrome at the emotional, cognitive and behavioral levels associated with the rigidity of psychological defense mechanisms and psychosomatic disorders has been clarified. Neuropsychological preventive treatment of emotional burnout is described, taking into account scientific data on the structural and functional organization of the cerebral hemispheres, which affect individual psychological differences in overcoming the syndrome of physical exhaustion. The phases and factors of emotional burnout development among students are indicated. Neuropsychological preventive treatment of emotional burnout among students is presented as a set of measures, with complication of the proposed techniques, taking into account an individual approach and personal resources, motivation to overcome stress, interests and needs of students. Recommendations for normalization of emotional exhaustion among students by modern foreign and domestic researchers are summarized.*

Keywords: *stress resistance, emotional and physical exhaustion, neuropsychological techniques, hemispheric asymmetry, academic progress, emotional response to stress, professional burnout, psychophysiological features of a person.*

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Introduction

So far in Ukraine the influence of pandemics and reforms in education is noticeable not only in social transformations, but also on essential changes of social-psychological and emotional-personal characteristics of students. Learning conditions with information and psychophysiological stress, psychological crises at the stages of professional development in a stressful educational environment require from future professionals a high level of emotional resilience and cause psychological trends in their stress resilience – in the form of constant self-training and neuropsychological activation of mental health defense mechanisms, health consciousness that is in the priority of self-sufficient, active, harmonious student personality.

Psychological analysis of scientific research on stress resistance as a factor of preventing and overcoming the primary phase of emotional burnout of Ukrainian youth allows successful development and implementation of neuropsychological projects to preserve the mental health of future professionals as a factor in ensuring their successful professional development and educational process at higher education establishments. An important criterion for the success of these projects is human resources, in particular students' awareness of the importance of developing emotional resilience in the educational and professional environment through their cooperation with senior partners. Unfortunately, the scientific literature does not sufficiently cover the issue of neuropsychological preventive treatment of emotional burnout among students at higher education establishments. Instead, there is a large number of them about issues studied in detail of the psychophysiological characteristics of people who are prone to emotional exhaustion and development of stress resilience among students, which is specifically related to understanding the neuropsychological causes of the origins and overcoming emotional burnout among students (Bakhmat, 2019; Bezliudnyi, 2019; Maksymchuk, 2020b; Nerubasska et al., 2020; Palamarchuk et al., 2020).

Modern researchers consider stress resistance as the ability to withstand stress – a frequent cause of emotional burnout; as a complex integral property of personality, which is interconnected with a set of intellectual, cognitive, emotional and personal qualities that provide an individual with the ability to withstand significant mental, physical, volitional and emotional stress, while maintaining effective functionality in stressful situations. All of them are manifested through individual experience of the

student's personality, the ability to overcome the state of emotional excitement when performing complex tasks, the ability to control emotional response to stressors, psychophysiological parameters, neuropsychological competence in overcoming stress as a response to emotional burnout (Gerasymova et al., 2019; Nerubasska & Maksymchuk 2020b; Maksymchuk et al., 2020a; Onishchuk et al., 2020; Sheremet et al., 2019).

In adolescence, along with educational crises, a natural phenomenon is the normative identity crisis, when social and biological factors are included in determination of personality of the future specialist. Young people try to apply certain strategies and use personal resources to reduce psycho-emotional tension and restore emotional balance in a crisis situation. Not always the chosen cognitive or behavioral strategies have an adaptive result, especially for freshmen. Moreover, the launched mechanism of maladaptation from a number of chronic stresses can turn into a syndrome of "emotional burnout", which in the phase of psychosomatic disorders is extremely capable of depleting the nervous system, therefore it is very important to carry out neuropsychological preventive treatment of this condition among students of higher education establishments which is undoubtedly an urgent applied problem in neuropsychological science and in the work of psychological services at higher education establishments.

