

The Role of Positive Thinking in Overcoming Stress by a Person: The Neuroscientific Paradigm

Olena BESSARABA¹,
Iruna MELNYK²,
Volodymyr SHAKHOV³,
Vladyslav SHAKHOV⁴,
Nataliia MATEIKO⁵,
Olesia RYHEL⁶

¹ Vinnytsia Mykhailo Kotsiubynsky State Pedagogical University, Ukraine,
bessaraba25@gmail.com,

<https://orcid.org/0000-0002-8846-1447>

² Vinnytsia Mykhailo Kotsiubynsky State Pedagogical University, Ukraine,
IraMelnik@i.ua, <https://orcid.org/0000-0001-5340-8358>

³ Vinnytsia Mykhailo Kotsiubynsky State Pedagogical University, Ukraine,
shahovu2016@gmail.com,

<https://orcid.org/0000-0003-1535-2802>

⁴ Vinnytsia Mykhailo Kotsiubynsky State Pedagogical University, Ukraine,
vshahov74@gmail.com,

<https://orcid.org/0000-0002-1069-9295>

⁵ Vasyl Stefanyk Precarpathian National University, Ukraine, mnm2807@ukr.net

⁶ Drohobych Ivan Franko State Pedagogical University, Ukraine,
olesyarygel@ukr.net,
<https://orcid.org/0000-0002-8470-7403>

Abstract: *The article provides a theoretical analysis of the problem of the impact of positive thinking on overcoming stress in the context of neuroscience. It is noted that coping-counteraction with stress is ruled by conscious and meaningful at the level of mental activity intellectual strategies of anti-stress actions related to individual characteristics of thinking style and personal characteristics. The style of thinking and its influence on the self-regulation of an individual in stress can largely determine the interhemispheric asymmetry of a brain and the localization of its dynamic functions. The content and functional features of positive thinking are determined. Methods of development of positive thinking are considered. It is emphasized that realistic (positively and health-improving) thinking with reasonable optimism should be developed comprehensively – in a combination of neuropsychological and socio-psychological technologies at the systemic, integration level. Effective technologies of anti-stress thinking training are offered: self-help, debriefing, development of reflection, use of cognitive-behavioral, positive and rational psychotherapy techniques, psychological training, neuropsychological methods and techniques, ecological methods of optimizing health thinking. Practical recommendations for „reprogramming” a brain for positive thinking have been developed.*

Keywords: *Stressful situations; a cognitive style of thinking; the interhemispheric asymmetry of a brain; nervous system; a brain; sanogenic thinking; reflection; optimistic and pessimistic thinking.*

How to cite: Bessaraba, O., Melnyk, I., Shakhov, V., Shakhov, V., Mateiko, N., & Ryhel, O. (2022). The Role of Positive Thinking in Overcoming Stress by a Person: The Neuroscientific Paradigm. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 13(3), 1-15.
<https://doi.org/10.18662/brain/13.3/350>

Introduction

Modern realities of society are reflected in a human psyche in dynamic images of unstable, changing and complex word associated with life crises, social trials of stress, long-term quarantine deprivation, anxiety and fears of pandemics, which is currently the most stressful problem for many people of the planet. The criticality of the social environment is always determined by a person through the analysis and generalization of stressful information about possible threats to life and health, coping with behavior and the consequences of stressors for humans. Triggering psychological mechanism as a „button” of adequate cognitive assessment of stress system „stress stimulus – a psychological resource and emotional attitudes to oneself, to events and people – to avoid or overcome stress” and psychological readiness to overcome stress while maintaining optimal mental processes, including the quality of the emotional sphere, is health-improving (positive) thinking, and neuropsychological-specialized in „mental self-regulation” coping-behavior centers of a brain.

The individual style of positive optimistic thinking of an individual is closely interrelated with the system of cognitive processes, personality traits and emotional states as an integrative mechanism of neutralization of stress at the neuro-psycho-social level – with optimal functionality of brain systems and psychological adaptation to unpredictable stress (Berbets et al., 2021; Demchenko et al., 2021; Karasievyh et al., 2021; Kosholap et al. 2021; Prots et al., 2021; Sarancha et al., 2021). The unfavorable influence of pathogenic thinking, when a person sees the negative aspects not only of current stress, but also most life events and other people, is the dominance of negative emotions, depression, avoidance of significant psychological problems resolving in life.

