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«CASCADE» METHOD IN PROFESSIONAL ORGANIZATION OF PSYCHO-PHYSIOLOGICAL SELECTION OF MILITARY OFFICERS IN PEACETIME AND UNDER MARTIAL LAW

Kalnysh V. V.[1], Nagorna A. M.[1], Kompaniets O. A.[2]

[1] State Institution «Kundiiev Institute of Occupational Health of the National Academy of Medical Sciences of Ukraine», Kyiv

[2] Ukrainian Military Medical Academy, Kyiv

Introduction. The work related to the rational selection of personnel, especially during military operations, has become one of the main tasks assigned to the leadership of military units. The process of personnel selection can be defined as a complex organisational function aimed at increasing the efficiency of professional activity both for an individual specialist and for the formation of personnel as a whole. The development of new approaches aimed at improving the professional selection procedure is relevant. This is due to the fact that recently, the requirements for personnel of military units have increased due to the increasing complexity of combat missions, rapid changes in the combat situation, introduction of new types of weapons, etc. At the same time, organisational measures for professional selection are not yet sufficiently developed.

The aim of the study is to develop a «cascade» method of professional selection of military personnel.

Materials and methods of research. A substantive analysis of modern approaches to the organisation of psychophysiological selection, involving approaches from the theory of complex systems analysis.

Results. A special integrated methodology is proposed that uses the methods of the Decision Making Test and Evaluation Laboratory (DEMATEL) and the Methods of Elimination and Selection Expressing Reality (Elimination et Choix Traduisant la Realité, ELECTRE) in an intuitive fuzzy environment (IF). The proposed methodology first uses the IF-DEMATEL method to obtain the importance weights of the identified criteria, and then the IF-ELECTRE method is formed and applied to rank the candidates based on the obtained scores.

Conclusions. 1. The article substantiates a «cascade» approach to professional psychophysiological selection, where at each stage of such selection, persons who are unsuitable for performing professional duties in a particular position under certain conditions are identified. These persons do not undergo further research, which allows freeing up the time of qualified psychophysiologists and material costs for other work. The advantages of such a selection procedure in comparison with traditional approaches are determined. 2. By modelling possible situations of exposure to certain factors on the applicant's body to perform work in extreme conditions, it is necessary to analyse the degree of this exposure and conclude on their significance or not (the level of tolerance of the applicant to prolonged exposure to high temperatures, the ability to operate various technical means, work with elements of homogeneous work or continuous dynamic activity, etc.), which undoubtedly affects the professionally important qualities of a specialist. 3. The analysis proves the possibility and value of improving the procedure for conducting professional psychophysiological selection with the use of «cascade» selection techniques.

Key words: professional selection, military personnel, «cascade» approach

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Introduction

For Ukraine, at the current stage of its development, especially in the context of military operations in the country, it is extremely important to recognise the crucial role of human resources. In this context, human resource management is a critical function for civilian and military organisations, as qualified labour is one of the most important resources for achieving goals and objectives. Human resource management is concerned with the professionally important qualities of people, especially those who work in high-risk environments.

The modern world is a dangerous place, and recent military events have made it even less safe. Such situations are the quintessence of stress development, when everyone is in conditions of imminent danger and lives with the knowledge that they can be attacked, injured or even killed at any time [1]. The authors of this book raise a number of pressing questions (How do people work in these conditions? How do they maintain a high level of vigilance when nothing can happen in their place for weeks or even months? What happens when the bullets start flying? Can we develop technology to help people make the right decisions in these extremely dangerous situations? Can we select those who are best able to withstand such adverse conditions?) and are looking for answers to them, in particular from an organisational point of view.

The relevance of developing these issues is discussed in numerous contemporary publications. It is emphasised that resilience, the ability to overcome stress associated with extreme living conditions, is a complex process that includes not only human physiology and psychology, but also the influence of factors such as gender, environment and learning [2]. The following five key resilience issues were addressed at the roundtable meeting: physiological and psychological resilience, gender differences, the contribution of aerobic and strength training, thermal resilience, and the role of nature versus nurture.

