

On the Role of the Brain Asymmetry Profile in the Implementation of Emotional Competence in Stroke Patients

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Abstract

The present work considers changes of emotional competence in patients with acute cerebrovascular disorder depending on the lesion location and the individual brain asymmetry profile. The study of the emotional competence components was based on the author's analytical model, which integrates the functional, operational and regulatory mechanisms of emotional activities and represents a multi-level system, with interpersonally- and intrapersonally-oriented emotional competencies being the central units of its analysis, which comprises the scientific novelty of the research. The study used diagnostic methods to study empathic abilities, reflection, self-regulation, emotional intelligence, brain lateral organization profile (LOP), hierarchical factor analysis, and cross tabulation. It represents statistically-structured emotional competencies (intrapersonally-oriented: reflective, irreflexive, manipulative, and interpersonally-oriented) corresponding to the author's analytical construct of emotional competence and being appropriate tools of analysis and evaluation of emotional activities. Based on the comparative analysis, there have been revealed some distinctive trends in the manifestations and formation of emotional competence in stroke patients and managers who have been successful in their careers based on the LOP type and taking into account the affected side (left or right). There has been noted a decrease in the emotional competence in stroke patients, the peculiarity of which is determined by the side affected by stroke, as well as the individual brain asymmetry profile, which allows us to discuss functional asymmetries as predictors for the development of the person's abilities in emotional regulation.

Keywords: brain asymmetry, emotional competence, emotional competencies, emotional intelligence, empathy, lateral organization profile (LOP), lesion location, reflection, self-regulation, stroke.

INTRODUCTION

According to the research by the World Health Organization and A. J. Egido et al. [1] (case-control study) dedicated to the study of risk factors of stroke with a lethal outcome, it is 2 to 4 times higher in individuals who do not tend to maintain their physical and mental health, who suffer from emotional fatigue and chronic stress [1, 2]. There is a rather curious phenomenon which is a universally accepted psychosomatic variant of development of diseases which are predictors of stroke manifestation [3, 4], which is based on disorders of emotional regulation of activity represented by prolonged states of fear, anxiety, hostility, destructive intrapersonal and interpersonal conflicts, failed and/or inadequate expression of emotions [1]. Psychosomatic pathology, as a manifestation of non-adaptive processes, may be associated with disorders in interhemispheric interaction manifested by increasing or leveling functional brain asymmetry [5, 6]. According to K. Shimoda, R.G. Robinson [7, 8] T.G. Vizel, O.I. Shabetnik [9, 10], patients with lesions in the right hemisphere face more difficulties during rehabilitation.

It seems relevant to follow a competence-based approach [11-15] to the issue of emotional and personal non-adaptation in stroke patients since it allows to evaluate empirically observed strategies in terms of organic pathology, taking into account the person's premorbid, as well as adaptation and compensation mechanisms [16].

The categories and concepts used within the competency-based approach include "competence" and "competency". Competencies are internal, potential, psychological neoplasms (knowledge, behavior, action-prediction algorithms, value orientations, etc.), "subjective conditions" [15] which manifest themselves in the activity within the person's competence [11] under "objective conditions" [15]. Thus, competence is considered as an individual phenomenon which is a system of certain knowledge, skills, and qualities necessary for the successful implementation of any activity. Competencies are components of this system [17].

Within our study, the construct of emotional competence (EC) was used, which is a developing system of the person's abilities aiming at the most appropriate coordination of emotions and goal-oriented behavior [18], which manifests itself in the peculiarities of self-regulation and regulation of

interpersonal relations by understanding one's own emotions and emotions of others [19]. The structure of emotional competence is a more detailed structure of emotional intelligence taking into account social phenomena influencing its development [20] and the formation of personal regulation mechanisms. Emotional intelligence can be regarded as a tool of emotional competence since it is a mental formation and manifests itself in the person's ability to understand the internal environment of one's own feelings and experiences and act in tune with them, to understand one's relationships represented in emotions, to build schemes to control one's emotional sphere based on intellectual analysis and synthesis, and to use emotions to enhance the efficiency of thinking, activities, and behavior.

EC is a means of personal self-regulation, the joint work of various functional systems, including brain structures – higher-order ones mainly – the leading role being played by the third functional unit of the brain (programming, regulation, and verification of activity and behavior, according to A.R. Luria). Activity is a condition for EC development, with EC being the factor ensuring the efficiency of activity.