Theoretical and methodological analysis of the study of neuropsychological means of preventive treatment and overcoming emotional burnout among students

It can be predicted that physical and intellectual stress of technical and medical professionals, the intensity of psycho-emotional communication among socio-humanitarian professionals in combination with neuropsychological features of their temperament, excessive introversion or psychological unpreparedness for unexpected emotional and cognitive stress will cause manifestations of occupational psychological syndrome of emotional burnout. In our opinion, the risk group with symptoms of this condition includes those individuals who have a neuropsychological predisposition (with psychophysiological and individual psychological characteristics and their corresponding cognitive styles in the assessment of stressful situations and emotional disorders, etc.) to the development of the syndrome of professional burnout. Emotional exhaustion can be caused by a set of reasons that have a negative impact on the human organism and psychological health: neurotic traits, internal conflicts with exacerbation of internal personality contradictions, chronic stress under the simultaneous action of several stressful social stimuli from different spheres of life,

absence of protective biological hormonal, psychophysiological and mental mechanisms to counteract depletion of vital forces. Neuropsychological preventive treatment of this phenomenon among students is especially important for overcoming emotional exhaustion and preventing the occurrence of possible depressive conditions against the background of emotional burnout syndrome.

The term “burnout” has appeared in the psychological literature relatively recently. It was proposed by the American psychiatrist H. Froudenberger in 1974. With this term the author defined psychological state of healthy people who are in intensive and close communication with patients (clients) and emotionally charged atmosphere performing their professional rounds. In the scientific psychological literature, the emotional burnout syndrome is considered as a mechanism of psychological protection in the form of partial or complete exclusion of emotions to traumatic events; or in response to chronic stress, which contains three components: performance impairment, dehumanization or depersonalization of interpersonal relationships, and cognitive, physical, and emotional exhaustion as a leading factor in all other symptoms. Prolonged stress and mental overload can cause disintegration of various areas of mental activity, especially emotional. Emotional exhaustion is the main component of “professional burnout”, which manifests itself in experiencing low emotional tone, loss of interest in others, dissatisfaction with oneself and activities on the background of anxiety and depression, indifference or emotional oversaturation, aggressive reactions, outbursts of anger. As a dynamic process, this phenomenon occurs in stages, in accordance with consistent development of increased nervous tension (Chemali et al., 2019; Ilyin, 2013; Kokun, 2013; Kustova, 2016; Vodopyanova & Starchenkova, 2011).

Empirical studies of the symptoms of emotional burnout among students by modern domestic scientists have identified those factors that are really stressful for students and can cause serious violations in the professional life of students, in particular to the development of emotional burnout among students of psychology lead to: inadequate selective emotional response; expanding the scope of saving emotions, emotional and moral disorientation, reduction of professional responsibilities, self-dissatisfaction, social frustration, psychomatic and autonomic disorders, anxiety and depression, emotional alienation (Mudryk, 2013). Empirical studies of the symptoms of emotional burnout among students by modern domestic scientists have identified those factors that are really stressful for students and can cause serious violations in the professional life of students, in particular to the development of emotional burnout among students of

psychology lead to: inadequate selective emotional response; expanding the scope of saving emotions, emotional and moral disorientation, reduction of professional responsibilities, self-dissatisfaction, social frustration, psychomatic and autonomic disorders, anxiety and depression, emotional alienation (Mudryk, 2013).

Also interesting is the study of emotional burnout among students conducted by Boni et al. (2018). According to the researchers, freshmen are more prone to emotional exhaustion due to beliefs and the motivational attitudes and expectations they received in school. These findings reinforce the need to establish preventive measures focused on the personal qualities of the first-year students, providing better performance, motivation, optimism and empathy in subsequent courses.

Phases of development of emotional burnout among students: 1. Tension, which is formed due to chronic intense psycho-emotional atmosphere of learning, a high level of demands and complications in interaction with the environment. The student experiences chronic dissatisfaction with one's own learning activities and oneself as a subject, anxiety and depression become a constant emotional accompaniment to learning. 2. Resistance, during which student tries to protect oneself to some extent from unpleasant impressions, external influences, to spend as little time as possible on educational duties. 3. Exhaustion as a global loss of student's mental resources, decreased emotional tone, automatism, devastation in performance of educational duties, emotional alienation and depersonalization as a protective barrier in educational communications, psychosomatic disorders (deterioration of physical well-being, sleep disorders, headache, problems with blood pressure, gastric disorders, exacerbation of chronic diseases, etc.). In addition, normative crises of vocational training among certain students can also transform into a syndrome of emotional burnout. The most dangerous consequences of emotional burnout are the student's devaluation of their educational and professional achievements, self-disappointment, decreased efficiency and vitality, depressive experiences. Typical means of preventing emotional burnout of students are use of mastering behavior during crises of professional training, harmonization of life and professional values, harmonization of academic and professional self-esteem, level of demands, proper organization of recreation and leisure (Boyko, 1996; Serhieienkova & Stoliarchuk, 2017).