The purpose of the article is theoretically to analyze the neuropsychological and psychological mechanisms of human thinking in overcoming stress and psychological conditions for the development of positive thinking as a factor in self-regulation of an individual in stressful situations. The novelty of the article is an attempt to conduct a neuroscientific analysis of the impact of positive thinking on overcoming stress in life, analyses personality traits and qualities associated with positive thinking, identifies the content and functional characteristics of positive thinking in overcoming stressful situations. The practical significance lies in the development of practical recommendations for training the brain to think positively and effective technologies for the development of anti-stress

thinking. The generalized theoretical and methodological analysis of the role of positive thinking in overcoming stress in the context of neuroscience can be used in the practice of medical and psychological education, and in preparation for psychological training on stress and positive thinking and psychological counseling of anxious and depressed clients with pessimistic thinking corresponding to his cognitive style, features of higher nervous activity, interhemispheric asymmetry of the brain.

The theoretical analysis of the problem of the positive thinking style influence on overcoming stress in the context of neuroscience

In psychology, the problem of counteraction to stress is reflected in the concept of "coping" (coping – from English "copy", which is proposed to use in the sense of "successfully cope, overcome"), and includes a set of mental processes to overcome stress states, different forms of human activity, that are regulated by psychical processes, conscious and intellectual strategies of anti-stress actions, cognitive thinking styles and personal qualities. Such mental activity is aimed at the tactics of transforming a stressful situation or changing the emotional attitude to it and maintains the emotional balance and resilience of an individual.

Clinical psychologists know that formation of individual thinking style with appropriate intellectual strategies and skills of a person, taking into account the interhemispheric asymmetry of a brain and localization of its dynamic functions is a neuropsychological factor in the development of psychological self-regulation in unpredictable critical situations. Stress-coping behavior, features of thinking and neuropsychological and psychophysiological mechanisms of stress resistance should be considered comprehensively, at the systemic integration level, which is an understudied issue in science.

Neuropsychological and psychophysiological mechanisms of stress, different approaches to the concept of stress, causes, its forms, dynamics, evaluation and "cognitive-mental" stress management are discussed in detail in the work by Nauholnyk (2015). Neuroscientific approach to the problem of positive thinking as a factor in overcoming stress is based on the works of: Chomska (2005), Hranovska (1988), Sirotiuk (2003) and others. Technologies of the development of positive thinking are considered on the basis of the analysis of works by: Kutbiddinova (2019), Sirotiuk (2003), Yalova (2000), Yarosh (2018).

The problem of interhemispheric asymmetry and interhemispheric interaction is one of the most pressing in science. Nowadays, it is being developed by various neurosciences: neuroanatomy, neurophysiology, neurobiology, and others. It is also studied very productively in neuropsychology. Interhemispheric asymmetry of a brain in adults is a product of biosocial mechanisms. Studies concerning children have shown that basics of functional specialization of the hemispheres are innate, but as the child develops, the mechanisms of interhemispheric asymmetry and interhemispheric interaction improve and become more complex. Neuropsychological study of disorders of various mental functions (memory, thinking, voluntary movements and actions, etc.) showed that an voluntary level of control of mental functions is realized mainly by the structures of the left hemisphere, and involuntary, automated – by structures of the right hemisphere (among right-handed), Chomska (2005).

Sapolsky (2003) argues that the nervous system of an adult is not static. Stress could change the plasticity of the nervous system, especially the limbic system. The author considers the impact of severe and / or prolonged stress on learning impairment and changes in hippocampal-dependent plasticity; the ability of weak and transient stress to promote such plasticity; the ability of a number of stressors to increase fears and the almond-shaped plasticity that in its base.