The analytical construct of emotional competence suggested in this article, being the systems of developing abilities of a person, is based on the synthesis of functional (structural and functional brain organization), operational (emotional intelligence) and regulatory mechanisms defined by V.D. Shadrikov [13] in his theory of abilities, and they were regarded by the author as properties of functional systems which perform individual mental functions; functions are generic systems of activity and can be described as functional systems of activity considered in the context of three dimensions (according to B.D. Ananyev): individual, subject of activity, and person.

It makes sense to distinguish between five levels in the sophisticated multi-level EC system: **the system level** (level of competence), **the level of functional units** (regulation of the activity level, reception, processing and storage of information, programming, regulation and control); **the level of subsystems or competencies** (the 1st subsystem (intrapersonally-oriented emotional competencies) – understanding and regulation of emotions, the 2nd subsystem (interpersonally-oriented emotional competencies) – understanding and regulation of emotions of others); **the component level** (in the intrapersonally-oriented subsystem – reflection and self-regulation; in the interpersonally-

oriented subsystem – regulation and empathy); and **the mechanism level** (private mechanisms of reflection, empathy, self-regulation, and regulation of relations) (Figure 1).

Based on the properties of the system, its levels are interrelated: changes on each level will lead to changes in the functioning of the whole EC system. The most radical and extensive changes will be associated with impaired functioning of higher levels, including a significant reformation of the EC system. Within the EC, intra- and interpersonally-oriented emotional competencies are implemented, influencing each other both on the subsystem level (Level III, Figure 1) and through higher levels of functional units ensuring the inclusion of emotional competencies in the activity, as well as in the formation and implementation of behavioral programs. At the same time, the inclusion of functional units, dealing with the regulation of the activity level, reception, processing and storage of information, programming, regulation and verification in the EC structure, by appealing to the psychological structure of activity, explains the indirect influence of the cerebral organization of mental functions (including sensory and motor asymmetries) on the implementation of its construct, especially obvious in patients with acute cerebrovascular disorder (stroke), affecting the functional units of the brain.

The issue of emotional regulation and formation of emotional abilities in individuals with different lateral organization of functions has been discussed in a number of studies. V.N. Klein, V.A. Moskvina, A.P. Chuprikov [21], L.A. Shmakov, S.E. Voloshenko [22], E. Harburg, P. Roeper, F. Ozgoren [23], S.G. Mascie-Taylor [24] discovered the prevalence of high indicators of emotional manifestations in individuals with unilateral functional dominance (right-handed and left-handed people), as compared to persons with a mixed type of functional asymmetry. Studies by V.A. Moskvina [25] showed that men with latent left-handedness had higher indicators for schizoid personality disorder, intrapsychic disorganization, conformity, timidity, aesthetic sensibility; in women, the relation between their emotional and personal characteristics and the variations of interhemispheric organization of the brain was more variable. P. Renter-Lorenz, R. R. Givens, M. Moscovitch [26] discovered that the predominance of the right or left hemisphere in the recognition of people's emotional expressions of different polarities was related to the predominance of the right or left hand; in right-handed people (as well as left-handed people with inverted hand position during writing), the reaction time necessary to respond to the image of cheerful people was shorter when it was presented in the right field of view (in the left hemisphere) than when it was presented in the left field, and for sad facial expressions, the results were the opposite. In left-handed people with non-inverted hand position during writing, the lateral differences were opposite [27].

L.Ya. Ballonov, V.L. Deglin, N.N. Nikolaenko [28], T.V. Evtukh, E.A. Silina [29] believe that there is an "emotional specialization" of hemispheres: the right hemisphere is associated with the mechanism of negative emotions, and the left hemisphere – with positive ones. According to L.Ya. Ballonov [28], the participation of the hemisphere in emotional processes is asymmetric: emotional states are regulated mainly by the structures of the left dominant hemisphere, and emotional expression in the motor and sensory parts — by the structures of the right hemisphere.

