

# Diagnostics and prediction problem of personality adaptation in emergency situations under conditions of the Arctic Regions

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**Abstract**—The emergency situations in the Arctic Regions arise both under the influence of natural and human factors. Personality disadaptation highly increases the risk of mistake in the activity, the risk of emergency. Diagnostics of personality adaptation is performed by means of objective and subjective methods and techniques. Both proved for decades and newly developed, modified techniques are applied for this purpose. The prediction problem of personality adaptation under conditions of the Arctic Regions retain its relevance in virtue of the increasing need for the experts capable to carry out professional tasks in special conditions, including overcoming difficulties of the emergency situations.

The Arctic conditions demand higher standards of psychophysiological features of the person, its psychological resistance to negative factors of the environment, severe conditions.

The research objective is a search of the possible summarized psychological profile of the personality adaptive to special conditions and also those features that are peculiar to representatives of the certain professions carrying out activity in special conditions. It is supposed that prediction of personality adaptation in emergency situations under conditions of the Arctic Regions is possible on the basis of high-quality and complex diagnostics. Any prediction of personality adaptation is limited in time by the stability of primary activity, i.e. in the case of relocation, change of office questions range, etc., adaptation level can change.

Research problems are: to consider the subject matter and meaning of diagnostics and prediction of personality adaptation in emergency situations under conditions of the Arctic Regions; to show the importance of system consideration of diagnostics and prediction of personality adaptation in emergency situations under conditions of the Arctic Regions; to show the connection of personal characteristics and adaptation of the persons having professional training of the activity in special conditions, and to separate the main clusters of the tested persons according to the adaptation level of the personality in the course of professional training; to develop possibilities of prediction of personality adaptation in the emergency situations under conditions of the Arctic Regions on the basis of diagnostics during professional training; to provide comparative analysis of psychological peculiarities of the studied subsampling depending on the course of study, future specialty, sex of the tested persons; to summarize the research results; to prove the further directions of theoretical and empirical researches on the basis of the results received.

The main research methods applied: the theoretical and methodological analysis of literature, psychodiagnostics (a complex of techniques for studying of the personality characteristics including a technique of D. Keirse in which the

tendency to certain professions and the psychosemantic variation of a technique of T. Leary developed and approved by S.V. Zabegalina in which the behavioural trends of the personality are estimated, is specified). As an additional ones the method of the participatory observation, and for the empirical verification of the hypothetical assumptions - methods of mathematical statistics was used. The cluster analysis allows to detach the main combinations of psychological characteristics of the persons trained for activity in special conditions including the emergency situations. Criteria of differences in our case give an opportunity to define essential characteristics for activity in special conditions in general and those qualities that mostly belong to professionally significant ones. Those characteristics that will be the general ones hypothetically concern to all experts of dangerous professions in the conditions of the Arctic Regions, in contrast those that will be peculiar only to cadets of FSIN Academy (Academy of the Federal Penitentiary Service of Russia) or the students - future rescuers – mean professional ones.

Activity of the Ministry of Emergency Situations staff in the territory of the Arctic Regions has various character as they should face the largest range of emergency situations in comparison with other experts carrying out their activity in special conditions. In this regard the students of specialty "Protection in Emergency Situations" were taken as the tested persons, the second selection became cadets of FSIN Academy due to the fact that a considerable part of them further fulfills the professional duty in UFSIN of Russia (Directorate of the Federal Penitentiary Service of Russia) in the territory of the Arctic Regions

*Keywords*—adaptation, personality, prediction, emergency situations

## I. INTRODUCTION

Personality adaptation represents diverse multifaceted process as both the personality is a difficult psychological phenomenon and psychological adaptation is closely connected with physiological and social adaptation. Personality adaptation is always the active process [1] assuming two directions - the environment changes and personality changes beginning from minimum ones, i.e. a state and ending with deep ones, i.e. temperament and self-consciousness. Emergency situations are characterized by the development of the last component of the system "personality-activity-situation". At the same time high requirements are set to activity. The complexity of the carried-out activity in special conditions leads to actualisation of personal characteristics [2]. Detailed

diagnostics of psychological adaptation is possible only with respect for not only procedures of testing but also validity of the applied diagnostics methods, taking into account factors defining efficiency of adaptation process to the future professional activity [3]. Prediction of the personality adaptation in special conditions is carried out on the basis of system of theoretical and empirical methods and also mathematical statistics. Diagnostics and prediction of personality adaptation in emergency situations are capable to reduce the influence of the stress inducing factors [4], to increase activity efficiency due to competent and rational people casting, development or correction of certain personality aspects. Also a certain complexity is represented by variability of requirements to the personality in an emergency situation depending on its nature and specifics of professional activity [5].

