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Dynamics of Mental States' Representations in the Conditions of Experimental Influence

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ABSTRACT
The study of the human mental state as a mental phenomenon supposes a study of different parts of representations in the state of consciousness. The emergence and consolidation of mental representations of states associated with the processing of internal sensations and impressions that in comparison with the content of an earlier experience form the mental structures associated with the current state. The aim of research is the study of the dynamics of mental states' representations of students in the experimental exposure. The experiment involved 30 people aged 18-19 years. Investigation of the stability-variability of mental representations was carried out as follows. First recorded baseline characteristics of mental states' representations: associative, evaluative and imaginative. Then students described the current state. Associative characteristics of mental representations before and after the relaxation session differ in sectoral and generative characteristics. Found the impact of the mobilizing effects on the imaginative characteristics of mental states representations: there is an increase of sensitivity to external influences, clarity, awareness of perception, memory improvement. Revealed leading regulatory function of meditation. After the meditation the intensity of evaluative characteristics of mental representations of states close to the average values. The significance of the results obtained is that there is a leading regulatory function of meditative techniques in changing of mental states.
Keywords: mental representation, mental state, dynamics, experimental influence, learning activity

INTRODUCTION

The concept of a "mental representation", according to G. Eysenk [1], is one of the most complex, appeared recently in psychological science. The starting point of that concept is the idea of a mental (internal) representation which is acting as a reflection of external world's

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some qualities. It is mentioned that mental state of students depends on quality of life [2, 3] and cognitive abilities [4].

At the present time, researchers of that psychological construct have developed ideas about mental representations as an internal structures related with the subjective mapping of the objective and social world, understood as "the subjective form of the vision of what is happening", which occurs ontologically in the process of individual development of a man [5 p. 245].

Mental representations can be considered as a process (process of mapping, representation) and as a result, the unit (description of experience within the view of the world). The first approach is characteristic of foreign psychology, where the emphasis is on the procedural, dynamic side of mental representation, on its cognitive functions [6, 7, 8, 9, 10].

Within the second approach, mental representations are understood as internal structures that are formed in the process of a human life, in which the view of the world, the society and him is formed. This paradigm of mental representation is characteristic of a number of Russian and foreign works [11, 12, 13, 14]. It allows us to consider the organization and content of human verbal and imaginative representations.

According to that approach, which considers mental representation as the result of a mapping, it is customary to distinguish several forms: figurative, conceptual, functional representations (representations related to the action) and social representations [15]. The key in that case are figurative and conceptual mental representations.

Consistent with the views expressed, the study of mental representations of human states has a special significance, since the mental state - the individual subjective phenomenon of the human psyche and the identification of universal patterns of state representations will reveal the patterns in formation of the world view and the structure of judgments about it. This is a special kind of representation of what does not correspond to the objective substantive world that is why studying the psychological mechanisms and patterns of states representations of the subject will allow a deeper understanding of the nature and functioning of representations in a person's mental life, in his inner world.

In that context, the study of human condition as a mental phenomenon associated with the mental experience of one's own experiences presupposes the study of different aspects of the state representation in consciousness. The proposed conceptual positions for studying mental representations of mental states [16, 17] are based on the assumption that the emergence and consolidation of mental states representations are associated with the processing of internal sensations and impressions which pass through the stage of comparison with the content of an earlier experience, form mental structures associated with the actualized state. Emerging mental structures are fixed and enunciate in the memory structures, forming subjective mental experience. We suggested that there are universal (invariant) and specific (individual) components of mental representations of mental states; the ratio of these components is different for mental states of a different sign, modality,

duration and level of mental activity. Subsequent studies have confirmed the correctness of the assumptions [18, 19].

Another assumption was related to the stability-variability of representations in different time formats and in different situations (events) of viability: a hypothesis was expressed that the dynamics of mental representations of mental states is characterized by the preservation of the basic nucleus of representations, regardless of situations, conditions and temporal characteristics. This hypothesis was based on studies of mental state image which was found that the image of the state is stable independently of situations and factors affecting it (it should be reminded that figurative characteristics are the component of states' mental representations) [20, 21].

An experimental test of this hypothesis was devoted to this study.