The activation of hypothalamus is the psychophysiological mechanism of stress, which plays an important role in a human body and directly related to stress. It is the highest center of the autonomic nervous system, besides: responsible for coordinating the nervous and humoral systems of a body; controls the secretion of hormones of the anterior pituitary gland, adrenocorticotrophic hormone that is stimulated by the adrenal glands; forms a person's emotional reactions; regulates the intensity of nutrition, sleep and energy metabolism. It is the hypothalamus that determines nature of the first neuro-humoral reactions at the first emotional irritation arising from the contact of a person with a stressor. Stress is connected with humoral and autonomic changes. On the one hand, it increases the activity of the sympathetic nervous system, and on the other one – causes the secretion of anti-stress hormones of the adrenal cortex, Nauholnyk (2015).

Stress is a psychophysiological response of a body to the influence of the environment that goes beyond the adaptive norm. Numerous studies have shown that chronic stress dramatically inhibits the development of the

child's brain. During stress, the development and myelination of the neural pathways occur only in the centers of survival, while the development of nervous structures in the limbic system and neocortex is limited. The constant action of stress leads to the fact that nervous activity is concentrated mainly in the right hemisphere and brain stem, in the sympathetic nervous system. Conductive organs that are controlled by a certain hemisphere can be blocked in a state of stress (an ear, an eye, an arm, and a leg). The individual lateral profile of each person determines the type of perception, thinking, stress resistance, style and success of learning. In a stressful situation, the main burden is borne by the left hemisphere, a right arm and a right eye. The left ear, which is controlled by the right hemisphere, is blocked. In a stressful situation, right-hemisphere people always prefer holistic perception, figurative thinking and unconscious actions, and left-hemisphere people prefer detailed perception, linear thinking and conscious actions, Sirotiuk (2003).

Estimation of the localization of dynamic brain functions is associated with thought processes and actions. Peculiarities of mental activity with a certain cognitive style are formed in the process of life and are leading in solving various (life, educational, professional) problems. Thinking style is defined as a system of intellectual strategies, techniques, skills of the individual, which due to its individual characteristics is associated with the inter-radicular asymmetry of the brain. Most right-handed people are the most socially adapted, with a pronounced extrovert feature. Realistic style of thinking indicates the concretization and attitude to change, correction of results in order to achieve certain results. Analytical and synthetic styles of thinking indicate the influence on deep orientation in theoretical concepts, low adaptability to situations of uncertainty, the tendency to rational, logical, orderly actions to apply theoretical knowledge in practice, Arkhipova (2016).

Positive thinking in stress situation can be defined as the ability of an individual to psychologically support himself despite the complexity of a difficult life situation; argue the acceptance of yourself, own emotional reactions and stress; optimistic worldview, which is characterized by far from ideal world moments and characterological qualities of people around; conscious implementation of self-regulation of behavior under the influence of cognitive processes as a self-correcting individual-personal trait of thinking. Functional features of such thinking are: reflexivity, awareness, purposefulness, logic, lability, generalization, controllability. Psychophysiological and neuropsychological basis of positive thinking in stress are: specialization of the large hemispheres of a brain with

interspherical asymmetry; functions of the associative cortex of the cerebral hemispheres, the functional organization of a brain and patterns of integrative activity of a brain.

Reynolds (2011) thinks that positive thoughts and positive thinking, in general, support brain growth, as well as the generation and strengthening of new synapses, especially in the prefrontal cortex, which is the center of integration of all brain and mind functions. Positive mood, and a sense of happiness stimulate the growth of nervous connections, improves cognition by increasing mental productivity and the ability to analyze and think, increases attentiveness. Happy people are more creative, solve problems faster, and tend to be more mentally alert. Negative thinking slows down the coordination of a brain, which complicates the processing of thoughts and finding solutions. Feelings of fear, which often occur when focusing on negative results, reduce the activity of the cerebellum, which slows down the brain's ability to process new information, which limits the ability to solve problems creatively. In addition, the fear factor affects the left temporal lobe, which affects mood, memory and control over impulses.

