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Psychological features of space perception as main PIQ of military aviation

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Abstract

Beginning of the XXI century is connected with cardinal changes in the military aviation of the Republic of Kazakhstan. A special place occupies training of military aviation professionals. The successful fulfillment of military aviation activity directly depends on the person's professional formation in the process of getting education in military high school. The successful fulfillment of military aviation activity directly depends on the person's professional formation in the process of getting education in military high school. Research conducted on the basis Military Institute of Air Defense Forces between 2012 and 2014. There were 120 participants from 17 to 22 years old. All subjects are males. Findings showed that most of participants showed domination of left hemisphere. In addition, method "Spatial Orientation Test" revealed interesting data on the "mirror" effect of perception among space cadets. 18% of responses were given in the "mirror" displaying, that is with turn on 180 °. As a result of our research we can conclude that the main professional qualities, in the opinion of the students, are formed by the students by the third year of training, which falls on the stage of professional growth. The most productive stage of military aviation specialist's professional development is the period of study on the senior courses.

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1. Introduction

Beginning of the XXI century is connected with cardinal changes in the position of the Republic of Kazakhstan in the global community. In this regard, there is a need to ensure the state's security, maintaining the integrity of borders and sovereignty. In the country there were denoted new reference points of the military reform: the transition to a professional army; reduction of the personnel's number by modernizing of combat assets, created on the basis of information technologies; use of the protection of the state borders of the new generation. Prioritized vector of reforms is recognition of human factor importance as the main border of positive changes in the Armed Forces.

By paying attention to the reform of the Armed Forces of the Republic of Kazakhstan based on modern military doctrine there is a need of study and scientific substantiation of military specialists' quality training. A special place occupies training of military aviation professionals.

An aviation activity belongs to the most specific human activities, and learning it has always been too special. Complexity, responsibility and the risk of flight activity, especially training of pilots, social and economic factors of life and activity, physical and mental status, determine the high level of their workers and mental exertion.

2. Problem Statement

This article discusses features of military aviation expert's professional formation in the conditions of military training activities at the Military Institute of Air Defense of the Republic of Kazakhstan (MIAD). Flight work is one of the most complex human activities.

Work in unusual conditions for a person leaving the ground, the rapid movement in space, a high rate of activity, the combination of intense mental work with complex and precise coordinated motor acts, effect on the body physical factors - all these features of military pilots' training, of course, must be considered in vocational training of cadets.

It should be noted that in modern psychology there are lots of studies on various psychological aspects of military's personal development, military-professional work and professionalization of the individual (Bodrov & Orlov, 1998).

The idea of professional formation as a systemic education which begins in early stages of professionalization and is developed throughout the conscious life, - is underlined in the leading researchers among modern concepts of Organizational Psychology (Bodrov, 1998; Zeer, 2005).

Professional development is a productive self-development of the personality, development and self-design of professionally-oriented activities, the definition of their place in the world of professions, realization of professional self-actualization and its potential for achieving the top level of professionalism - summarizes Zeer (2005).

Analysis of modern difficulties in improving the quality of military pilots' training in Kazakhstan determined the direction and the problem of research based on the following contradictions: the need for quality personnel replenishment of aviation parts and really low mental,

intellectual and physical indicators in most of the conscripts in relation to standards accepted in the military activity; change of personally significant targets and values of today's younger generation, choosing the military profession. The complexity of studying this problem caused by existing the large number of diverse social and psychological factors that influence the formation of officers' personality and determining the effectiveness of military service.

3. Research Questions

The successful fulfillment of military aviation activity directly depends on the person's professional formation in the process of getting education in military high school. The concept of personality's professional growth offered by Zeer (2005), gave the basis of numerous researches. Formation of personality is a process of purposeful progressive changes of the person influenced by social impacts on the person and own activity aimed at self-improvement and self-fulfillment.

According to Povarenkov (1999), one can distinguish main characteristics of professional growth: uneven and heterochronicity of personality. Unevenness is manifested by professional development's crises that occur both at the stage of vocational training, and at the stage of independent professional activities. Heterochronicity is expressed in diversity in the development of the individual substructures in different speed and depth of their conversion, the dynamics of changes in the discrepancy of criteria professionalization (Povarenkov, 1999).

During this time, life changes and professional plans occurs, there is a change of social situation, leading activities, restructuring of the personality. Therefore there is a need of separation process on periods or stages. It must be kept in mind that the psychological organization of the young professional, just mastering the military profession is different from the psychological organization of professional's personality. Psychological mechanisms of specific activities' realization on the reproductive and creative levels are so different that they can be attributed to different types of activities, i.e. the transition from one level of activity's implementation to another, higher, is accompanied by rearrangement of the individual and professional development's crisis (Bodrov et al., 1998).

