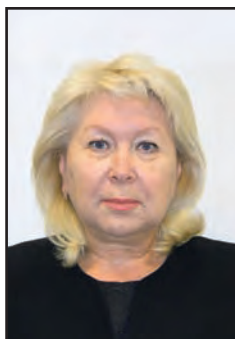


Study of Peculiarities of Coping Behavior of Cadets-Pilots of Civil Aviation



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ABSTRACT

The article substantiates the relevance of the study and development of coping behavior of future civil aviation pilots in the context of their higher professional education. The results of the study are presented, the purpose of which was to determine strength of coping strategies used by cadet pilots in difficult life situations, as well as their types of psychological defenses that «trigger» the mechanism of evading prompt and constructive solutions to personal and professional problems. The theoretical and methodological basis of the study is a stress-oriented approach to coping (R. Lazarus, S. Folkman). This approach studies the phenomenon of coping in terms of effectiveness and inefficiency of human interaction with stress factors.

As an empirical research method, testing was selected according to the questionnaire «Strategies for coping behavior» developed by a group of scientists from the laboratory of clinical psychology of St. Petersburg Psychoneurological Institute named after V. M. Bekhterev, and the questionnaire of types

of psychological defense (R. Plutchik in adaptation of L. I. Wasserman, O. F. Eryshev [et al]). The effectiveness of these methods is confirmed by the results of their application in examination of various categories of tested persons, by retest reliability, internal and external validity.

To determine presence or absence of a linear relationship between a number of values of «Confrontation» coping strategy (as, in our opinion, the most destructive strategy in flight conditions) and a series of values of the most pronounced types of psychological defenses of the respondents identified in the study, the method of parametric statistics was applied, calculation of the Pearson correlation criterion. Based on assessment of strength of the correlation between the coping strategy «Confrontation» and psychological defenses «Regression», «Projection», and «Substitution», the degree of their influence on the nature of interaction of pilots in the flight and cabin crew and on flight safety in general was analyzed.

Keywords: civil aviation, training, coping, coping behavior, psychological defense, coping strategies, flight safety.

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Background. The modern professional environment is characterized by an increase in the number of situational factors that have a significant impact on the psychological state of employees and, as a result, on quality of their work. The variety of these factors is determined by the characteristics of professional activity itself, job conditions, team relationships, socio-economic factors, the characteristics of family relations, intrapersonal and interpersonal conflicts, etc. Each of these factors requires a person to have a special response method that the employee selects as potentially successful, reducing psychological tension and providing optimal social adaptability. The expansion of the number of external and internal influences requires a person to apply more flexibility, self-control efforts, analytical skills and more. In this regard, it became necessary to determine the ability of an employee to cope with various kinds of life situations as a kind of integral personality trait of a modern person. This feature was defined as «coping», that is, «...behavioral, cognitive and emotional actions of a person taken to overcome difficult situations and adapt to the circumstances» [1]. The concept of «coping» was first introduced by L. Murphy in 1962 and was further developed in the ego-oriented theory of coping (K. Menninger, V. Vaillant, N. Haan, etc.), the cognitive-phenomenological theory of coping with stress (R. Lazarus, S. Folkman). In Russian psychology, theoretical, methodological issues of stress

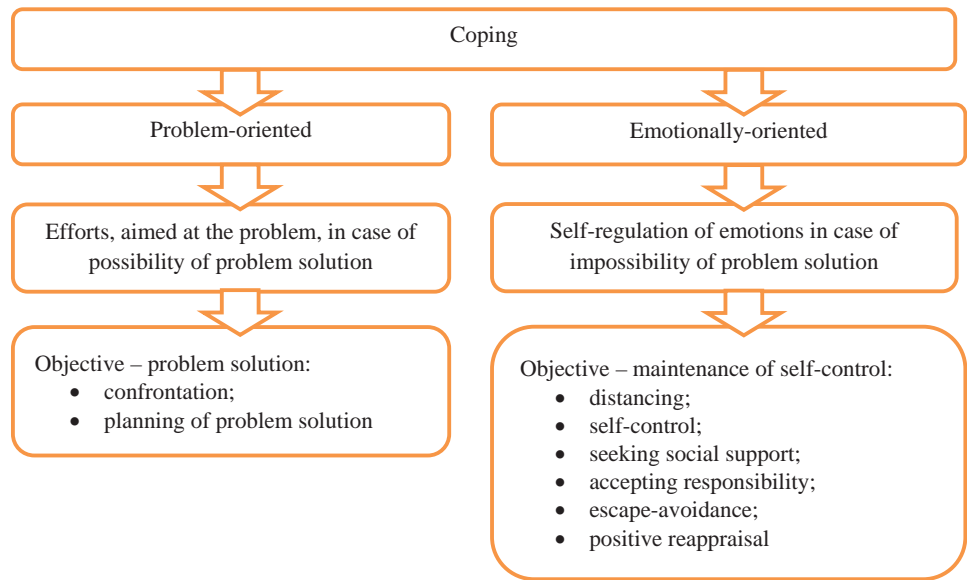
management are reflected in the works of L. I. Antsiferova, V. A. Bodrov, S. K. Nartova-Bochaver [et al].