As a rule, stressful situations contain elements of novelty, exceptionally unpredictability, absent in the experience of an individual, is already a stressor for anyone. In our opinion, in the absence of functional disorders of a brain, a practical neuropsychologist should develop and implement programs for the development of positive thinking, taking into account the involvement of both hemispheres of a brain. In this regard, Hranovska (1988) argues that the thought process, which leads to new information about the relationships and connections of objects, always requires the participation of both hemispheres. The researcher suggests that this process includes several successive stages, when one or the other hemisphere dominates in turn. When the left dominates, the results of mental activity achieved before the moment can be verbalized and understood. When right one dominates, the mental process, developing immanently, cannot be realized and verbalized. And only when the left dominates again, there is a feeling of suddenness of the result, its incoherence with the states immediately preceding its receipt, the unconsciousness of neither the preparatory stages nor the intermediate operations. In such cases, it is usually believed that the solution is found intuitively; the feedback that indicates an intuitive solution is closed due to emotional feelings that arise.

Based on an experimental study by foreign researchers (Eagleson et al., 2016), images of anxiety of highly anxious people have been replaced by various forms of positive ideas. Due to the power of positive thinking, pathological anxiety was reduced by changing the mind in generalized anxiety disorder. Makaremnia et al. (2021) in turn investigated the impact of a positive thinking program on hope and sleep quality in Iranian patients with thalassemia. Researchers have empirically confirmed the impact of positive thinking on feelings of happiness, and stress-resistance increasing.

One of the principal components in the process of human response to stress is cognitive assessment of a situation, which is determined by the peculiarities of human understanding of events that happen with him/her. The overcoming of a stressful situation is impossible without cognitive "processing", which becomes available through reflection. The role of the reflection influence on a choice of coping strategy of an individual is that reflective individuals choose more adaptive and effective strategies. Sanogenic reflection is a special type of systemic reflection, which includes the ability to identify and "reflect" on negative affective behavior programs, which in turn leads to physical and psychological well-being. Concept "reflect" is meant the possibility of isolating in one's own consciousness own Ego, emotions, and its causes. Sanogenic reflection is a means of achieving sanogenic thinking. Sanogenic thinking is a style of psychological response of an individual to the action of others factors. It is the presence of sanogenic reflection in an individual determines the nature of his thinking - sanogenic or pathogenic. A person who thinks sanogenically is able to better assess their own resources in overcoming difficult situations, accompanied by an optimistic attitude to the future, Yarosh (2018).

One of the most general guidelines of consciousness are optimism and pessimism that is, the tendency to see in the phenomena of the world good or bad moments. Everyone subconsciously or consciously chooses own type of attitude to life, based on some experience, examples of parents and the peculiarities of higher nervous activity. The benefit of pessimism is to force a person to prepare for an adverse course of events, and also allows to more calmly accept the blows of fate, but this is the end of its positive value. Experience shows that positive thinking (finding only good sides in life) brings for a person much more benefits, significantly reducing the total amount of stress in his/her life, Nauholnyk (2015).

Our thinking is pathogenic in a sense of inevitably generating emotional stress and conflict with oneself, with others. In order to keep good health, it is important to block negative emotions for programming our

behavior and as a source of prolonged emotional stress that lead to depletion of the body's defenses. But if emotions are not under control, then maintaining of human health is problematic. Sanogenic thinking expands the variety of thought processes and liberates thought by offering new programs that reduce emotionality. To think sanogenically, you need to develop new habits to think correctly about a particular emotion, for example, about resentment, shame or envy. Then these emotions will not be able to unambiguously program the flow of thoughts. This theory recognizes both the positive and negative functions of emotions, which are the product of human spiritual evolution. According to the traditions of modern Ukrainian psychotherapy, we never divide people into good and bad. The only right way to adapt to one's emotions is to learn to take offense, to be guilty and to be ashamed, so that the experience of senses promotes personal growth and self-regulation, Orlov (2006).

Chui and Chan (2020) investigated the functions of positive thinking about stress and the impact of positive thinking on students' psychological well-being. The authors believe that positive thinking is a moderator of the link between stress and psychological well-being, and recommend that student services at universities to consider organizing seminars to teach and promote the proper use of positive thinking by students to alleviate stress and improve their psychological well-being. Academic planning at high institutions may consider integrating the content of positive psychology into the curriculum and teaching.

Zandvakili and Nikmanesh (2014) studied the impact of the positive thinking training on the correction of depression, stress and anxiety of juvenile offenders. Learning about positive thinking can be useful for self-development, developing of positive relationships, increasing self-esteem, and respect for others. Scheier and Carver (1993) also argue that positive thinking involves maintaining positive expectations (which include the consequences of actions) about one's future. Dispositional optimism is a characteristic of personality. Optimism negatively correlates with indicators of depression and hopelessness; positively - with self-esteem and internal control. When results seem unreachable, people waste their efforts and move away from their goals.