MATERIALS AND METHODS

The aim of the research was to reveal the dynamics of associative, evaluative and figurative characteristics of mental representations of mental states during the experimental impact on them. Investigation of sustainability of mental representations' variability was carried out according to the following scheme. At the beginning, the source (background) characteristics of states' mental representations were recorded: associative, estimated and figurative, current states were described. Studies took place during the training sessions (lectures), so during the explanation of the material the lesson was interrupted, and the students immersed in the relaxation state: the methods of Schulz, Everly Rosenfeld, meditative techniques. Students were "removed" from the relaxation state by means of special activation techniques. After this, a re-measurement of the associative, conceptual and evaluative characteristics of states followed, as well as their description.

The experiments were conducted during the semester. It involved 30 people, at the age of 18-19 years. The results were processed with the help of content analysis, standard statistical techniques, as well as special processing techniques, characteristic for associative, evaluative and image characteristics of states.

RESULTS

Dynamics of associative characteristics of mental states mental representations

In the course of the study, with respect to background data, changes in the associative characteristics of mental representations were revealed, different for states of different levels of mental activity. Thus, for conditions of a high level of mental activity, there is a decrease in physiological characteristics and a lack of a category of "action" in generative characteristics.

Figure 1a presents the sectoral characteristics of the fear state (high level of mental activity) before the Everlen-Rosenfeld relaxation session. Figure 1b reflects changes in sectoral characteristics after a relaxation session. Significant changes are observed in the sector of physiological reactions: their decrease from 26% to 15%.

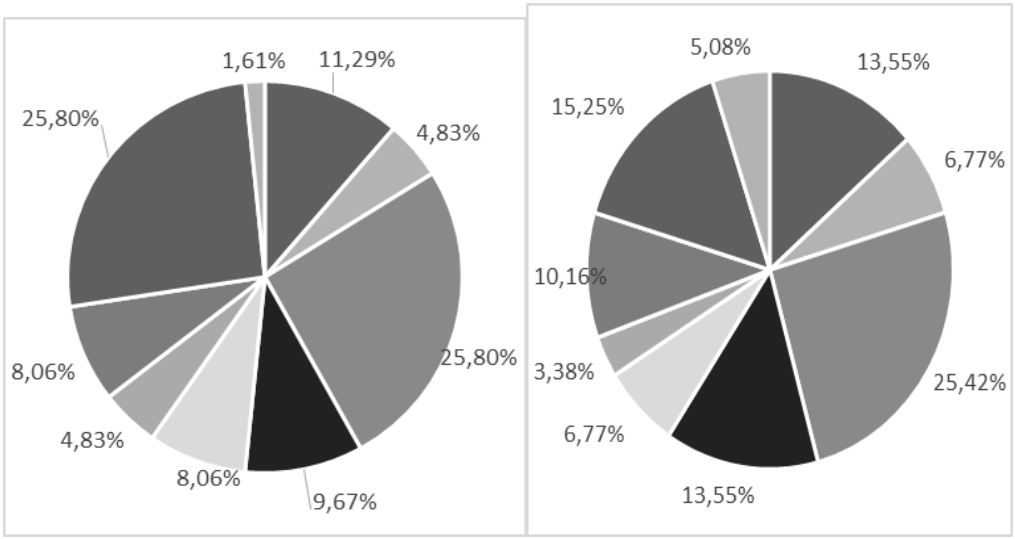

Figure 1a: (On the left). Sectoral characteristics of the fear state before the relaxation session by Everly and Rosenfeld

Figure 1b: **(**On the right). Sectoral characteristics of the fear state after a session of relaxation by Everly and Rosenfeld

While describing relatively equilibrium states, a decrease in the density of nuclear formations of semantic spaces was revealed. In sectoral characteristics - increase in the emotional components, as well as decrease in the number of subject and cognitive components. An increase in the denotative component in generative characteristics is observed (Figure 2).