Besides, according to Zeer (2005), as a basis for separating the stages of professional growth there must be taken into account social situation and realization leading activity's level. Overall, the latitude of the study perspective which considers the effect of these two factors on the personality's professional development we are interested only in the period - providing the vocational training in military high school.

Professional development of military aviation specialist begins with admission to the military educational institution. The social situation is characterized by a new social role of the personality - student, new relationships in a military collective, based on mutual support and respect, greater social independence from the family, political and civil majority. It should be noted that in process of training in military high school there is changing ideological and philosophical positions of the cadet: a sense of patriotism and love for the motherland is developing, sense of duty and responsibility to the state; cadets learn the role of defender of the Republic of Kazakhstan. The leading activity in this period is the professional training focused on obtaining the specific profession. According to Zeer (2005), "the duration of this stage of training depends on the type of school, and in case of job receiving immediately after graduation; the duration can be significantly

reduced". The distinctive feature of military training is that it initially has the character of training and service activity. Cadets intrudes into dresses and guards take part in the exercises and shooting, different types of ground and air training, which carries full military service.

4. Purpose of the Study

For actual implementation of professional military activity cadet should possess a number of professionally important qualities necessary for the profession. Professionally important qualities (PIQ) are person's qualities, affecting the efficiency of the implementation of its work on the main characteristics (performance, reliability, etc.).

Modern researches of professionally important qualities are held on the base of a systematic manner. Any activity is realized on the basis of professionally important qualities. This means firstly, "every activity requires a certain set of professionally important qualities, and secondly, the latter is not "mechanical" sum of qualities, and their naturally organized system. Between separate PIQ are set functional relationships of compensatory and cooperative types. The system itself is professionally important qualities acts as specific symptom complex subjective properties specific to a particular activity. It did not set in a ready kind, and is formed according to the subject in the course of mastering its activities".

In the opinion of pilots as a result of high-quality training not only the formation and consolidation of flight skills is improved, confidence in their abilities growth, but also the psychological resistance to flight conditions growth, self-assertion himself as a professional, motivation to further self-improvement.

Analysis of psycho physiological features of military fighter pilot activities on airplanes of the fourth generation, held by modern type(Gander, 2007), allowed allocating five main groups of PIQ:

- 1) Personal PIQ - flight directivity, morality, moral and fighting qualities, character and other personality traits constituting core of professional competence;
- 2) Intellectual PIQ- ability to reprocessing and mastering vast amounts of information, demanding from pilot availability of high level's development of all cognitive mental processes: perception, representation, thinking, memory and attention;
- 3) Psycho physiological PIQ - provide communication of the psyche with physiology, are characterized by the ability to manage their functional state;
- 4) Physiological PIQ - reliability of functioning human organs and systems under the impact of flight's specific factors;
- 5) Physical PIQ - the strength of the pilot's organism, its resistance to unfavorable factors of flight activity.

The level of physical and physiological PIQ at cadets is defined during a medical examination by qualified medical staff and is outside the psychologist's professional competence. Diagnosis and psychological support of psycho physiological, personality and intellectual PIQ included in job duties of psychological services' employees.

5. Research Methods

Analysis and solution of the tasks set out in present research was carried out from 2012 to 2014 on the basis of the Military Institute of Air Defense Forces. Empirical studies during 2 years have

been reached over 120 people. Age of subjects is from 17 to 22 years. All subjects are males, representatives of the titular nationality constitute in total 95% of the total number of learners. Diagnostic toolkit included test of the functional asymmetry for identifying the dominant hemisphere; and “Compasses”, Spatial Orientation Test.

6. Findings

Concept of the mental asymmetry implies inequality of the cerebral hemispheres in the implementation of mental activity, which includes emotional displays, perception, thoughts, consciousness, speech and other functions. Principled regularity in the relation to mental asymmetry is that the left hemisphere is mainly responsible for motor function, language and speech, and the right to manage the skills associated with sensory (especially visual) and spatial experience. Different types of asymmetry corresponds a specific type of higher mental functions' occurrence.