E.D. Khomskaya et al. [27] introduced the concept of "lateral organization profile" (LOP), which is a natural combination of sensory, motor and mental asymmetries inherent in a particular subject, a dynamic system which determines the interhemispheric interaction in general. It was discovered that there were correlations between the LOP type and the development of communicative properties, peculiarities of

interpersonal interaction, emotional and volitional regulation, and structure of intellectual activity [23, 24, 30]. Persons with the left profile indicators are more impulsive, anxious, confined, as well as restrained, timid, unconfident, and emotionally unstable [30-32], and those with the right profile indicators are more dynamic, adequate, and effective in communication, having high self-control [30]. People with unilateral dominance of motor and sensory functions (right- and left-handed people) tend to be more stable emotionally as compared to people with a mixed type of functional asymmetry [23-25]. V.N. Klein, V.A. Moskvina and A.P. Chuprikov [21] found an increasing imbalance of personal properties and a decreasing resistance to emotional stress in the course of leveling of the functional asymmetry of the brain.

The present research followed the assumption that functional asymmetries (sensory and motor) are predictors of development of emotional regulation abilities, which have been defined above as the EC, as they represent a specific spatial and temporal organization of neuropsychic activity [33] and, according to the theory of hierarchical organization of human psyche by B.D. Ananyev [34], they are included in the system integrating the dispositions of abilities as primary individual and typological properties. In case there are local brain lesions (stroke), due to changes in the functional systems (loss of components, displacement, etc.) and interaction of the hemispheres, there can also be adverse changes in the implementation of emotional competencies resulting in conflicting forms of social interaction, defects of intrapersonal recovery of emotional states, and a high risk of recurrent stroke, which justifies the need to include psychological programs in the treatment for stroke patients and patients with risk of stroke to restore the mechanisms of emotional and personal regulation and structuring of emotional competencies. This reflects the applied nature and practical significance of the study.

The aim of our empirical research was to study the role of the brain asymmetry profile (the LOP type) in the implementation of emotional competence in stroke patients.

MATERIALS AND METHODS

Based on the analysis of data about the phenomenon and definitions of emotional competence and formation of an analytical EC model (Figure 1), the following was studied:

- the structure of emotional competencies in stroke patients characterized by changes in the activities of the structural and functional units of the brain, forming the basis for the implementation of the functional mechanisms of EC, as well as in managers that have succeeded in their careers and probably have a well-developed EC [35-37];

- differences in the manifestations and development of EC in stroke patients and managers depending on the LOP type; and

- differences in the manifestations and development of EC in stroke patients depending on the LOP type taking into account the affected side (left or right).

The first stage studied the components of emotional competencies and the mechanisms of their structuring and implementation according to our theoretical EC model (empathy, reflection, self-regulation, emotional intelligence), and the brain asymmetry profile (of the LOP type). To study empathy parameters (empathy channels, empathic attitudes and mechanisms), the diagnosing empathic abilities technique by V.V. Boiko [38] were used. Forms of reflection (introspection, system reflection, quasi-reflexion) were studied by means of differential reflection test [39]. The individual profile and mechanisms of self-regulation were studied by means of the Self-Regulation Profile Questionnaire [40]. The instrumental development of intrapersonally and interpersonally-oriented emotional competencies was diagnosed by means of the Emotional

Intelligence Inventory (EmIn) [41], which is based on the interpretation of emotional intelligence being the person's ability to understand his/her emotions and those of others and control them. The technique by E.D. Khomskaya was used to determine the brain lateral organization profile (LOP). The author based her approach to the typology of the individual lateral organization profile on a combination of three types of asymmetry: manual, oral-aural, and visual. Taking into account that manual asymmetry was more significant for the general profile, 5 groups of individual profiles were distinguished: pure right-handed, right-handed, ambidextrous, left-handed, and pure left-handed people [42].

In the second stage, by means of hierarchical factor analysis (computer program SPSS_Statistics_22_win32) of empirical data, groups of interrelated properties, occurring in the data sample were identified, which can be considered as emotional competencies because they integrate the parameters of the 1st, 2nd, and 3rd levels of the functional structure of EC (Figure 1).

In the third stage, the tabular method was used – matching tables (computer program SPSS_Statistics_22_win32) – and an analysis of the percentiles conducted in order to investigate the occurrence of the selected factors – emotional competencies – in groups of stroke patients with different LOP types and stroke localization (right-hemisphere stroke, left-hemisphere stroke), as well as in a group of managers.

The study was conducted at the Neurological Department for Patients with Acute Cerebrovascular Disorder (ACVD) of the Regional Vascular Center at Stavropol Regional Clinical Center for Specialized Medical Aid, PJSC BANK URALSIB and PJSC VTB Bank. 85 people took part in the study: patients of the Neurological Department for Patients with Acute Cerebrovascular Disorder (N=61, age of the subjects: 32 to 51 years), of which 31 people had had right hemisphere stroke, 30 people – left-hemisphere stroke; bank employees (managers) (N=24, age of the subjects: 32 to 51 years).