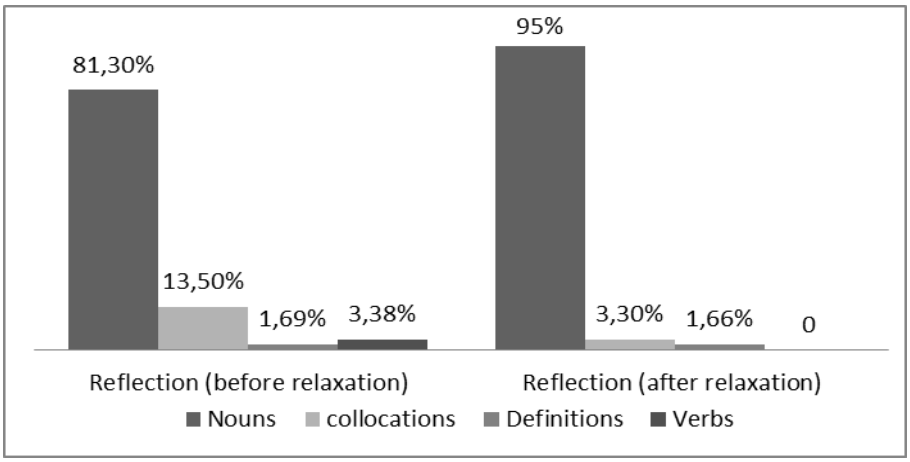

Figure 2: Changes in generative characteristics of the reflection state before and after relaxation session by Everly-Rosenfeld

For low level of mental activity conditions, there are differences in sectoral characteristics (the appearance of physiological reactions, the lack of cognitive characteristics). There is also an increase in the number of generative utterances.

Dynamics of the mental states representations' imaginative characteristics

During the research, as we noted, subjective descriptions of states were fixed before and after exposure on a person.

Let us turn to the results. After using the Everly-Rosenfeld relaxation method, some changes in cognitive indices are revealed, related to ingenuity, resourcefulness, logic; changes in physiological reactivity: a moderate increase in muscle tone; From the side of experience: lightness, relaxedness, activity of experiences; From the side of behavior: stability, confidence in behavior, optimism, fervor, etc. (Figure 3).

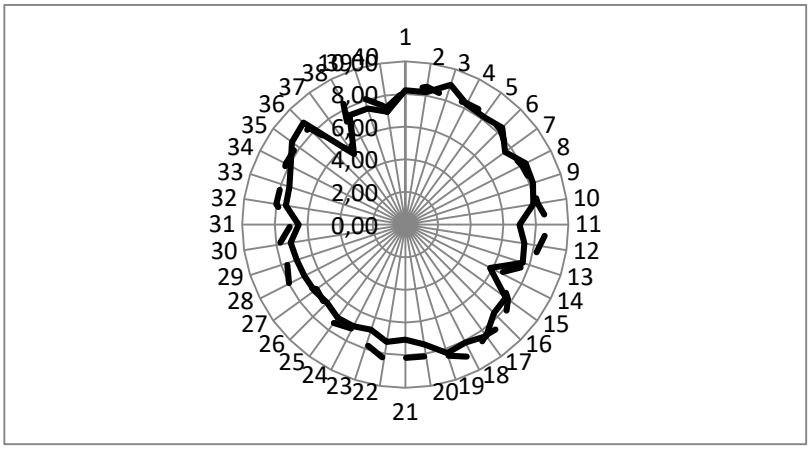

Figure 3: Changes in the imaginative characteristics of mental states mental representations after relaxation session by Everly Rosenfeld

NOTES: dotted line – before relaxation solid line – after relaxation

More pronounced changes were characteristic after meditative influences (Figure 4.) Meditation had an effect as follows: awareness of perception decreased. The memory improved, the ability to concentrate increased motor activity, cardiac activity improved, optimism, enthusiasm, activity, vivacity, briskness, ease, relaxedness, emancipation of emotions, activity, thoughtfulness, confidence, openness and balance of behavior.

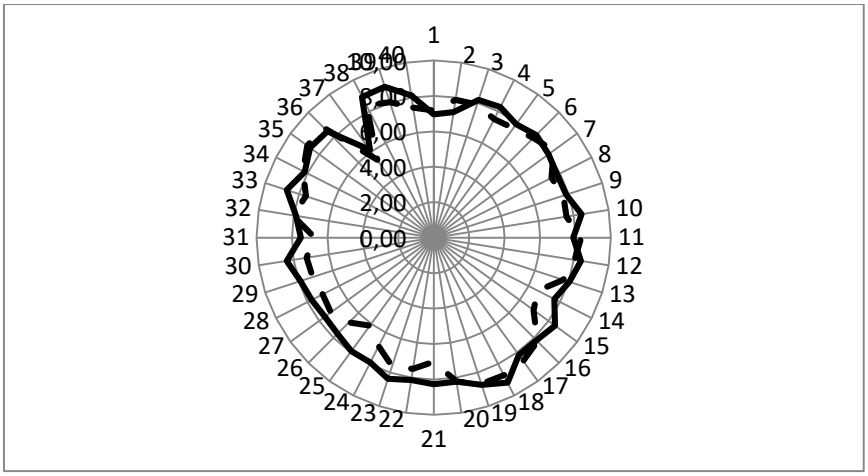

Figure 4: Changes in the imaginative characteristics of mental states mental representations after meditation session