The emergence of psycho-emotional stress in an individual is associated with the mechanisms of interaction of brain hemispheres, the lower parts of the brain structure, especially the hypothalamus. The urgency

of this issue is important for organization of cognitive and educational activities of students and its study is essentially one of the main neuropsychological factors in prevention of emotional burnout. Psycho-emotional stress is accompanied mainly by activation of the right hemisphere of the brain, so left-handed students need special attention. It can be predicted that they may be prone to neurotic experiences of stressful events against the background of hormonal metabolic disorders. Disturbances in the regulatory function of emotions, psychophysiological characteristics, stress of the body's adaptive systems are associated with the emergence of neurotic reactions of individual, which under the influence of his individual psychological qualities are modified into variable responses as reactions to stress and reflect in the symptom complex of emotional burnout mostly among the "right hemispheric" individuals. Thus, the symptom complex of emotional burnout of individuals with respective functional asymmetry of the brain is a neuropsychological cause of maladaptation of students, which requires development of socio-psychological training with neuropsychological exercises by psychological services of higher education establishments.

Of course, the program of neuropsychological prevention treatment of emotional burnout for students of higher education establishments should be developed on the basis of conceptual theoretical and methodological principles of studying this issue. Thus, in domestic and foreign psychology, neuropsychology and psychophysiology, the relationship between hemispheric brain asymmetry with cognitive and individual psychological characteristics of individuals was studied by Kenneth Hugdahl (2005), Chuprykov et al. (2011), Semenovich (2018), Antropova et al. (2011), and with emotional self-regulation – Allen and Kline (2004), Davidson et al. (2007), neurodynamic features of professional development of specialists in professions such as "person-person" – Kokun (2013), optimization of stress resistance of higher education establishments' students in the process of their professional development – Afanasenko et al. (2018), models of emotional burnout and technologies of its prevention and overcoming, mainly with techniques of self-recovery and neuropsychological exercises (Vodopyanova & Starchenkova, 2008), phases of deployment of emotional burnout among students (Boyko, 1996), crises of professional training as a basis for emotional burnout among students (Serhieienkova & Stoliarchuk, 2017).

Hemispheric asymmetry of the brain in adults is a complex product of psychosocial mechanisms. The basics of functional specialization of the hemispheres are innate, but in the process of ontogenesis their complication

occurs, which leads to the development of a certain profile of hemispheric asymmetry and hemispheric interaction (laterality). Functional asymmetry of the brain is one of the factors of adaptation in the conditions of effective organization of educational activity. The analysis of the conducted scientific researches has shown that regular connections of lateral profiles with some mental processes (cognitive, regulatory, styles of emotional reaction) are established. In this regard, the results of an empirical study of the relationship between functional asymmetry and creativity of Antropova et al. (2011) showed that the indicators of the right hemisphere related to intuition, which can be considered as an indicator of creative thinking; the left hemisphere is associated with high adaptability, emotional comfort and internality, stress resistance, optimism, self-confidence, consistency and perseverance in achieving goals, a high level of subjective control over significant events. Analysis of scientific data shows that individuals with dominance of the right hemisphere are characterized by high anxiety of the emotional-vegetative type, so the right hemisphere is associated with negative emotions, a high tendency to depression. Individuals with a right-sided profile in conflict situations choose unconstructive tactics of avoidance, competition, adaptation, with a left-sided profile - cooperation, compromise, positive change in a stressful situation (Antropova et al., 2011).

Vodopyanova and Starchenkova (2008) also claim that the higher the creative potential, the lower the level of emotional burnout and greater satisfaction with the quality of life (Vodopyanova and Starchenkova, 2008, p. 79). From this fact it follows that for the preventive treatment of emotional burnout among students, in our opinion, it is appropriate to apply not only the correct alternation of workloads with rest, but also relaxation self-training and affective correction training with introduction of practical professional tasks of creative content, attract young people by creative projects and competitions taking into account their professional level. Involving them in the cultural activities of a higher education establishment will also be important for the emotionally rich life of students.

According to Vasconcelos et al. (2019) and Tomaschewski-Barlem, et al. (2013) in the preventive treatment of emotional burnout among students, especially graduates of both private and public educational establishments it is necessary to promote their professional education, competently taking into account the methodology of teaching disciplines at university, integrated combination of theory and practice, stressful emotional situations with empathy for suffering people and individual psychological characteristics of future professionals in order to help them manage stress during study for bachelor's and master's degrees. Schaufeli et al. (2002)

suggest paying special attention to the factors of emotional burnout among students: selective emotional response to stress, especially in manifestations of cynicism as dehumanization, emotional exhaustion, excessive desire to achieve efficiency in activities.