## II. THEORETICAL BASIS OF THE RESEARCH

Therefore adaptation prediction is based not on some invariable set of techniques and single selected materials but on those requirements which are imposed by activity and environment, in this connection such method of psychology as observation comes into sharp focus. Now personality adaptation to activity in special conditions during profession mastering is considered “as spontaneous process by means of necessary actions training or with regard to identification of the factors increasing studying efficiency to specific actions or is psychologically reconstructed according to the subject content and specific actions characteristic of this profession” [6, page 17], it means that actually psychological aspect, i.e. that occurs inside the personality is covered insufficiently. System consideration of diagnostics and personality adaptation prediction in the emergency situations is the most reasonable approach which is based on numerous researches of the national science [1, 7, 8] now. At the same time theoretical and empirical ground for personality adaptation studying in the special conditions got the trend developed by A.G. Maklakov. The technique developed by him together with S.P. Chermyanin is intended both for future and real subjects of activity in special conditions with the corresponding variation of score distribution on stems and scales, interpretation.

## III. METHODS OF ORGANIZATION AND RESULTS OF THE STUDY

The empirical research on studying and prediction of personality adaptation in the emergency situations in the future professional activity was conducted on the basis of the Ulyanovsk State University and FSIN Academy of Russia in 2012-2018. The volume of empirical sample constituted 90 students (of the 1, 3 and 5 courses) of specialties “Protection in Emergency Situations” and “Fire Safety” of the Ulyanovsk State University (UIGU), 40 cadets of FSIN Academy of Russia. The number of girls and young people in subsamples in percentage had no significant distinctions.

As empirical data show, personal features are connected with ability to adaptation of the subjects having vocational training to activity in special conditions. Throughout training the adaptation level increases, indicators of a self-assessment become more differentiated,

the maximum values are not used. Gradually the expressiveness of behavioural trends also decreases that shows orientation to the behavior which is more corresponding to a situation than focused on the realization of standard behavioural patterns. Behavior determined by a situation take the place of the behavior directed to self-demonstration, that gets the greatest positive value in the emergency situations. Gradually in the course of personality adaptation a growth of its viability also takes place [9].

On the basis of adaptation level (measured by a technique of M.G. Maklakov and S.P. Chermyanin “Adaptability”) the main clusters of examinees according to the level of personality adaptation in the course of vocational training were selected. The following techniques were carried out on these selections: D. Keirsej, the psychosemantic variation of a technique of T. Leary (S.V. Zabegalina's modification) and also modification of a self-assessment technique according to Dembo-Rubenstein (S.V. Zabegalina's modification). Modifications of the specified techniques received the Certificate of the state registration by ROSPATENT in 2017 [10].

The U-test of Mann-Whitney for determination of psychological differences between cadets and students as future subjects of activity in special conditions was used. Psychological features of examinees are substantially different depending on studying orientation, future staff members of the Ministry of Emergency Situations showed higher self-assessment almost on all scales: the ability to difficulties overcoming, communicative abilities, adaptive abilities (difference test significance of  $p \leq 0.01$ ), mental capacities and physical abilities (test significance of  $p \leq 0.05$ ), but they are less inclined to note the expressed behavioural features (according to all scales, at test significance of  $p \leq 0.05$ ), also they demonstrate introversion in very rare cases (test significance of  $p \leq 0.01$ ). Indicators of mental to stress tolerance are also higher of the students of specialty “Protection in Emergency Situations” (test significance of  $p \leq 0.05$ ) that is explained by the fact that their professional activity is crowded with threats daily and imposes special requirements to their personalities. At the same time distinctions on the communicative potential and moral normalization (by a technique “Adaptability”) and also on a self-assessment of own equability (of character, behavior) and predictive abilities are not observed.

By using the k-means cluster analysis three clusters were selected. The algorithm of k-means cluster analysis is effective cause it does not need calculation of all paired distances between observations, unlike the majority of other algorithms of a clustering, including in the hierarchical cluster analysis. In the first cluster there were 75 people. This cluster is characterized by the highest rates of mental to stress tolerance, the smallest expressiveness of all behavioural trends, indicators on all scales of psychosemantic variation of a technique of T. Leary were lower the level at which the possibility of disadaptation could be diagnosed. Also in the first cluster “logicality” and “extroversion” (according to D. Keirsej) is the most expressed, the rates by a self-assessment technique (except the scale “physical abilities”) are the highest. The third cluster (32 persons) comprises examinees with the lowest adaptive abilities according to selection (at the same time only 4 of them are in the group of satisfactory adaptation),

in this cluster “sensitivity” is more expressed than “logicality”. The second cluster (32 persons) takes an intermediate position on adaptive abilities of examinees, at the same time unlike the first cluster adaptation is reached by means of “physical abilities” (by the technique of self-assessment) and also the expressed behavioural trends (even on senior courses of study), at the same time “sensitivity” and “logicality” are counterbalanced. It should be noted that any examinee on senior years was not in the group of low adaptation that was sometimes observed at the first year at the beginning of vocational education. Therefore, there is positive dynamics testifying the importance of psychological maintenance of adaptation process of the future experts who are carrying out their activity in special conditions.