NOTES: dotted line – before meditation solid line – after meditation

There is another interesting aspect of our study: in addition to relaxing influences, we also used "mobilizing influence." In general, the group data did not reveal any changes after the mobilizing influence on mental representations of the states - the effect of the influence was approximately the same as for the relaxing influence on the states.

At the same time, there were subjects in the group, on which the mobilizing effect had a significant influence on the imaginative characteristics (Figure 5).

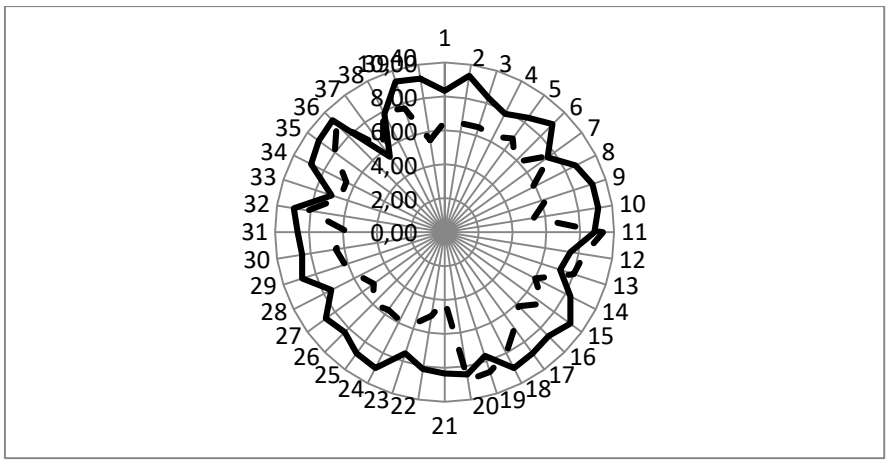

Figure 5: Changes in the imaginative characteristics of mental states mental representations after mobilizing effect

NOTES: dotted line – before mobilizing effect solid line – mobilizing effect

In particular, there is an increase in sensitivity to external influences, clarity, awareness of perception, improved memory, definition, clarity, perceptions, intelligence, self-confidence, increased concentration, motor activity, breathing depth.

Improvement of cardiac activity, sweating conditions, redness of the skin was revealed, activity of experiences was noted; activity, consistency, dimensionality, reasonableness, controllability, adequacy, confidence and openness of behavior.

Decreased speech activity, temperature sensations, muscle tone, coordination and clarity of movements, stability. Relaxation is noted.

Dynamics of evaluation characteristics of mental states mental representations

In order to study the dynamics of students' mental representations evaluation characteristics before and after meditation procedure, states of joy, anger, calmness and tiredness were considered. The subjects were asked to describe the data of the state with the help of adjective words represented in the semantic differential technique (in the author's modification). Estimation of states was carried out on 41 bipolar scales, the poles of which are given by verbal antonyms, describing the opposite qualities of objects.

Table 1: Nuclear, near-nuclear and peripheral characteristics of mental representations of mental states of joy, calmness, anger and tiredness

Mental states	Nuclear characteristics	Near-nuclear characteristics	Periphery
Joy	Light, joyful, active, kind, cheerful, beloved, warm, vigorous	Simple, relaxed, creative, expected, loud, healthy, sociable, confident	Chaotic, unconscious, soft, inaccurate, exciting, uncontrollable
Calmness	Relaxed, light, simple, adequate	Cheerful, light, pleasant, focused, warm, balanced	Conscious, arbitrary, practical, soft
Anger	Intensed, angry	Bad, small, dark, nasty, exciting, cheerful	Passive, long, chaotic, confident, frequent
Tiredness	Slow, passive, dull, sleepiness	Heavy, sad, unreceptive	Clamped, Closed

Data processing was carried out using frequency analysis; mean values were calculated for all scales, in addition, the mean values of the estimated characteristics were compared (according to Student's t-test). When processing data, the statistical package SPSS 16.0 was used.