Researchers describe in detail the methods (psychotechnics) of self-regulation according to the tasks of correction of mental state of neuropsychological orientation as prevention treatment and overcoming of emotional burnout: reduction of excitement (relaxation physical exercises, distraction or switching of attention, breathing exercises); resource mobilization (ideomotor training, recollection of feelings about one's confidence, means of sensory and mental stimulation, heterosuggestion); mental desensitization (self-suggestion of confidence and neutral attitude to stressors, the formula of intentional passive attitude); elimination of emotional stress (hetero-musical psychoregulation, methods of relaxation and psychological protection); recovery (inspired by sleep and rapid revival, meditation); "toning" (representation of psychophysiological state that excites certain body functions - heart rate, blood pressure, motor, sensory and other functions; ideomotor training as a figurative representation of motor actions that increase physical and emotional tone; figurative representations of situations that can cause an increase in psychophysical tone); regulation of autonomic processes (autogenic training, hetero regulation, breathing exercises to manage mental stress and mood). To expand the resource of "anti-burnout" it is appropriate to detect irrational thoughts and beliefs in oneself and master the principles and techniques of positive thinking, to conduct self-analysis of internal dialogue and eliminate self-abasement and self-flagellation, use problem-oriented coping as cognitive and behavioral efforts to solve stressful situations (Vodopyanova & Starchenkova, 2008).

Neurobiological mechanisms of emergence and development of positive emotions have been studied by the western researchers Jeffrey Burgdorf and Jaak Panksepp (2006). In their study, they point to the connection of parts of the limbic system, cortex and subcortical formations with the system of cognitive evaluation of one's emotions, psycho-emotional stress and its relaxation and describe how emotional phenomena are carried out through systemic brain mechanisms. Undoubtedly, systematic scientific ideas about the relationship of emotions contribute to effective application of the neuropsychological approach in the work of educators to study individual characteristics of the emotional sphere, which opens up new opportunities for introduction of innovative technologies in the

development of programs for neuropsychological preventive treatment of emotional burnout among students.

The purpose of developing measures to optimize adaptation of freshmen at the initial stage of professional development and increase their stress resistance may be neuropsychological support, in particular development of skills for keeping in the psychological comfort zone: 1) scanning one's own feelings (awareness of uncomfortable bodily sensations, heart rhythm, breathing, state of tension or relaxation that occurs inside; as a person focuses on neutral or more comfortable places of his body, he can begin to breathe deeper, the pulse slows down and muscle relaxation appears) – the basis that helps stabilize the nervous system. 2. Creation of resources, their search and activation – as one thinks about one's resource, or describes it, changes take place in one's body (breathing and pulse slow down, muscles relax), new feelings, thoughts, meanings arise. 3 Search for supports (grounding) – full presence in the present moment, when the past or future do not worry. 4. Gestures and spontaneous movements – the conscious use of protective and calming movements to calm the nervous system. 5. Strategies for returning to the comfort zone (taking care of one's health): drink a glass of water, name a few colors inside or outside the room; pay attention to surrounding objects, sounds, movements of one's legs and arms, etc. (Afanasenکو et al., 2018).

Almeida et al. (2016) suggest that educational support centers in educational establishments develop recommendations for students to apply constructive strategies to overcome stress in order to increase their emotional and personal stress resistance, forming discussion groups among students based on their aspirations and needs, and expanding their environmental resources to ensure quality of life, which can be contributed by cooperation and social support networks for students.

Recommendations for neuropsychological preventive treatment of emotional burnout among students

Neuropsychological preventive treatment of emotional burnout among students is a set of measures aimed at preventing emergence of emotional, cognitive and physical exhaustion, maintaining and strengthening mental health, developing competence in maintaining personal psychohygiene, constructive overcoming psychotraumatic situations, learning crises. Preventive technologies should be applied with complexity and taking into account an individual approach, depending on whether students are prone to anxiety and depression, or have low academic performance, high anxiety and psychosomatic disorders, ignore themselves

and the demands of the learning environment, not interested in professional or personal growth, learning in general.