Realistic (positively health-improving) thinking with adequate optimism, of course, should be developed comprehensively - in a combination of neuropsychological and socio-psychological technologies at the systemic, an integrational level.

The development of positive thinking

One of the effective technologies for training anti-stress thinking are: self-help in stress (use of the cognitive-behavioral psychotherapy techniques, including analysis of automatic thoughts and their relationship with emotions and mental states); a debriefing method is work with group mental trauma as a form of crisis intervention (mental activity to understand stressful events and experience related emotional reactions); the development of reflection as a component of thinking, awareness by an individual of his mental activity, the ability to focus on ones thoughts (the training of reflexive self-observation, resulting in the formation of self-regulation and positive behavioral strategies in stress); the cognitive processing of stressful information by methods of rational psychotherapy after working with negative emotions due to connection with stress (the activation of mental actions concerning determination the limits of responsibility, competence and time-territorial-personal space, conscious activation of positive thinking, separation of social role functions and personal motives); neuropsychological methods and techniques of forming positive thinking (exercises for visualization – is reproduction of images of overcoming behavior in mind, exercises for changing thoughts – is stimulating changes in attitudes to stressful situations, deep breathing, muscle relaxation); psychological training for the development of positive thinking and stress resistance.

Anti-stress kinesiological set of exercises is recommended to do daily for 6-8 weeks for 15-20 minutes. After doing anti-stress exercises, the interhemispheric interaction is restored and the neuroendocrine mechanism is activated, which provides adaptation to a stressful situation and a gradual psychophysiological way out of it. Sometimes it is enough to perform several exercises for emergency stress relief, for example, "frontal-acceptance (fronto-occipital) correction". Purpose consists of next elements : activation of brain stem structures and interhemispheric interaction, rhythm of the right hemisphere, energization of the brain, visualization of a positive situation. Instructions: place one palm on the back of the head and the other on the forehead. Close your eyes and think about any negative situation. Take a deep inhale - pause - exhale - pause. Imagine the situation again, but only in a positive aspect. Think about and understand how you can solve the problem in front of you. After the appearance of synchronous "pulsation" between the occipital and frontal part, self-correction ends with a deep

inhale-pause-exhale-pause. Do the exercise from 30 seconds to 10 minutes before the synchronous pulsation in palms. The next exercise is "erasing stress information from memory (visualization)": close your eyes and mentally draw on a piece of paper a negative situation that needs to be forgotten. It can be a real picture, figurative association, symbol, etc. During thoughts take an eraser and begin to consistently "erase" from a sheet of paper the created negative situation, Sirotiuk (2003). We call such exercises ecological methods of optimizing health thinking as one of the important psychological factors of overcoming human stress.

An successful method of self-regulation to the influence of stressors is the formation of positive thinking. Positive thinking evokes positive feelings and emotions: happiness, joy, self-confidence, self-satisfaction, peace, while negative thinking causes mostly negative emotions: fear, anger, jealousy, frustration, sadness. Positive emotions not only affect mental health, they strengthen the immune system. Exercises for the formation of positive thinking operate on the same principle as physical exercises: the formation of a new habit in our brain takes from 21 to 60 days. Thus, the exercise "getting rid of negative words" with the help of affirmation is a short phrase that contains a verbal formula, which after repeating fixes the necessary image or installation in the human subconscious, helping to improve psycho-emotional state. Exercise "be grateful!", we need to thank for absolutely everything in life, even for difficulties and disappointments, because ones make a person stronger, enrich his life experience. A person looks at life what he already has, but not in terms of what is missing. The essence of the exercise "it is great ..." – is a reaction to every unexpected situation, even if others do not understand, and then the brain itself will propose positive moments, Kutbiddinova (2019).