As a result of research, invariant components of mental representations of various mental states were established. For example, as nuclear formations of the state of "joy", one can single out such characteristics as: "joyful" - is represented in the consciousness of

absolutely everyone; "cheerful", "good", "pleasant" - found in almost all subjects; "beloved", "light" - is observed in the vast majority of respondents who evaluated that condition.

For the state of "anger" such invariant elements as "intense" and "angry" are characteristic. In addition, the majority of respondents evaluate this state as "bad", "dark", "nasty" and "exciting", etc. To the periphery of the mental representation of the state of anger, such characteristics as "passive", "chaotic", “frequent”, etc., Thus, if we compare high-intensity states of "joy" and "anger," it can be noted that in the mental representation of these states, opposite characteristics prevail: "good-evil", "active-passive", "relaxed-stressful". However, there are general indicators, such as: vigorous, confident, exciting, chaotic. The latter indicates that these characteristics are more inherent for high-intensity states.

The state of "tiredness" is characterized by such nuclear components as: "slow", "passive", "dull", "sleepiness". In that case, the state of tiredness has even more variable components, which indicates that it is described differently by different respondents, and therefore is represented in the mind by a large set of elements.

Relatively equilibrium state of "calmness" is assessed by the subjects as relaxed, easy, simple and adequate. In addition, most noted that this state can be described as fun, pleasant, warm, and also conscious and practical. It should be noted that, being positive, the state of "calmness" has more similar characteristics with a state of joy than tiredness and anger.

In future, the problem of comparing mental representations of mental states of joy, tiredness, anger and calmness before and after meditation was solved. As it shown in Table 2, after meditation, some characteristics of mental representations of states changed significantly.

Table 2: Comparison of the mean values of the estimated states characteristics: joy, anger, calmness and tiredness before and after meditation (according to the Student's t-test)

Joy				Anger			
State characteristics	Before meditation	Relevance	After meditation	State characteristics	Before meditation	Relevance	After meditation
stressed	1,78	p≤0,013	2,56	severe	5,65	p≤0,007	4,30
practical	1,52	p≤0,013	2,30	unperceived	4,17	p≤0,026	2,91
solid	1,91	p≤0,050	2,82	stressed	5,91	p≤0,001	4,73
unchained	5,60	p≤0,032	4,86	hated	5,47	p≤0,008	4,39
rosy	5,69	p≤0,010	4,47	calming	2,13	p≤0,024	3,04
				sick	4,65	p≤0,004	4,00

				unbalanced	5,39	p≤0,016	4,39
Calmness				Tiredness			
sad	2,86	p≤0,050	2,17	passive	5,09	p≤0,050	4,34
good	5,56	p≤0,029	4,47	practical	4,52	p≤0,02	3,26
light	6,09	p≤0,050	5,17	slow	4,57	p≤0,031	3,60
practical	3,09	p≤0,043	2,04	unreceptive	5,26	p≤0,033	4,47
sad	3,39	p≤0,013	2,30	manageable	4,13	p≤0,035	3,21
manageable	5,35	p≤0,014	4,39	closed	5,35	p≤0,050	4,34

Considering the state of joy, we should note that in the mental representation of students this state becomes less relaxed, more practical and firm, at the same time, the indicator of relaxedness decreases. That is, after the meditation procedure, averaging of the characteristics in question occurs, and the state of joy becomes more balanced. In turn, a similar state of calm is characterized by similar manifestations: after meditation, it is assessed by students as a bright, good and manageable state.

In the case of a state of tiredness, there is a decrease in closure and sleepiness. In addition, the subjects note an increase in activity, controllability and mobility in the mental representation of the state of tiredness. A significant decrease in the intensity of the mental representation of the state of anger characteristics was found after meditation on the indicators: severity, tension, hatred, soreness and imbalance. In addition, anger is assessed by students as a more calm state. In general, the assessment of anger becomes more even (Figure 6).