Neuropsychological preventive treatment of emotional burnout should be carried out taking into account the results of neuropsychological diagnosis, which indicate the level of emotional maturity as the ability of the subject to understand their negative emotions or dissatisfaction with themselves and the ability to accept them, the specificity of emotional reactions to stress and specifics of cognitive analysis of the impact of stressful situations on the mental inner world of an individual, the causes of apathy and emotional detachment in stressful situations. We believe that neuropsychological preventive treatment of the manifestation and development of emotional burnout among students should be carried out using the methods of cognitive-behavioral therapy to work with neurotic reactions, high anxiety and worry; neuropsychological, self-regulatory and self-relaxation anti-stress techniques; technologies for developing motivation to overcome the emotional burnout syndrome, expanding neuropsychological competence in caring for one's health and raising the level of mental hygiene culture; psychological correction techniques in changing attitudes to traumatic situations with the use of constructive mechanisms of psychological protection, in particular rationalization and sublimation and strategies of flexible behavior; conducting informational education on dependence of indicators of the neuropsychological level of emotional burnout syndrome on psychophysiological, biological and individual psychological characteristics of an individual.

It is advisable that the neuropsychological program for the preventive treatment of emotional burnout among students be supported by additional methods of harmonization of psychophysical condition, which involves development of skills of psychoemotional self-regulation using music therapy and art therapy, daily and self-performed exercises to realize one's negative emotions and allow oneself to overcome them; reducing fatigue and improving psychophysical tone, relieving emotional tension and reducing the effects of stress through mastering autorelaxation techniques of deep breathing, muscle and mental relaxation (techniques of ideomotor recovery – “from rubbing the palms to doing fitness exercises”, visual concentration on colors, basically green shades, etc.), proper diet and sleep, moderate exercise, sports and hobbies, water treatments, massage.

Conclusion

The neuropsychological symptom complex of emotional burnout syndrome is a complex dynamic process that covers first the emotional sphere, reducing the manifestation of volitional efforts and emotional stress resistance, and then become involved mental triggers for energy loss at the personal and behavioral levels, associated with neurotic stress reactions, manifestation of rigid mechanisms of psychological protection, psychosomatic disorders, deformations in professional self-consciousness. Development of emotional burnout syndrome among students begins at the stages of their professional development under the influence of stress in educational and professional situations, frustrating the development of their professional self-awareness, in which future professionals, usually with negative attitudes including negative attitudes to the educational and professional environment or difficult learning tasks, experience emotional exhaustion and inability to solve unexpected psychological problems in a way that is acceptable or effective for them.

Emotional, informational and communicative stresses can emotionally disorganize and professionally maladapt the student and negatively affect his psychological well-being, academic success. Lack of personal resources to withstand psycho-emotional stress in subjectively significant educational and professional situations of adaptation to the requirements of the professional environment or situations of educational crises leads the future specialist to emotional exhaustion. In critical living conditions, it is important for anyone to maintain contact with oneself to choose a constructive coping strategy, but not everyone has the resources to unconditionally accept oneself and understand one's psychological capabilities. Rehabilitating students with emotional burnout and successfully adapting them to the learning environment is more difficult than preventing the development of emotional and physical exhaustion, which can reduce the academic performance of the future specialist, his health and quality of student life in general. That is why it is so important for practical psychologists, social educators and teaching staff of higher education establishments to have the competence to implement programs on neuropsychological preventive treatment of emotional exhaustion of the young generation.