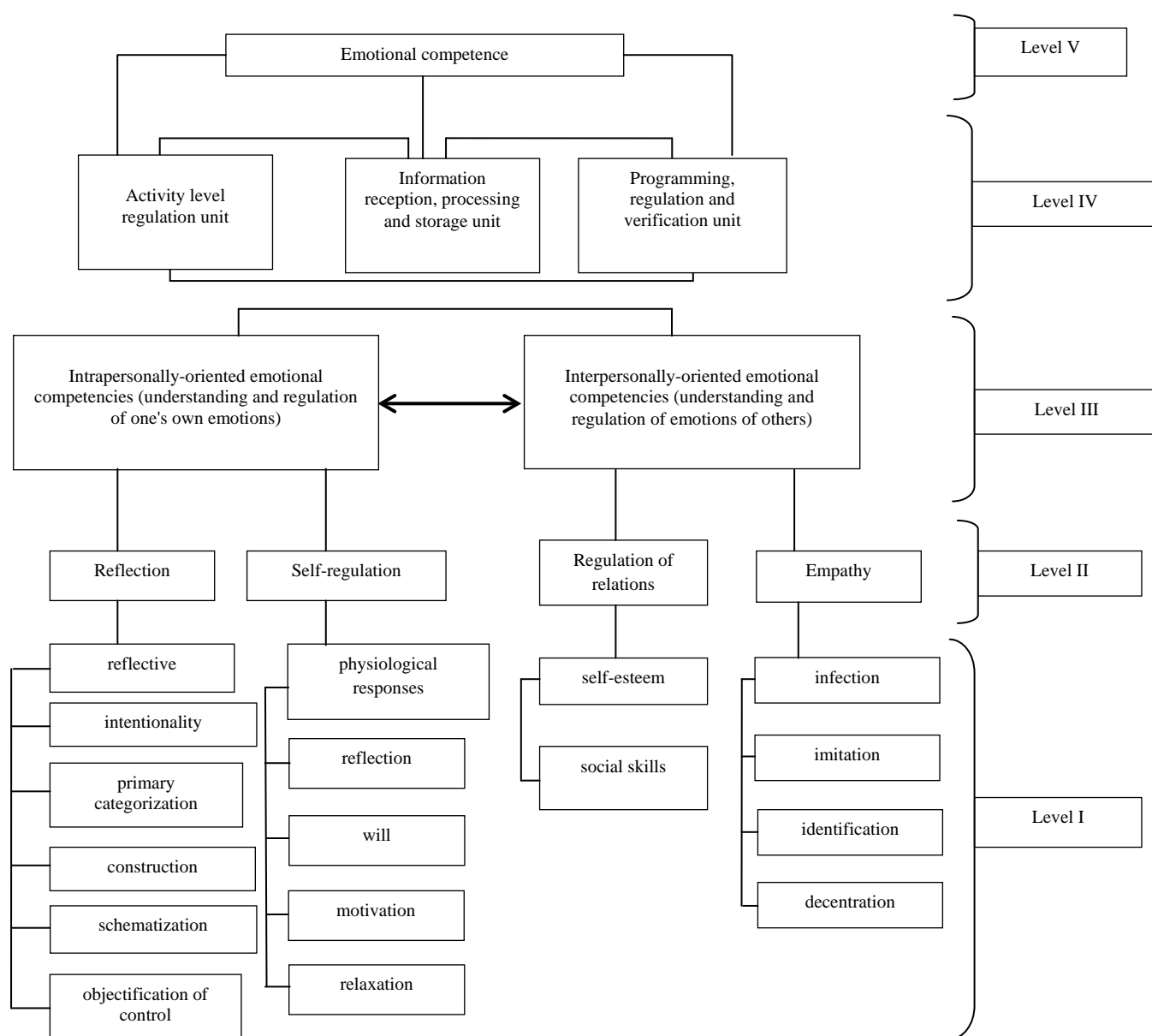


Figure 1. Functional structure of emotional competence

RESULTS

According to the emotional competence structure suggested by us, being a system quality of personality formed by the interaction of the mechanisms of empathy, reflection, self-regulation and interpersonal communication, representing a set of internal, potential psychological formations – competencies (knowledge about emotions and their manifestations, assessment of emotional states and emotional self-regulation and regulation of interpersonal relations), it has been assumed that there are **empirically definable groups of interrelated properties**, which are manifested in the peculiarities of emotional regulation, which can be considered emotional competencies as components of the emotional competence structure.