Currently, the problem of coping is the subject of a large number of applied research, reflecting the variety of stress factors affecting a modern man. These include studies of everyday, post-traumatic stressors and ways to overcome them [2–4]; the study of educational stress [5], integrated assessment of the personality of a person experiencing various types of stress [6–8]; the study of special types of professional activity occurring in unusual, intense and stressful conditions [9] and others.

The *objective* of the article is to substantiate importance of studying and developing the coping behavior of future civil aviation pilots in the context of their higher professional education. To achieve this objective, the research has used theoretical *methods* of cognition (analysis of scientific literature, classification), as well as empirical methods (measurement, experiment).

Results. The study of coping behavior presented below is based on a stress-oriented approach to coping (R. Lazarus, S. Folkman). This approach studies the phenomenon of coping in terms of effectiveness and inefficiency of human interaction with stress factors [10].

R. Lazarus and S. Folkman distinguish two global types, or strategies for interacting with a stressful situation, called problem- and emotionally-oriented coping. The choice of a



Pic. 1. Problem-oriented and emotionally-oriented coping [11].



strategy is based on a person's assessment of possibility-impossibility of undertaking something to change a stressful situation. According to the authors, problem-oriented coping begins to prevail if a person is able to change the situation, according to his assessment. Emotionally oriented coping occurs if a person can only change the «way of interpreting what happened», but not the situation itself [11].

As a result of an experimental study (S. Folkman, 1986), an eight-factor model of coping with stress was obtained, which included the following scales:

- 1) confrontive coping;
- 2) distancing;
- 3) self-control;
- 4) seeking social support;
- 5) accepting responsibility;
- 6) escape-avoidance;
- 7) planful problem-solving;
- 8) positive reappraisal [12].

Let's describe briefly the designated coping strategies.

1. *Confrontive* coping describes a person's aggressive efforts aimed at changing the situation and assumes that a person has a certain degree of hostility and risk-taking, includes impulsive actions and rash acts carried out for the sake of the actions themselves.

2. *Distancing* describes cognitive efforts to escape a problem.

3. *Self-control* describes emotional efforts aimed at maintaining self-control and regulating one's own feelings and behavior.

4. *Seeking social support* describes efforts related to the search for informational and emotional support.

5. *Accepting responsibility* describes efforts related to recognition of one's own role in the current situation: it includes criticism and self-incrimination.

6. *Escape-avoidance* describes dreams of what is desired, includes various methods of self-intoxication and methods of protective behavioral elimination.

7. *Planned resolution of the problem* describes the actions to change the situation and to solve it.

8. *Positive rethinking, or reappraisal*, describes the efforts involved in creating a positive image of what happened as a result of shifting the emphasis from the problem to personal development.

According to the authors, six strategies related to maintaining self-control in an unsolvable stressful situation are related to emotionally-oriented coping, namely:

- distancing;
- self-control;
- seeking social support;
- escape-avoidance;
- accepting responsibility;
- positive reappraisal of the situation.

Problem-oriented coping strategies are aimed at resolving the situation through confrontive behavior and planned resolution of the problem. Assessment of severity of these strategies can be determined using Ways of Coping Questionnaire (WCQ) [7; 9], an adapted version of which we used in the course of the present study [13].

The study of complex life situations in concepts of coping is associated not so much with identifying a person's endurance range, maximum level of his energy and mental costs, but rather with choosing an adequate, appropriate and optimal way to apply efforts for successful resolution of the difficulty [14].

According to Norma Haan, coping strategies reflect effective (from the point of view of the result), optimal (from the point of view of internal costs) and constructive (from the point of view of expediency) ways for a person to make efforts to resolve the difficulty [15].

In contrast to coping strategies, defensive strategies are manifested in ineffective (from the point of view of the result), non-optimal (from the point of view of internal costs) and non-constructive (from the point of view of expediency) ways of human interaction with difficult life situations. Protective trends are reflected in impulsive reactions of a person and in his expectation of eliminating internal anxiety without directly resolving the problem situation [15].