References

- Afanasenko, L., Martyniuk, I., Omelchenko, L., Shamne, A., Shmarhun, V., Yashnyk, S. (Eds.). (2018). *Psykhobohiia stresostiukosti studentskoi molodi* [Psychology of stress resistance of student youth]. NUoLaE Publishing Center of Ukraine.
- Allen, J. J. B., & Kline, J.P. Editorial. (2004). Frontal EEG asymmetry, emotion, and psychopathology: the first, and the next 25 years. *Biological Psychology*, 67(1-2), 1-5. <http://doi.org/10.1016/j.biopsycho.2004.03.001>
- Almeida, G.de C., Souza, H. R. de, Almeida, P. C. de, Almeida, B. de C., & Almeida, G. H. (2016). The prevalence of burnout syndrome in medical students. *Archives of Clinical Psychiatry*, 43(1), 6-10. <https://doi.org/10.1590/0101-60830000000072>
- Antropova, L. K., Andronnikova, O. O., Kulikov, V. Y., Kozlova, L. A. (2011). Funktsionalnaya assimetriya mozga i individualnye psikhofiziologicheskie osobennosti cheloveka [Functional brain asymmetry and individual psycho-physiological characteristics of a person]. *Medicine and education in Siberia*, 3. <https://cyberleninka.ru/article/n/funktsionalnaya-asimetriya-mozga-i-individualnye-psihofiziologicheskie-osobennosti-cheloveka>
- Bakhmat, N., Maksymchuk, B., Voloshyna, O., Kuzmenko, V., Matviichuk, T., Kovalchuk, A., Martynets, L., Uchytel, I., Solovyov, V., Manzhos, E., Sheian, M., Aliksieiev, O., Slyusarenko, N., Zhorova, I., & Maksymchuk, I. (2019). Designing cloud-oriented university environment in teacher training of future physical education teachers. *Journal of Physical Education and Sport*, 19 (4), 1323-1332. <https://doi.org/10.7752/jpes.2019.s4192>
- Bezliudnyi, O., Kravchenko O., Maksymchuk B., Mishchenko M., Maksymchuk, I. (2019) Psycho-correction of burnout syndrome in sports educators (2019). *Journal of Physical Education and Sport*, 19 (3), 1585. <http://doi.org/10.7752/jpes.2019.03230>
- Boni, R. A. d. S., Paiva, C. E., de Oliveira, M. A., Lucchetti, G., Fregnani, J. H. T.G., Paiva, B. S. R. (2018). Burnout among medical students during the first years of undergraduate school: Prevalence and associated factors. *PLoS One*, 13(3). <https://doi.org/10.1371/journal.pone.0191746>
- Boyko, V. V. (1996). *Diagnostika emotsionalnogo vygoraniya* [Diagnostics of emotional burnout]. <https://www.bsmu.by/page/6/5657/>
- Burgdorf, J., & Panksepp, J. (2006). The neurobiology of positive emotions. *Neuroscience and Biobehavioral Reviews*, 30, 173–187. <http://doi.org/10.1016/j.neubiorev.2005.06.001>
- Chemali, Z., Ezzeddine, F. L., Gelaye, B., Dossett, M. L., Salameh, J., Bizri, M., Dubale, B., & Fricchione, G. (2019). Burnout among healthcare providers

- in the complex environment of the Middle East: a systematic review. *BMC Public Health*, 19, 1337. <https://doi.org/10.1186/s12889-019-7713-1>
- Chuprykov, A. P., Gnatyuk, R. M., Chuprykova, M. A. (2011). *Asymetriya mozku ta livorukist* [Brain asymmetry and left-handedness]. KMM.
- Davidson, R. J., Fox, A., & Kalin, N. H. (2007). Neural Bases of Emotion Regulation in Nonhuman Primates and Humans. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 47–68). The Guilford Press.
- Gerasymova, I., Maksymchuk, B., Bilozero, M., Chernetska, Yu., Matviichuk, T., Solovyov, V., & Maksymchuk, I. (2019). Forming professional mobility in future agricultural specialists: the sociohistorical context. *Revista Romaneasca pentru Educatie Multidimensionala*, 11(4), 345-361. <http://doi.org/10.18662/rrem/195>
- Hugdahl, K. (2005). Symmetry and asymmetry in the human brain. *European Review*, 13(2), 119-133. <http://doi.org/10.1017/S1062798705000700>
- Ilin, Y.P. (2013). *Psikhofiziologiya sostoyaniy cheloveka* [Psychophysiology of human states]. St. Petersburg.
- Kokun, O. M. (2013). *Psikhofiziologichne zabezpechennia stanovlennia fakhivtsia u profesiakh typu «liudyna-liudyna»* [Psychophysiological support of becoming a specialist in professions such as "man-man"]. Imex-LTD.
- Kustova, V. V. (2016). *Fenomen sindroma emotsionalnogo vygoraniya pedagogov* [The Phenomenon of the Emotional Burnout Syndrome of Teachers]. ISTU.
- Maksymchuk, B., Gurevych, R., Matviichuk, T., Surovov, O., Stepanchenko, N., Opushko, N., Sitovskiy, A., Kosynskiy, E., Bogdanyuk, A., Vakoliuk, A., Solovyov, V., & Maksymchuk, I. (2020a). Training Future Teachers to Organize School Sport. *Revista Romaneasca Pentru Educatie Multidimensionala*, 12(4), 310-327. <https://doi.org/10.18662/rrem/12.4/347>
- Maksymchuk, B., Matviichuk, T., Solovyov, V., Davydenko, H., Soichuk, R., Khurtenko, O., Groshovenko, O., Stepanchenko, N., Andriychuk, Y., Grygorenko, T., Duka, T., Pidlypniak, I., Gurevych, R., Kuzmenko, V., & Maksymchuk, I. (2020). Developing Healthcare Competency in Future Teachers. *Revista Romaneasca Pentru Educatie Multidimensionala*, 12(3), 24-43. <https://doi.org/10.18662/rrem/12.3/307>
- Mudryk, A. B. (2013). *Osoblyvosti roznytku ta proiavu syndromu emotsiinoho vyborannia u studentiv-psykholohiv* [Features of the development and manifestation of emotional burnout syndrome among students of psychology]. Open International University of Human Development.
- Nerubasska, A., & Maksymchuk, B. (2020b). The Demarkation of Creativity, Talent and Genius in Humans: a Systemic Aspect. *Postmodern Openings*, 11 (2), 240-255. <https://doi.org/10.18662/po/11.2/172>
- Nerubasska, A., Palshkov, K., & Maksymchuk, B. (2020a). A Systemic Philosophical Analysis of the Contemporary Society and the Human: New