Necessity of using already accumulated knowledge about the functional asymmetry of the pilot in various conditions of professional military activity is a fact. Shirogorov (1976) writes about this, his work involved the question of just how comfortable is pilot's workplace's organization for persons with a different profile asymmetry. Maneuvering airplane in height, course and other parameters of the flight is carried out in the first place “through active work of the pilot with control stick having a standard layout under his right arm”. Operation control of engine is produced by the influence of the left hand on the handle of the gas sector; is required coordinated work of both hands, “particularly intense on the abundance and complexity of the movements for the right hand. By work of this hand pilot does most of the difficult task of keeping the set parameters of flight” machine in the ever-changing environmental conditions; the author suggests that high level of right hand's motor activity is “one of the main conditions for the successful piloting airplane”. As a result of conducted research we obtained the following data presented in the diagram (Fig. 1).

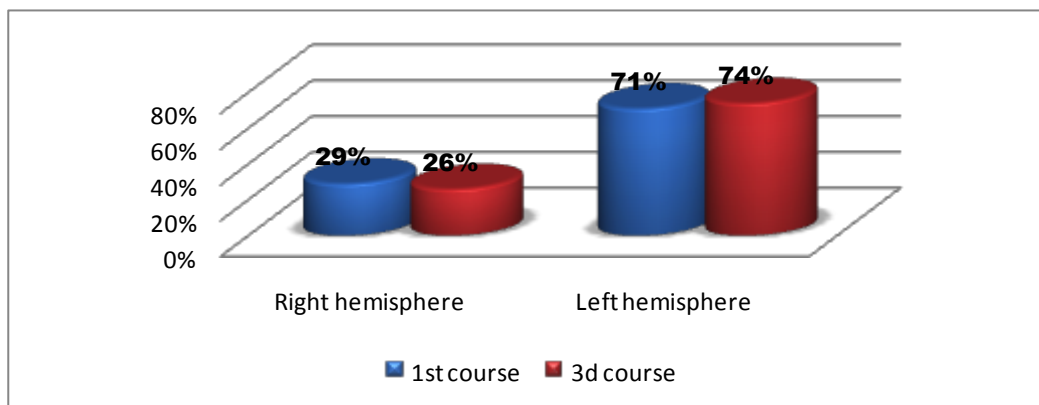


Fig. 1. Results of the dominant hemisphere research among 1st and 3rd course

Minor discrepancies of obtained results among young and senior students reveal certain results.

The relative number of left-handed subjects during training flight activity and the work itself become smaller than among the recruitment of interested persons, because of their natural attrition.

Fedoruk (1982) implemented research in which the quality of pilot's professional work was compared with the profile asymmetry, which was determined based on the specification of hands' functional asymmetry (it was expressed quantitatively in the form of right hand's coefficient (RHC), legs, vision (sighting capability) and hearing (dichotic presentation of words) and asymmetry expressed quantitatively in the form the right ear's coefficient (REC) (Nikolayev, 2008). By determining the arms' asymmetry, legs, the author takes into account not only history and self-assessment test, there were used special tests and, importantly, functional tests, which are particularly noticeable in the dominance of one of the arms.

The advantage of such multilateral determination of the subject's individual profile showed just legal or accounting left-handedness. Left asymmetry not only hands turned out significant signs. At the right-brain pilots frequent mistakes in determining the flight's direction, the order of numbers in reading the instrument information; instead of the right engine they include left and vice versa (Bragina & Dobrokhotova, 1998).

These examples show that it is important to note not only right- and left-handedness, but also the collection of all signs of motor, sensor and mental asymmetries. In addition, Bragina and Dobrokhotova (1998) note that among pilots there are right-brain, characterized by high professional data. However, the dominance of the left hemisphere among pilots is one of the main conditions for the effective implementation of professional.

Besides, the results of study of psycho-physiological PIQ revealed correlation between temperament and the dominant hemisphere. We carried out a correlation analysis using the computer program SPSS 17.0 using Pearson criterion (see. Table 1).

Table 1. Results of correlation analysis on Pearson criterion

		Functional asymmetry
Temperament	Pearson correlation	,450**
	Value (2 sides)	,000
	N	120

** Correlation is significant at the level 0.01 (2 sides).

Revealed connection between temperament and functional asymmetry of the cerebral hemispheres allow to highlight strong pronounced correlation. In most cases, the right hemisphere is dominant at choleric persons, at sanguine persons - left. We suppose that it is connected with irritability, emotionality of choleric persons, which are inclined to undertake hasty actions and rationality, reasonableness of sanguine inclined to planning its activities. The relationship of temperament and the dominant hemisphere in phlegmatic and melancholic persons in research were not identified due to the absence of these types of temperament carriers among the cadets.

Further we investigated the properties of personality in order to obtain comparable information on the development of personality PIQ at cadets of the 1st and 3rd courses.