Thus, unlike defensive behavior, «Coping behavior (coping) is flexible, intentional, reality-oriented and evolving behavior» [14].

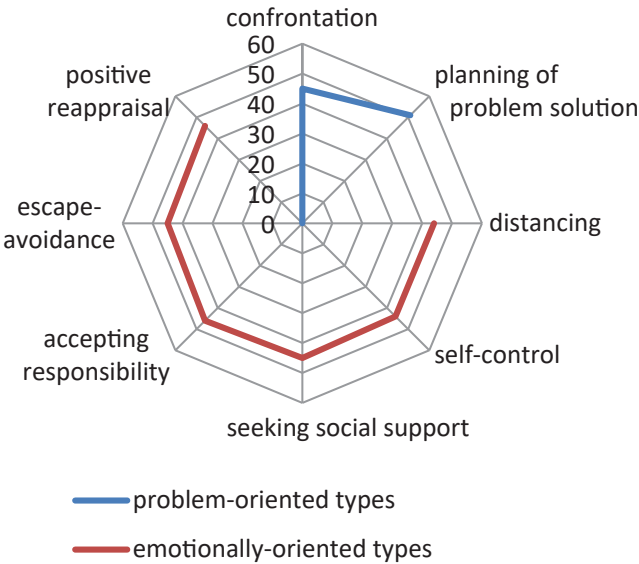
The profession of a civil aviation (CA) pilot requires development of coping behavior as an integral characteristic of the psyche of this category of specialist, allowing him not only to optimize interaction in the cockpit, but also to make optimal, operational decisions in standard and non-standard flight situations.

Cognitive coping contributes to maintaining high intellectual activity and

Table 1

Types of coping strategies used by cadet pilots [13]

Types of coping strategies								
	Confrontation	Distancing	Self-control	Seeking social support	Accepting responsibility	Escape-avoidance	Planning of problem solution	Positive reappraisal
Av. value	6,8	7	12,6	9,6	6,8	8,1	12,7	10,7
T-score	45	44	44	45	46	45	51	46



Pic. 2. Severity of coping strategies of cadet pilots [11; 13].

development of cognitive motivation. Behavioral coping helps a person to achieve his goals, strengthens confidence in achieving success. These features are extremely important for CA pilots. CRM trainings (Crew Resource Management), which are a necessary component of CA pilot training, contain separate training blocks aimed at developing coping skills: «Decision Making» block, «Situational Awareness» block, «Business Communication» block, etc. However, the prevailing forms of training in the framework of this training is learning, skills training. Development of pilot coping intelligence involves a value-semantic immersion, the result of which is not only a change in attitude to error, which is the main point of CRM concept, but also the optimal use of three modalities of strategies that reflect the specifics of a person's efforts (cognitive,

emotional and behavioral), three vectors of orientation of strategies (on others, on themselves, on the subject), as well as two characteristics of intensity of strategies, reflecting either the active or passive nature of the pilot's interaction with the difficult situation. It is advisable to initiate development of coping intelligence of CA pilots during the period of their higher professional education. In this regard, in our opinion, it may be interesting to study severity of main coping strategies of cadet pilots, the types of psychological defenses inherent in this category of respondents and the relationships between them.

Study of the characteristics of coping behavior of cadets-pilots

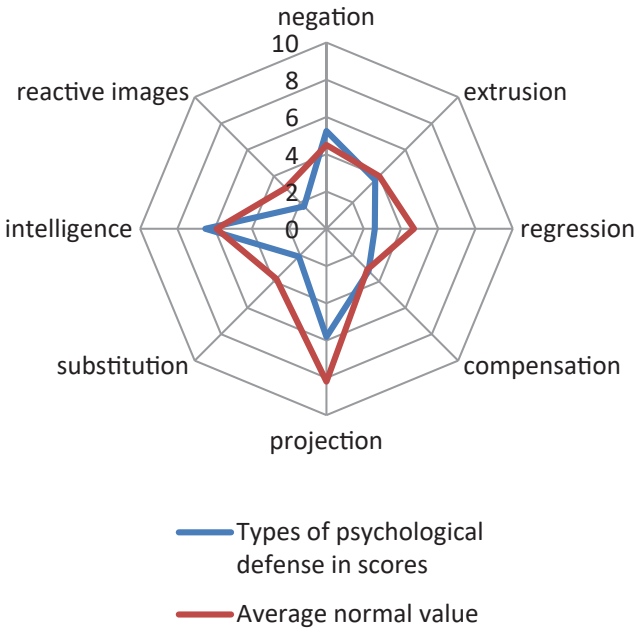
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Table 2

Severity of types of psychological defense of cadet pilots

	Types of psychological defense							
	Negation A	Extrusion B	Regression C	Compensation D	Projection E	Substitution F	Intelligence G	Reactive images H
Average value in the group	5,25	3,7	2,6	3,2	5,8	2,1	6,5	1,7
Norm M	4,5	4	4,7	3,1	8,2	3,8	5,9	3,1



Pic. 3. Severity of types of psychological defense of cadet pilots [16].