- Potential. *Postmodern Openings*, 11(4), 275-292.
<https://doi.org/10.18662/po/11.4/235>
- Onishchuk, I., Ikonnikova, M., Antonenko, T., Kharchenko, I., Shestakova, S., Kuzmenko, N., & Maksymchuk, B. (2020). Characteristics of Foreign Language Education in Foreign Countries and Ways of Applying Foreign Experience in Pedagogical Universities of Ukraine. *Revista Romaneasca Pentru Educatie Multidimensionala*, 12(3), 44-65.
<https://doi.org/10.18662/rrem/12.3/308>
- Palamarchuk, O., Gurevych, R., Maksymchuk, B., Gerasymova, I., Fushtey, O., Logutina, N., Kalashnik, N., Kylyvnyk, A., Haba, I., Matviichuk, T., Solovyov, V., & Maksymchuk, I. (2020). Studying Innovation as the Factor in Professional Self-Development of Specialists in Physical Education and Sport. *Revista Romaneasca Pentru Educatie Multidimensionala*, 12(4), 118-136.
<https://doi.org/10.18662/rrem/12.4/337>
- Schaufeli, W. B., Martínez, I. M., Pinto A. M., Salanova, M., Bakker, A. B. (2002). Burnout and Engagement in University Students: A Cross-National Study. *Journal of Cross-Cultural Psychology*, 33(5), 464-481.
<https://doi.org/10.1177/0022022102033005003>
- Semenovich, A. V. (2018). *Eti neveroyatnye levshi*. [These incredible left-handers]. Genezis.
- Serhieienkova, O. P., & Stoliarchuk, O. A. (2017). Kryza fakhovoho navchannia yak pidgruntia emotsiinoho vyhorannia studentiv [Crisis of professional training as a basis for emotional burnout of students]. *Pedagogical education: theory and practice. Psychology. Pedagogy*, 27, 77-81.
<https://pedosvita.kubg.edu.ua/index.php/journal/article/download/273/368/1164>
- Sheremet, M., Leniv, Z., Loboda, V., & Maksymchuk B. (2019) The development level of smart information criterion for specialists' readiness for inclusion implementation in education. *Information Technologies and Learning Tools*, 72, 273-285. <https://doi.org/10.33407/itlt.v72i4.2561>
- Tomaschewski-Barlem, J. G., Lunardi, V. L., Ramos, A. M., da Silveira R. S., Barlem, E. L. D., Ernandes, C. M. (2013). Signs and symptoms of the burnout syndrome among undergraduate nursing students. *Texto e Contexto Enfermagem*, 22(3), 754-762. <http://doi.org/10.1590/S0104-07072013000300023>
- Vasconcelos, E. M., Trindade, C. O., Barbosa, L. R., De Martino, M. M. F. (2020). Predictive factors of burnout syndrome in nursing students at a public university. *Revista da escola de enfermagem da usp*, 54.
<https://doi.org/10.1590/s1980-220x2018044003564%20>
- Vodopyanova, N. Y., & Starchenkova, Y. S. (2008). *Sindrom vygoraniya: diagnostika i profilaktika* [Burnout syndrome: diagnosis and prevention]. Piter.