The clustering on subselections was carried out separately. Future specialists of the Ministry of Emergency Situations at division into clusters according to the level of adaptation were distributed on three clusters: groups of satisfactory (1 person), normal (78 persons) and high (11 persons) adaptation. The prevalence of the first three behavioural trends, e.i. domination, independence, forthrightness, high predictive abilities (according to self-assessment), highly expressed intuition (according to D. Keirse), is characteristic of the group of high adaptation. In the group of satisfactory adaptation the examinee is characterized by approximately equal expressiveness of behavioural trends, with prevalence of domination and suspiciousness, it has a low self-assessment of mental capacities, the sensitivity prevails over logicality. Normal adaptation is combined with implicit prevalence of the following behavioural trends: domination, independence, friendliness and altruism. The self-assessment above the average, the developed planning with low impulsiveness, prevalence of an extroversion, good mental to stress tolerance, communicative potential and moral normalization are characteristic for the groups of normal and high adaptation. Similar results were received from the cadets of FSIN Academy.

The self-assessment of adaptive abilities is of special interest for studying as the approach to measurement of self-assessment is shown in it as reflexive component of adaptation [11]. The self-assessment of adaptive abilities in a very predictable manner correlates with other subscales of this technique [10]: with mental capacities – 0.39, steadiness – 0.45, physical abilities – 0.41, ability to difficulties overcoming – 0.69 and also communicative – 0.70 and predictive – 0.38 abilities (test significance of  $p \leq 0.01$ ). But also the self-assessment of adaptive abilities is connected with altruism – 0.27, mental to stress tolerance (test significance of  $p \leq 0.01$ ), a behavioural trend of domination – 0.23 (test significance of  $p \leq 0.05$ ). The significant correlation of adaptive abilities by a technique “Adaptability” and by results of the self-assessment proves an opportunity to base on diagnostics of adaptation on assessment of the examinees themselves on the one hand, and demonstrates adequacy of their ideas of themselves on the other.

Adaptive abilities of cadets of FSIN Academy also, as well as the students of specialty “Protection in Emergency Situations”, are closely connected with other scales of a technique “Adaptability”: with mental to stress

tolerance – 0.65, communicative potential – 0.43, moral normalization – 0.75 (test significance of  $p \leq 0.01$ ). Communication in all cases is positive that indicates that abilities to adaptation directly depend on above-mentioned features of the personality and change in direct ratio.

The adaptive abilities changed by the technique “Self-assessment” significantly correlate (test significance of  $p \leq 0.01$ ) with all other scales of this technique except the scale “tolerance”: with mental capacities – 0.43, physical abilities – 0.45, ability to difficulties overcoming – 0.71, communicative abilities – 0.58 and predictive abilities – 0.56. This circumstance specifies that tolerance in behavior, in character is not perceived by them as immanent property of the personality in special conditions, probably because of need to react quickly that means an exit from a condition of perfect serenity, it is necessary also to consider that they can understand tolerance as serenity, stability of behavior and actions. Also they associate adaptive abilities with such behavioural trend as domination that indicates their need to influence the others for the purpose of their solutions advance and achievement of their purposes.

#### IV. CONCLUSION

Thus, the problem of diagnostics and prediction of personality adaptation in the emergency situations can be solved by means of system approach to studying of this phenomenon, with the theoretical, methodological justification, special and suitable for this group of future or really acting experts, selection of instrumentarium. The content of emergency situations, their specifics influence on the personality, and on the other hand only the personality having certain qualities is capable to act effectively in the conditions of the Arctic. For an empirical research the U-test of Mann-Whitney for determination of differences between cadets and students as future subjects of activity in special conditions was used. Data on difference in the dominating behavioural trends, value of separate parameters of self-assessment and also on a support on “an intuition - common sense” are obtained as a result. In particular, mental to stress tolerance, the high differentiated self-assessment, the developed communicative potential and moral normalization, prevalence of planning over impulsiveness were the general for future subjects of activity in special conditions, in emergency situations. Taking into account participation in a research of two various subselections extrapolation of the received results, rather general for subjects of dangerous professions, on other experts who are carrying out and going to carry out the activity in the conditions of the Arctic, is possible.

Further studying of personality adaptation in the emergency situations are possible as in line with search of the theories explaining differences between representatives of various dangerous professions, top trends of changes and within the empirical researches, in particular on the experts who are carrying out the activity in the conditions of the Arctic.

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