To increase stress resistance is real by internally playing possible of situations in imagination (the property of anticipatory reflection). People with such abilities are stress resisted in conditions of partial lack of information, lack of time and other obstacles, Filippov (2003). Of course, advanced analysis requires quality thinking, processing information from the standpoint of optimistic "thinker", the content of mental activity which is the optimal course of mental processes that serve at the neuropsychological, psychophysiological levels of wellbeing for health mental states - their integration is combined with positive thinking, which in combination with personal qualities (self-sufficiency, responsibility, tolerance, etc.), need-

motivational and emotional-volitional characteristics regulate behavior of an individual in subjectively significant stressful situations for everyone.

Short-term positive psychotherapists tend to find for resources everywhere, even in the past of a client who is experiencing feelings of injustice, resentment, persistent anger or guilt, remaining in the past and already chronic stress. Belief that a tragedy of the past (as a trauma) is the cause of current problems can be fulfilled by prophecy programmed by our brains. Conversely, thinking about one's past as a resource, an gained experience, could help people to achieve their goals. Thus, the past should be discussed with the client not as a difficulty, but as a resource.

To train a person by the theory and practice of sanogenic thinking allows you to expand awareness of emotional mental operations and acquire skills and abilities to introspect own emotions, experiences in overcoming stress. That is, sanogenic thinking can be a factor in stressful behavior of an individual. A practical tool for the development of stress resistance, which meets modern requirements, is a mobile application "sanogenic thinking". It allows you to develop sanogenic thinking skills regularly, systematically, mobile and in an accessible form. No less interesting would be the creation of training programs aimed at mastering the skills of sanogenic thinking through group work, Yarosh (2018).

Our brain can be "programmed" to see more negativity due to parenting upbringing style, trauma, inconsistency of genetic programs with social requirements, thinking errors and even functional disorders of the brain, eventually every brain itself begins to look for threats, causing pessimistic thinking as a trigger, that makes a person victim of stress . To train your brain in the ability to see the positive aspects of human life and the world, we offer some recommendations: in difficult situations, teach the brain to analyze only the facts, not the "emotional material" of others or own inventions; do self-praise more often, remembering your positive deeds during the day and every day; compare the past results of your activities or current affairs with the present-day ones, noting their improvement and impact on self-development, and not oneself with others and even to the detriment of your "Ego"; use neuropsychological exercises to activate the simultaneous work of the cerebral hemispheres through the representation of images, performing certain actions with both hands alternately, etc .; look for the positive in everything, even when you feel reluctant to perform such a task, try to analyze what experience you have had difficulties and overcome stress; try to be realistic with reasonable optimism, believe in yourself and accept life and others as they really are, without unreasonable expectations.

Waters et al. (2021) believe that positive psychology contributes to the psychological support of people in a pandemic. Researchers have suggested positive psychology practices to be part of a multidisciplinary approach to strengthening psychological resources (self-development opportunities, self-empathy, skills to cope, positive emotions, strengths, etc.) during a pandemic, with hope that cultivating these results will continue after this crisis and will lead to strong positive results.

Motamed-Jahromi et al. (2017) discussed the effectiveness of a program to teach positive thinking about the quality of nurses' working lives through smartphone applications. Stress at work is part of the professional life of nurses, which causes a decrease in job satisfaction and quality of nurses. Training of positive thinking through social media has improved the quality of life of nurses. Research by Park et al. (2016) also showed that the practice of positive psychology (eg, positive emotions, life satisfaction, optimism, life goals, social support) prospectively associated with good health.

We use synonymously the concepts of positive and sanogenic thinking, although in the psychological literature they are sometimes distinguished, believing that the basis of positive thinking is features of self-awareness, self-concept and optimistic qualities, and sanogenic - adequate reflection and perception of images. In common for concepts is a focus on solving psychological problems related to stressful situations in a positive and at the same time realistic context and reducing emotional tension.

Conclusion

Healing style of positive thinking is associated with mostly left hemispheric asymmetry of the brain, the dominance of optimistic thoughts, rethinking the experience of stressful situations through accepting it and personal resource, underlining the positive moments in life, reflection and conscious overcoming of emotional disorders which only strengthens a person's psychological health and is an effective way to solve a traumatic problem. In contrary, pathogenic thinking is more often associated with right hemispheric asymmetry of the brain, reasoning about images and fears, automatic emotional response to stress, lack of willpower and lack of reflection and control over behavior management in critical life situations.