Aviation B. P. Bugaev a study of the peculiarities of coping behavior of 5th-year pilot cadets of the faculty of air traffic control and flight safety was carried out. The survey involved 24 cadets. The objective of the study was to determine severity of coping strategies used by cadet pilots and their characteristic types of psychological defenses that «trigger» the mechanism of protective behavior in problem situations. It should be noted that the number of respondents involved in the study (24 cadets) is not enough to identify sustainable relationships stated for the purpose of the study. However, the results obtained may be of some interest for a deeper study of coping behavior of CA pilots.

The main research methods used were: theoretical methods (analysis of psychological literature on the problem of development of

coping behavior and the relationship of coping and protective strategies for human behavior); empirical methods (testing with questionnaires that meet the requirements of validity and reliability); methods of parametric statistics (calculation of Pearson correlation coefficients). The questionnaires used in the study («Strategies for coping behavior» and «Life style questionnaire») were standardized, adapted and tested for the Russian-speaking category of respondents in the Clinical Psychology Laboratory of St. Petersburg Psychoneurological Institute named after V. M. Bekhterev [13; 16]. The methods have retest reliability, internal and external validity and are widely used in restorative medicine, professional selection in stressful professional activities.

The study was conducted in three stages. At the first stage, cadets were diagnosed using

Table 3

r-Pearson correlation coefficient

Cadet pilots (24 persons)				
Name of the first row of variables	Name of the second row of variables control index	r-Pearson correlation coefficient	Critical value of r-Pearson (error probability 0,05)	Critical value of r-Pearson (error probability 0,01)
Coping strategy «Confrontation»	Type of psychological defense «Regression»	0,55	0,4	0,52
Coping strategy «Confrontation»	Type of psychological defense «Projection»	0,42	0,4	0,52
Coping strategy «Confrontation»	Type of psychological defense «Substitution»	0,32	0,4	0,52

the questionnaire «Strategy for coping behavior» (SCB) [13]. The questionnaire includes 50 statements, each of which reflects a specific version of behavior in a difficult situation. The questionnaire items are combined into eight scales corresponding to the main types of coping strategies described above. After calculating the «raw» indicators using the scales, they were converted to standard T-points using the developed tables [13]. Diagnostic results for the SCB questionnaire are shown in Table 1 and in Pic. 2.

The analysis of the diagnostic results showed that on average the group shows moderate severity of all coping strategies (from 40 to 60 T-scores). The most predominant is the problem-oriented coping strategy: problem solving planning. This indicates the willingness of respondents to perceive the problem situation as solvable and to model the technology for resolving it.

At the second stage, a questionnaire of types of psychological defense was used (developed by R. Plutchik and adapted by L. I. Wasserman, O. F. Eryshev, E. B. Klubova [et al])) or, in another way, the questionnaire «Life Style Index» [16]. This questionnaire is based on the psycho-evolutionary theory of emotions of R. Plutchik and the structural theory of personality [Ego Defenses and Emotions] by H. Kellerman, which offers a specific relationship between different levels of personality: level of emotions, protection and disposition (hereditary predispositions to mental illnesses). Determining the predominant type of psychological defense allows to determine the scope of human problems, the occurrence of which is based on the identified protective settings.

Diagnostic results of the types of psychological defense of cadets are shown in Table 2 and in Pic. 3. The severity of the type of defense is presented in points and is compared with the average value M of regulatory data identified by the authors of the methodology.

The analysis of the diagnostic results showed that the following types of respondents' defense became the most pronounced on average for the group (compared to the norm): regression, projection, and substitution.

Manifesting a defensive reaction of regression, a person seeks to avoid anxiety by replacing the solution of subjectively more complex tasks with simpler and more accessible ones in the current situation. Often this occurs through the use of familiar behavioral stereotypes. It should be noted that the professional behavior of pilots is regulated by a huge number of rules: federal aviation rules (FAR), standard operating procedures (SAP), ICAO documents, etc. This forms some stereotypes of professional behavior that help pilots quickly navigate in standard and non-standard situations, providing flight safety. Perhaps this kind of adherence to regulations also forms a protective regression mechanism among pilots as an appeal to well-known and prescribed rules. However, updating this protective mechanism in complex aviation situations can significantly complicate the pilot's operational decision making.