As it is known, the properties of the individual are not static form, and undergo changes in the course of human life. In the framework of research, it is necessary to obtain information on the formation of a military-professional orientation, the presence of professional abilities and character traits, as well as the level of self-esteem and the development of volitional qualities. The data obtained in the study helped to obtain information about readiness of students to the development of intelligent professionally important qualities.

It is known that the orientation in the air space is one of the basic skills required for aviation activity's effective implementation. This skill is formed purposefully at cadets during their study the disciplines "Air navigation" and "Aerodynamics of flight".

Besides, cadets taught orientation in space bby participation in military exercises in the pre-arranged location, carrying out combat mission, to find reference points and in practice to calculate the points of the compass. We conducted training for spatial perception development using psychological tools. For measuring mentioned PIQ there was used "compass" method, Spatial Orientation Test.

Ananyev's ideas (1963) that the functional asymmetry is a product of temporary connections of individual experience, a consequence of the normal activity of both brain's hemispheres and a necessary condition for effective spatial orientation has great value today.

There are different spatial skills and experience of pedestrians and passengers, drivers and passengers, men and women, people of bilinguals and monolinguals, adults and children, as well as special groups of children, groups living in a spatially-varying environment.

Groups with highly developed spatial skills that require regular use of spatial information can have a particularly high level of spatial cognitive abilities. These are architects, dancers, navigators, pilots, taxi drivers.

Table 2. Results of the correlation analysis

By Spearman	SOT	Correlation coefficient	1,000	,512*	,436
		Value (2 sides)	.	,025	,062
		N	19	19	19
Compass		Correlation coefficient	,512*	1,000	,087
		Value (2 sides)	,025	.	,722
		N	19	19	19
Functional asymmetry		Correlation coefficient	,436	,087	1,000
		Value (2 sides)	,062	,722	.
		N	19	19	19

*. Correlation is significant at the level 0.05 (2 sides).

In addition, method “Spatial Orientation Test” revealed interesting data on the “mirror” effect of the perception of space cadets. 18% of responses were given in the “mirror” displaying, that is with turn on 180 °.

Deceptions of perceiving the world - its mirror reflection in human consciousness - judging by the few long descriptions in the literature, there are “individuals with left asymmetries or hands, or hearing (the function of perception the words) or view (the sighting capability), combined with a right asymmetry or symmetry of the other paired organs”. Such a hypothesis were put forward in the works of Gyurdzhian & Fedoruk (1982) established that at pilots with a mixed profile asymmetry illusion of spatial position (mistakes perception of the object and himself in space) arise during the flight and among them, perhaps mirroring perception: such mistakes are not observed at pilots with right asymmetry. An interesting question about what plane is realized mirror perception occurs. According to the observations of Bragina & Dobrokhotova (1998) “it is observed more often turn of space in the subject's perception on 180 °, i.e., in the horizontal plane: right and at the same time becomes the left and vice versa”. Such deception space perception was identified in our study. Significant correlation by Pearson between the presence of “mirror” display space and dominance of the right or the left hemisphere of the brain of cadets haven't been identified at our sample.

7. Conclusions

According to the results of our research we can conclude that the main professional qualities, in the opinion of the students, are formed by the students of the third year of training, which falls on the stage of professional growth. Stage adaptation of younger students to professional training conditions in military high school and lack of practical experience is a temporary obstacle to the formation of PIQ. It should be also noted the presence of high academic motivation among freshmen, which is a prerequisite to the formation of (PIQ) in post adaptation period.

Thus, based on the results of the study we can draw general conclusions:

- in the first year there are active processes of adaptation to living conditions and life in the military high school, it imposes a significant imprint on the minds and behavior of students;

- first - year students need psychological support for the early completion of adaptation to the new conditions;

- senior students already have set of specific knowledge and skills to solve stressful situations, behavior in extreme conditions, such as methods of cognitive processes, leadership, etc .;

- choice of the military profession is not random, it has psycho-physiological basis: depends on the temperament and the dominance of the cerebral hemispheres - in military schools sanguine persons and choleric persons mainly come with the dominance of the left hemisphere.

Thus, the most stable and productive stage of military aviation specialist's professional development is the period of study on the senior courses. As it was noted earlier, on the third course most clearly manifested cognitive activity of cadets promotes the development of professionally important qualities as an integral part of the overall competence of military aviation professionals. Integral indicator of technical education's high quality in the conditions of military high school is competence of graduates, which is shown in aspiration and the ability to realize their intellectual and spiritual potential for success in the professional military sphere. All this forms requires quality organization and psychological support for the military aviation professionals.

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