Successful technologies for training anti-stress thinking are: self-help, debriefing, development of reflection, use of cognitive-behavioral, positive and rational psychotherapy techniques, psychological training,

neuropsychological methods and techniques, environmental techniques for optimizing health thinking. Realistic (positively health-improving) thinking with reasonable optimism should be developed comprehensively - in a combination of neuropsychological and socio-psychological technologies at the systemic, integration level. In case of dominant pessimistic thinking, the brain can be "reprogrammed" with the help of self-development technologies and the introduction of neuropsychological programs to develop positive thinking and stress-resistant personality, taking into account its psychological resource, interhemispheric asymmetry features of the brain and higher nervous activity.

References

- Arkhipova, I. V. (2016). Neiropsikhologicheskii podkhod v issledovanii osobennosti razvitiia stilei myshleniia studentov. *ANI: Pedagogika i Psikhologiya*, 5(16), 225-228.
<https://cyberleninka.ru/article/n/neyropsihologicheskii-podhod-v-issledovanii-osobennostey-razvitiya-stiley-myshleniya-studentov>
- Berbets, T., Berbets, V., Babii, I., Chyrva, O., Malykhin, A., Sushentseva, L., Medynskii, S., Riaboshapka, O., Matviichuk, T., Solovyov, V., Maksymchuk, I., & Maksymchuk, B. (2021). Developing independent creativity in pupils: Neuroscientific discourse and ukraine's experience. *BR/AIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(4), 314-328.
<https://doi.org/10.18662/brain/12.4/252>
- Chui, R. C. F., & Chan, C. K. (2020). Positive thinking, school adjustment and psychological well-being among Chinese college students. *The Open Psychology Journal*, 13, 151-159.
<http://dx.doi.org/10.2174/1874350102013010151>
- Demchenko, I., Maksymchuk, B., Bilan, V., Maksymchuk, I., & Kalynovska, I. (2021). Training future physical education teachers for professional activities under the conditions of inclusive education. *BR/AIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), 191-213.
<https://doi.org/10.18662/brain/12.3/227>
- Eagleson, C., Hayes, S., Mathews, A., Perman, G., & Hirsch, C. R. (2016). The power of positive thinking: Pathological worry is reduced by thought replacement in generalized anxiety disorder. *Behaviour Research and Therapy*, 78, 13–18. <https://doi.org/10.1016/j.brat.2015.12.017>
- Filippov, M. M. (2003). *Psikhofiziologiia liudyny* [Human psychophysiology]: a textbook. Kyiv: Interregional Academy of Personnel Management.
- Hranovska, R. M. (1988). *Elementy prakticheskoi psikhologii* [Elements of practical psychology] (2nd ed.). Leningrad: Publishing House of Leningrad University.