The defensive mechanism of projection is manifested in the fact that feelings and thoughts that are unacceptable to a person are attributed to other people and, thus, are justified. The actualization of this mechanism enhances suspicion, stubbornness, intransigence, intolerance to objections, a tendency to blame the environment, search for flaws,



increased sensitivity to criticism and remarks, and exactingness. In relation to pilots, these features reduce effectiveness of interaction in the cockpit and flight crews, especially in stressful situations, which directly affects flight safety.

The defensive mechanism of substitution is manifested in discharge by a person of suppressed emotions (usually hostility, anger), which are addressed to objects that are less dangerous or more accessible than those that caused negative emotions and feelings. In this situation, a person can perform unexpected, even meaningless actions that reduce internal stress. In situations of professional interaction between pilots, this mechanism may manifest itself when problems, and, as a result, negative feelings that arose before the flight (family, flight delay, health, communication with colleagues at the airport, etc.) are transferred to the cabin crew during the flight. This, of course, dramatically reduces the constructive nature of interaction of pilots and, thus, affects flight safety.

The protective mechanisms described above are quite common in everyday life, but in flight conditions have a negative impact on control of the aircraft.

At the third stage of the study, the degree of consistency was determined between a number of values of «Confrontation» coping strategy (as, in our opinion, the most destructive strategy in flight conditions) and a series of values of the most pronounced types of psychological defenses of respondents, namely, «Regression», «Projection» and «Substitution».

To study the relationship of two variables measured in metric scales on the same sample, the Pearson (r-Pearson) correlation coefficient is used [17].

Let's evaluate the empirical values of the Pearson coefficient obtained by us, comparing it with the corresponding critical value for a given level of significance from the table of critical values of the Pearson correlation coefficient. For a sample with 24 elements and a significance level of $p = 0,05$, the critical value of the Pearson coefficient is $r_{crit} = 0,4$, with a significance level of $p = 0,01$, $r_{crit} = 0,52$.

The analysis of tabular data shows the absence of a statistically significant relationship between «Confrontation» coping strategy revealed by cadets and severity of their «Substitution» psychological defense.

The correlation coefficient between the coping strategy «Confrontation» of pilots and severity of their psychological defense «Projection» if greater than the critical value with a significance level of 0,05 (located in the significance zone) indicates a direct linear relationship between these variables. That is, with an increase in severity of «Projection» psychological defense by respondents, the likelihood of their confrontational behavior increases. In other words, presence of a pronounced tendency among future CA pilots in which feelings and thoughts unacceptable to them are attributed to other people and, thus, lose their personal significance, reduce their level of criticality, and entail an increase in the likelihood of impulsive, hostile, conflict behavior. This type of response is especially dangerous when the flight crew interacts in acute stressful situations, in conditions of overwork, general crew unworkedness, etc. As a preventive way to overcome the confrontational coping strategy, the pilots master the technology of positive persistence and undergo LOFT (Line Oriented Flight Training) training. However, future pilots' awareness of the systematic manifestation of «Projection» defensive mechanism in their behavior can enable them to change their attitude to their personal constraints, respectfully criticize and, more generally, treat errors more professionally, which is the backbone principle of CRM system.

The correlation coefficient between the coping strategy «Confrontation» of pilots and severity of their psychological defense «Regression» if greater than the critical value with a significance level of 0,01 (located in the significance zone) indicates a direct linear relationship between these variables. That is, with an increase in severity of the respondents of the psychological defense «Regression», the likelihood of their confrontational behavior increases. This means that a future pilot with this form of defensive reaction in a stressful situation can replace the solution of subjectively more complex tasks with simpler ones in the current situation. This forms a biased image of the flight for the pilot and, as a result, provokes conflicts and confrontation in the flight and cockpit crews.

Thus, the types of psychological defenses «Projection» and «Regression» that were identified as a result of the study and were most pronounced among cadets-pilots turned out to be in a linear (statistically significant) dependence on «Confrontation» coping strategy. This stress management strategy is poorly expressed among respondents. However, the presence of the identified relationship demonstrates possible risks of interaction between the flight crew, the probability of which may increase in flight conditions.

Conclusion. The study showed the importance of a deeper study of the psychological mechanisms that shape the professional behavior of future CA pilots. The implementation of CRM (Crew Resources Management) system in all aviation companies, development of a safety culture as a priority organizational value, requires that pilots have a special style of professional behavior, upbringing of which should begin when they are getting their professional education. This process should be based on a comprehensive study of not only the cognitive processes of cadets, but also of the emotional, behavioral, personality and semantic characteristics of future CA pilots.

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