Factor analysis of indicators of emotional intelligence, reflection, empathy, and self-regulation in the sample allowed to perform an objective R-classification and to define the latent variables based on the presence of linear statistical correlations between the observed variables. After the variance was redistributed, the most simple and clear structure of 4 factors related to emotional competencies was obtained (Table 1):

1. Intrapersonally-oriented irreflexive emotional competency (EC-1) – the explained percentage of variance 27, 766;
2. Interpersonally-oriented emotional competency (EC-2) – the explained percentage of variance 39, 854;
3. Intrapersonally-oriented reflexive emotional competency (EC-3) – the explained percentage of variance 58, 310;
4. Intrapersonally-oriented manipulative emotional competency (EC-4) – the explained percentage of variance 68, 677.

The designations (nominations) of emotional competencies and description of their indicators were given in accordance with the analysis of the contribution of variables (psychological parameters of the analytical construct of emotional competence) to the factor structure.

Description of the indicators of emotional competence

1. Intrapersonally-oriented irreflexive emotional competency

- **Self-regulation indicators:** developed abilities to *model* ($r=0.432$) (compliance of action programs with activity plans, compliance of obtained results with the objectives), *programming* ($r=0.523$ accordingly) (action programs are developed independently, they are adaptable to change under new circumstances, they are stable in case of interference; when the obtained results do not comply with the goals, the action program is to be adjusted to obtain the result appropriate for the person), and *regulatory flexibility* ($r=0.512$) (the ability to rebuild, to make adjustments in the self-regulation system due to changing external and internal conditions).

- **Empathy indicators:** *low* ability to resonate emotionally with others (to empathize, to participate) and see the behavior of partners, to act in case of lack of source data (the contribution of the emotional channel of empathy ($r=-0.781$) and intuitive channel of empathy ($r=-0.591$)).

- **Reflection indicators:** *low* ability to introspect (self-scrutiny) ($r=-0.675$) associated with a lack of focus on one's own condition, experiences; absence of quasi-reflexive trends ($r=-0.435$) aimed at objects which are not related to actual life situations.

- **Emotional intelligence indicators:** developed parameters of intrapersonal emotional intelligence: *understanding one's own emotions* ($r=0.578$) (detection, recognition and identification, understanding the causes, verbal description) and *control over expression* ($r=0.616$) (the ability to control external manifestations of one's own emotions).

2. Interpersonally-oriented emotional competency

- **Self-regulation indicators:** formed abilities to *model* ($r=0.539$) (compliance of action programs with activity plans, compliance of obtained results with the objectives).

- **Empathy indicators:** *a clear* focus of attention, perception and thinking on the state and behavior of the communication partner (the contribution of the rational channel of empathy ($r=0.550$); presence of personal attitudes (focus on establishing contact, interest in other people's feelings) that contribute to the manifestation of empathy and facilitate the action of all empathic channels (rational, intuitive, emotional) (the contribution of empathic attitudes ($r=0.634$)).

- **Reflection indicators:** not represented.

- **Emotional intelligence indicators:** developed parameters of intrapersonal emotional intelligence: *understanding another person's emotions* ($r=0.466$) based on the analysis of their external manifestations and/or intuition; the ability to influence another person, causing him/her to experience certain emotions and/or to reduce the intensity of undesirable emotions ($r=0.691$); a developed ability to *control one's own emotions* ($r=0.607$).

3. Intrapersonally-oriented reflexive emotional competency

- **Self-regulation indicators:** a developed ability to independently build realistic, detailed, hierarchical, and stable plans for one's activity and behavior based one's own goals, to control their implementation, to analyze and evaluate intermediate and final results (a well-developed regulatory autonomy) (contribution of planning ($r=0.681$), autonomy ($r=0.655$)).

- **Empathy indicators:** not represented.

- **Reflection indicators:** focus on one's own states and feelings (contribution of introspection ($r=0.485$)); a developed ability to distance oneself (a detached view on oneself) (the contribution of system reflection ($r=0.777$)), the presence of quasi-reflexive trends ($r=0.583$) determining the focus of consciousness on objects not related to real life situations.

- **Emotional intelligence indicators:** not represented.