- Karasievych, S., Maksymchuk, B., Kuzmenko, V., Slyusarenko, N., Romanishyna, O., Syvokhop, E., Kolomiitseva, O., Romanishyna, L., Marionda, I., Vykrushch, V., Oliynyk, M., Kovalchuk, A., Halaidiuk, M., & Maksymchuk, I. (2021). Training future physical education teachers for physical and sports activities: Neuropedagogical approach. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(4), 543-564.
<https://doi.org/10.18662/brain/12.4/264>
- Chomska, E. D. (2005). *Neiropsikhologiya* [Neuropsychology]: 4th edition. Sankt-Peterburg: Piter.
- Kosholap, A., Maksymchuk, B., Branitska, T., Martynets, L., Boichenko, A., Stoliarenko, O., Matsuk, L., Surovov, O., Stoliarenko, O., & Maksymchuk, I. (2021). Neuropsychological bases of self-improvement of own physical health of future teachers in the course of university education. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), 171-190.
<https://doi.org/10.18662/brain/12.3/226>
- Kutbiddinova, R. A. (2019). *Psikhologiya stressa (vidy stressovykh sostoianiy, diagnostika, metody samoregulatsii)* [Psychology of stress (types of stressful states, diagnosis, methods of self-realization)]: a training manual. Yuzhno-Sakhalinsk: Sakhalin State University.
- Makaremnia, S., Dehghan Manshadi, M., & Khademian, Z. (2021). Effects of a positive thinking program on hope and sleep quality in Iranian patients with thalassemia: A randomized clinical trial. *BMC Psychology*, 9(43).
<https://doi.org/10.1186/s40359-021-00547-0>
- Motamed-Jahromi, M., Fereidouni, Z., & Dehghan, A. (2017). Effectiveness of positive thinking training program on nurses' quality of work life through smartphone applications. *International Scholarly Research Notices*.
<https://doi.org/10.1155/2017/4965816>
- Nauholnyk, L. B. (2015). *Psykhologiya stresu* [The Psychology of Stress]: A Textbook. Lviv: Lviv State University of Internal Affairs.
- Orlov, Y. M. (2006). *Ozdoravlivaiushche (sanogennoe) myshlenie* [Healing (sanogenic) thinking]. Compiled by A. V. Rebenok, Series: Behavior Management, Book 1, 2nd edition. Slaiding.
http://psychologi.net.ru/1/Orlov_Yu_M_Ozdoravlivayuschee_sanogennoe_myshlenie.pdf
- Park, N., Peterson, C., Szvarca, D., Vander Molen, R. J., Kim, E., & Collon, K. (2016). Positive psychology and physical health. *American Journal of Lifestyle Medicine*, May-June, 10(3), 200-206.
<https://doi.org/10.1177%2F1559827614550277>
- Prots, R., Yakovliv, V., Medynskyi, S., Kharchenko, R., Hryb, T., Klymenchenko, T., Ihnatenko, S., Buzhyna, I., & Maksymchuk, B. (2021). Psychophysical training of young people for homeland defence using means of physical

- culture and sports. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), 149-171. <https://doi.org/10.18662/brain/12.3/225>
- Reynolds, S. (2011). Happy brain, happy life. *Psychology Today*.
<https://www.psychologytoday.com/us/blog/prime-your-gray-cells/201108/happy-brain-happy-life>
- Sapolsky, R. (2003). Stress and plasticity in the limbic system. *PubMed*, 28(11), 1735-1742. <https://doi.org/10.1023/a:1026021307833>
- Sarancha, I., Maksymchuk, B., Gordiichuk, G., Berbets, T., Berbets, V., Chepurna, L., Golub, V., Chernichenko, L., Behas, L., Roienko, S., Bezliudna, N., Rasskazova, O., & Maksymchuk, I. (2021). Neuroscientific principles in labour adaptation of people with musculoskeletal disorders. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(4), 206-223.
<https://doi.org/10.18662/brain/12.4/245>
- Scheier, M. F., & Carver, C. (1993). On the power of positive thinking: The benefits of being optimistic. *Current Directions in Psychological Science*, 2(1), 26-30.
<https://doi.org/10.1111/1467-8721.ep10770572>
- Sirotiuk, A L. (2003). *Neyropsikholohicheskoie i psikhofiziolohicheskoie soprovozhdeniie obucheniia* [Neuropsychological and psychophysiological support of education]. Moscow: «Sfera».
- Waters, L., Algae, S., Dutton, J., Emmons, R., Fredrickson, B., & Heaphy, E. (2021). Positive psychology in a pandemic: Buffering, bolstering, and building mental health. *The Journal of Positive Psychology*, 17(3), 303-323.
<https://doi.org/10.1080/17439760.2021.1871945>
- Yarosh, N. S. (2018). *Sanohenne myslennia yak chynnyk stress-dolainchoi povedinky osobystosti* [Sanogenic thinking as a factor of stressful personality behavior]: Ph.D. dissertation abstract; 19.00.01 – general psychology, history of psychology. Kyiv. http://www.psychology-naes-ua.institute/files/pdf/avtoreferat_yarosh_1539596276.pdf
- Zandvakili, M., & Nikmanesh, J. (2014). The effect of positive thinking training on reduction of depression, stress and anxiety of juvenile delinquents. *International Journal of Medical Toxicology and Forensic Medicine*, 4(2), 55-62.
[https://doi.org/10.22037/ijmtfm.v4i2\(Spring\).5622](https://doi.org/10.22037/ijmtfm.v4i2(Spring).5622)