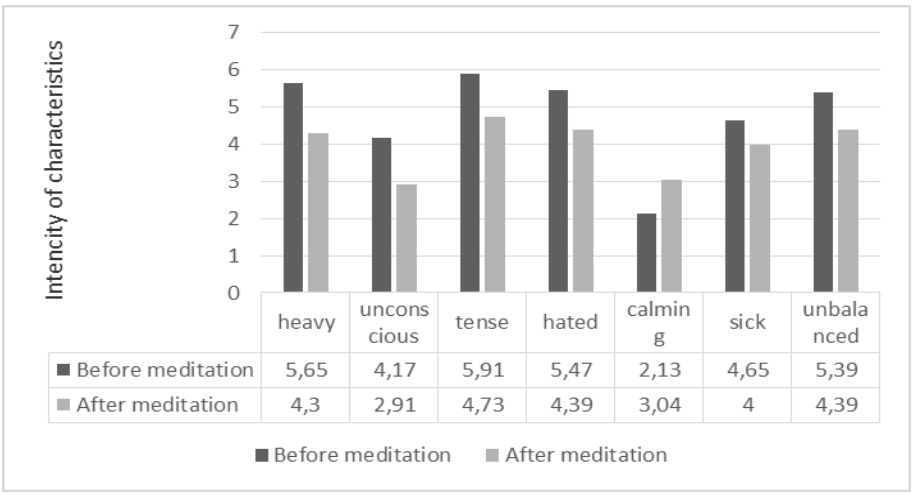

Figure 6: Comparison of the mean values of state of anger evaluation characteristics before and after meditation

As it is shown in the figure, in the mental representation of the state of anger, there is a significant decrease in negative indicators: gravity ($p \leq 0,007$), tension ($p \leq 0,001$), imbalances ($p \leq 0,016$), which characterize the state of anger. Consequently, the influence of meditation, in the first place, affects precisely these characteristics of the state of anger. At the same time, after meditation, there is an increase in the indicator "soothing" ($p \leq 0,024$), and anger becomes less exciting.

DISCUSSION

Studies have established that the associative characteristics of mental representations before and after relaxation session are characterized by manifestations of sectoral and generative characteristics. For conditions of a high level of mental activity, there is a decrease in physiological characteristics and a lack of a category of "action" in generative characteristics. For conditions of low level of mental activity, there are differences in sectoral characteristics (the appearance of physiological reactions, the lack of cognitive characteristics).

Each of the applied techniques had a certain effect on the imaginative characteristics of a person's condition. Note that the results of relaxing or activating effects may depend on the specific nature of the used technique, as well as on the individual characteristics of the subjects. In particular, the mobilizing effect was influenced by the conditions of 40% of the subjects. Positive influence on the majority of students is associated with meditation: the experiences, direction and awareness of behavior in the structure of mental representations of states have improved. The method of neuromuscular relaxation by Everly-Rosenfeld has had a greater effect on the physiological manifestations. Autogenous influence affected the processes of sensation, perception and memory, the direction of behavior, muscle tone and the work of the gastrointestinal tract in the structure of states representations.

Common elements of the evaluation characteristics of mental representations of states are: relaxation, lightness, simplicity, and also simplicity and softness. The greatest number of changes is characteristic for mental representations of negative mental states of anger and tiredness. Positive states of joy and calmness are less affected by the changes after the meditation procedure. Note the regulatory function of meditation: after this procedure, the intensity of mental representations of all considered states in students' decreases tends to average values.

CONCLUSION

The study established features of changes in mental representations of students' mental states: evaluation, imaginative and associative characteristics after relaxation, mobilization and meditative influences. In general, the observed changes are more of a trend nature.

It has been established that the associative characteristics of mental representations before and after the relaxation session are characterized by differences in sectorial characteristics (the appearance of physiological reactions in the absence of cognitive ones) and an increase in the number of generative utterances.

It was found that the results of relaxing or activating effects may depend on the specific nature of the technique used, as well as on the individual characteristics of the respondents. Thus, the method of neuromuscular relaxation by Everly-Rosenfeld had a greater effect on the physiological manifestations, whereas autogenous immersion affected the processes of sensation, perception and memory, the direction of behavior, and muscle tone.

Invariant components of the estimated characteristics of mental representations of mental states: anger, joy, calmness and tiredness are established. The greatest changes after the meditation procedure are typical for mental representations of negative mental states of anger and tiredness. The leading regulatory function of meditation has been revealed: after this procedure, the intensity of mental representations of all considered states in students decreases to average values.

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