4. Intrapersonally-oriented manipulative emotional competency

- **Self-regulation indicators:** adequate assessment of oneself, the results of one's activities and behavior based on the development and stability of subjective evaluation criteria and flexible adaptation to changing conditions (the contribution of results estimation ($r=0.643$)).

- **Empathy indicators:** *low* focus of consciousness on the state, problems and the partner's behavior, lack of spontaneous interest in another person (the contribution of the rational channel of empathy ($r=-0.607$); developed communicative abilities ($r=0.687$); a developed ability to understand the partner based on compassion, the ability to take the other person's side, lightness, mobility and flexibility of one's own emotions, a developed ability to *emulate* (the contribution of identification with the partner ($r=0.401$)).

- **Reflection indicators:** not represented.

- **Emotional intelligence indicators:** a developed ability to *understand one's own emotions* ($r=0.407$), including detection, recognition and identification, understanding the causes and verbal description.

It is rather noteworthy that developed *self-regulation* processes are indicators of all statistically structured emotional competencies.

Undertaking to determine the contribution of brain asymmetry in the implementation of emotional competence, which is manifested in the degree of integrity and adequacy of emotional regulation of behavior and activity, the matching table method was used. The tabular method represents the results of statistical observations, summaries and groups of statistical

indicators that characterize the object under study, and allows to assess the representativeness of the factors (the emotional competencies described above) and their influence in the comparison groups (in the group of managers and the group of stroke patients; the groups of stroke patients with right-side and left-side localization of stroke with different profiles of lateral organization of functions).

The analysis of the matching tables (Table 2) shows that intrapersonally-oriented irreflexive emotional competency (EC-1) and interpersonally-oriented emotional competency (EC-2) are more typical of the group of successful managers than of the stroke patients group. As for EC-3 (intrapersonally-oriented reflexive emotional competency) and EC-4 (intrapersonally-oriented manipulative emotional competency), the groups of stroke patients and managers do not differ significantly, but they tend to have a greater influence in the managers group.

Thus, it can be seen that stroke, being an acute cerebrovascular disorder, correlates with a general decrease in emotional competence.

The analysis of matching tables of emotional competencies of stroke patients with right-side and left-side localization of stroke (Table 3) detected significant differences between them in terms of formation of EC-3 (intrapersonally-oriented reflexive EC): that emotional competency has a stronger impact in the group of patients with right-hemisphere stroke. Less obvious distinctive trends were also found for EC-1 (intrapersonally-oriented irreflexive emotional competency) – it is most influential in the right-hemisphere stroke group; EC-2 (interpersonally-oriented emotional competency), and EC-4 (intrapersonally-oriented manipulative emotional competency) are most influential in the left-hemisphere stroke group.

Table 1. Results of factor analysis of psychological parameters of the analytical construct of emotional competence

Psychological parameters	Component			
	1	2	3	4
Rational channel of empathy		,550		-.607
Emotional channel of empathy	-.781			
Intuitive channel of empathy	-.591			
Empathic attitudes		,634		
Penetrating ability in empathy				,687
Identification with the partner				,401
Planning (regulatory process)			,681	
Modeling (regulatory process)	,432	,539		
Programming (regulatory process)	,523			
Estimation of results (regulatory process)				,643
Flexibility (regulatory process)	,512			
Independence (regulatory process)			,655	
System reflection			,777	
Introspection	-.675		,485	
Quasi-reflexion	-.435		,583	
MU (management of others' emotions)		,691		
VP (person's understanding of one's own emotions)	,578			,407
VU (management of one's own emotions)		,607		
VE (control of emotional expression)	,616			
MP (recognition of others' emotions)		,466		

Note: the level of statistical significance of the correlations (factor loadings) between the observed variables - $p < 0.01$.

Table 2. A matching table of emotional competencies in managers and stroke patients groups

		Factor 1 (EC-1)		Total
		weak impact	strong impact	
Type	stroke patients	88.1%	55.8%	71.8%
	managers	11.9%	44.2%	28.2%
Total		100.0%	100.0%	100.0%
		Factor 2 (EC-2)		Total
		weak impact	strong impact	
Type	stroke patients	95.2%	48.8%	71.8%
	managers	4.8%	51.2%	28.2%
Total		100.0%	100.0%	100.0%
		Factor 3 (EC-3)		Total
		weak impact	strong impact	
Type	stroke patients	83.3%	60.5%	71.8%
	managers	16.7%	39.5%	28.2%
Total		100.0%	100.0%	100.0%
		Factor 4 (EC-4)		Total
		weak impact	strong impact	
Type	stroke patients	83.3%	60.5%	71.8%
	managers	16.7%	39.5%	28.2%
Total		100.0%	100.0%	100.0%

Note: impact was classified as "low" or "high" by means of dividing the factor values into percentile groups.

Table 3. Matching table of emotional competencies in groups of stroke patients with right-side and left-side localization of stroke

		Factor 1 (EC-1)		Total
		weak impact	strong impact	
Type of stroke	RHS	48.6%	54.2%	50.8%
	LHS	51.4%	45.8%	49.2%
Total		100.0%	100.0%	100.0%
		Factor 2 (EC-2)		Total
		weak impact	strong impact	
Type of stroke	RHS	52.5%	47.6%	50.8%
	LHS	47.5%	52.4%	49.2%
Total		100.0%	100.0%	100.0%
		Factor 3 (EC-3)		Total
		weak impact	strong impact	
Type of stroke	RHS	42.9%	61.5%	50.8%
	LHS	57.1%	38.5%	49.2%
Total		100.0%	100.0%	100.0%
		Factor 4 (EC-4)		Total
		weak impact	strong impact	
Type of stroke	RHS	54.3%	46.2%	50.8%
	LHS	45.7%	53.8%	49.2%
Total		100.0%	100.0%	100.0%

Note: RHS – right-hemisphere stroke; LHS – left-hemisphere stroke.

Table 4. Matching table of emotional competencies in groups of stroke patients with different LOP types

		Factor 1 (EC-1)		Total
		weak impact	strong impact	
LOP	Right-handed	57.1%	53.5%	55.3%
	Ambidextrous	23.8%	41.9%	32.9%
	Left-handed	19.0%	4.7%	11.8%
Total		100.0%	100.0%	100.0%
		Factor 2 (EC-2)		Total
		weak impact	strong impact	
LOP	Right-handed	50.0%	60.5%	55.3%
	Ambidextrous	31.0%	34.9%	32.9%
	Left-handed	19.0%	4.7%	11.8%
Total		100.0%	100.0%	100.0%
		Factor 3 (EC-3)		Total
		weak impact	strong impact	
LOP	Right-handed	64.3%	46.5%	55.3%
	Ambidextrous	21.4%	44.2%	32.9%
	Left-handed	14.3%	9.3%	11.8%
Total		100.0%	100.0%	100.0%
		Factor 4 (EC-4)		Total
		weak impact	strong impact	
LOP	Right-handed	40.5%	69.8%	55.3%
	Ambidextrous	50.0%	16.3%	32.9%
	Left-handed	9.5%	14.0%	11.8%
Total		100.0%	100.0%	100.0%

Note: impact was classified as "low" or "high" by means of dividing the factor values into percentile groups.

Impact was classified as "low" or "high" by means of dividing the factor values into percentile groups.

It is worth mentioning that EC-2 and EC-4 are indifferent to reflexive mechanisms, but their structuring requires empathy mechanisms, which, in turn, allows us to suggest the presence of an indirect positive relation between right-hemisphere regulation and manifestations of empathy and possible disruption of interpersonally-oriented emotional competencies in patients with right-sided stroke. At the same time, only EC-3, which was largely represented in the right-brain stroke group, is characterized by the ability to plan, a developed regulatory autonomy, and the involvement of different forms of reflective

activity. Therefore, the "affinity" of these markers is assumed to be for left-hemisphere regulation.

Using the technique by E.D. Khomskeya et al. [42] to determine the brain lateral organization profile (LOP), the group of stroke patients was divided into three comparison subgroups: right-handed, left-handed, and ambidextrous people (other LOP types in this sample were not diagnosed). The analysis of matching tables of emotional competencies of stroke patients having the selected LOP types revealed (Table 4) discriminatory trends between them for all statistically structured emotional competencies. EC-1 (intrapersonally-oriented irreflexive emotional competency) and EC-3 (intrapersonally-oriented

reflexive emotional competency) have a more obvious impact on emotional regulation in ambidextrous people, a less obvious impact in right-handed people, and an insignificant impact in left-handed stroke patients. EC-2 (interpersonally-oriented emotional competency) is mostly represented in the group of right-handed patients, less represented in the ambidextrous group, and is not represented at all in the group of left-handed stroke patients. EC-4 (intrapersonally-oriented manipulative emotional competency) is more typical of right-handed stroke patients, it decreases in the left-handed group, and is less common for ambidextrous people.

Table 1 shows that EC-1 (based on this EC is the understanding of one's own emotional states and control over expression of emotions on the basis of regulatory processes such as programming, modeling and flexibility, blocking of channels of irrational empathy and non-systemic reflection) and EC-3 (structured based on planning, regulatory autonomy and reflection), being interpersonally-oriented emotional competencies, are mainly represented in the right-sided stroke group (Table 3) and have a significant impact on emotional regulation in ambidextrous people. Probably, the formation of these emotional competencies in ambidextrous people follows the way of coping strategies in the regulation of their emotional instability, observed by several researchers [23, 30-32], and these competencies remain intact in case of right-hand stroke (Table 3), because their implementation mechanisms include the functional systems of left-sided regulation. EC-2, typical of right-handed patients, is based on the ability to understand and manage emotions of others and manage one's own emotions on the basis of the regulatory modeling process, which correlates with the peculiarities of left-sided regulation and rational attitudes towards empathy correlated with right-hemisphere regulation. Probably, the consistency of empathic mechanisms ensures the implementation of this competency in case of left-hemisphere stroke. EC-4, less common for ambidextrous people, but, unlike other competencies, represented both in right-handed and left-handed patients, is intrapersonally oriented, as it reflects the ability to understand one's own emotions, as well as manipulative, as it is structured by means of specific empathy mechanisms (penetrating ability and identification with the partner, blocking of the rational channel of empathy) and mechanisms estimating the results of one's activity. Probably, generalization of this competency takes place during the formation of interhemispheric interaction processes, but, to a greater extent, this competency is correlated with right-hemisphere regulation, which is proven by its consistency in case of left-hemisphere stroke (Table 3).

CONCLUSION

The analytical construct of emotional competence developed by the authors based on the integration of functional, operational and regulatory mechanisms of emotional activity is a multi-level system, with competencies (interpersonally and intrapersonally oriented) being the central units of analysis. Empirical verification of the developed construct has confirmed its viability through the factorization of groups of interrelated properties which reflect different aspects and mechanisms of emotional regulation of behavior and activity. A clear structure of emotional competence represented by four emotional competencies has been established – intrapersonally-oriented irreflexive, interpersonally-oriented, intrapersonally-oriented reflexive, and intrapersonally-oriented manipulative, the indicators of which are the mechanisms and processes of empathy, reflection, and self-regulation, and instrumental parameters of emotional intelligence. The developed self-regulation processes are indicators of all four empirically selected emotional competencies.

Due to local brain lesions in case of stroke, there is a change in the activity of the functional systems underlying the implementation of emotional competence, which is manifested in its general decrease in stroke patients, as compared to the group of successful managers who have not had a stroke, mainly thanks to intrapersonally-oriented irreflexive emotional competency and interpersonally-oriented emotional competency.

One of the factors determining the variability of emotional competence of stroke patients is the right-sided or left-sided localization of the lesion. Left-sided localization of stroke is characterized by a decrease in the intrapersonally-oriented reflexive and irreflexive emotional competencies, the functioning of which is ensured by reflection mechanisms. At the same time, right-sided localization of stroke is characterized by a significant decrease in interpersonally-oriented and intrapersonally-oriented manipulative emotional competencies, the indicators of which are developed mechanisms of empathy.

Some differences in emotional competencies of stroke patients with different LOP types have been discovered: emotional regulation in ambidextrous people is largely represented by intrapersonally-oriented reflexive and irreflexive emotional competencies, which are not typical of left-handed patients; interpersonally-oriented and interpersonally-oriented manipulative emotional competencies are more developed in the group of right-handed patients; and left-handed patients have less developed emotional competencies, which have been selected empirically, with the exception of intrapersonally-oriented manipulative emotional competency, which is more obvious in the left-handed group than in the group of ambidextrous people. Thus, the influence of the lateral organization profile on the structuring and implementation of emotional competencies and individual peculiarity of emotional competence in general is obvious, which is confirmed by a relative preservation of emotional competencies significantly correlating with certain LOP types, even in case of a stroke affecting the dominant hemisphere.

The trends in variation of emotional competence in stroke patients with different lateral organization profiles and lesion location, discovered through the study, allow to develop individual programs of psychological support, the application points of which are interpersonally- and intrapersonally-oriented emotional competencies.

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