In this regard, the work related to the rational selection of personnel has now come to the fore and has become one of the main tasks assigned to the leadership of military units. The process of personnel selection can be defined as a complex organisational function that purposefully forms the flow of candidates into and out of the organisation to increase the effectiveness of professional activity both for an individual specialist and for the institution as a whole. Deciding on the degree of suitability of a person to perform duties in a particular profession is a process that consists of choosing among possible alternatives and trying to achieve the best choice for specific needs. This choice can be viewed as a type of multi-criteria decision-making problem, where problems involve more than one criterion and often have more than one conflicting objective that must be considered together to reach the most likely solution [3].

Given the severity of the problem, the development of new areas aimed at improving the professional selection procedure is relevant. This is due to the fact that in recent years, the requirements for the personnel of military units have increased due to the increasing complexity of combat missions, rapid changes in the combat situation, the introduction of new types of weapons, etc. At the same time, organisational measures for professional selection are not yet sufficiently developed. Thus, E. A. Klimov proposes a number of techniques to improve the interview with a candidate for a position. He emphasises that such interviews should take into account the following: first impression, comparison of the current candidate with the previous one, the importance of experience

ISSN 2223-6775, Ukrainian Journal of Occupational Health, 2022, 18 (4), 320–328

in communication, peculiarities of one's own perception, and the factor of external attractiveness [4]. But these techniques are abstract and subjective. They are highly individualised and cannot be clearly algorithmised. However, having practical experience, Ukrainian specialists, although without a clear algorithm, select for military service and participation in combat operations those who are most professionally, physically, and mentally prepared to perform certain combat operations (tankers, artillerymen, drivers of special combat vehicles, etc.).

Recently, methods of fuzzy environment analysis have been actively used to obtain accurate estimates in professional selection [3]. In the present study, the authors propose a special integrated methodology that uses the methods of the Decision Making Test and Evaluation Laboratory (DEMATEL) and the methods of elimination and selection expressing reality (ELECTRE) in an intuitionistic fuzzy environment (IF). The proposed methodology first uses the IF-DEMATEL method to obtain the importance weights of the identified criteria, and then the IF-ELECTRE method is formed and applied to rank the candidates based on the obtained scores.

In terms of organisation, advice is given on how to conduct a professional selection. For example, O. M. Kokun [5] states the need to determine the list of methods that can be recommended at different stages of selection: primary, repeated (with a time interval of less than 6 months) and when monitoring the psychophysiological state, taking into account the peculiarities of professional activity. The author emphasizes that the presence of critical deviations from the normative values in the indicators of the psychophysiological state indicates the need to correct the identified negative dynamics; to develop a system of optimization and preventive measures to prevent excessive depletion of functional reserves and development of pathological conditions.

Another area of organisational work is the selection of team members to perform complex tasks [6]. As the authors emphasise, teamwork is often easy to observe, somewhat more difficult to describe and even more difficult to implement. In a broad sense, teamwork is the process by which team members cooperate to achieve the necessary goals. This study reviews the fundamental principles underpinning modern teamwork analysis, outlines the main dimensions of teamwork, and discusses approaches to selection, training, and development to improve teamwork.

The organisation of professional selection may be accompanied by mistakes. It is noted that some typical errors may occur when assessing candidates for certain positions [7]: the «central tendency» error (when some of the unexamined professionally important qualities of candidates are assessed with an average score, i.e. everyone is adjusted to the «norm», although one can expect that some of the candidates may be better and some worse in terms of these indicators) the «leniency» fallacy (when most candidates are given a high score, which can lead to the recruitment of unsuitable servicemen); the «over-demanding» fallacy (when most candidates receive very low scores, which leads to the elimination of potentially suitable servicemen); the «halo effect» fallacy (when the interviewer evaluates a candidate based on only one, «most important characteristic», i.e. the complexity of the assessment is lost); the «contrast» fallacy (when the expert's opinion is influenced by the sequence of candidates, i.e. an average candidate is rated highly if he/she comes after several rather weak candidates, or, conversely, is rated low if he/she comes after strong candidates);

ISSN 2223-6775, Ukrainian Journal of Occupational Health, 2022, 18 (4), 320–328

errors of «stereotyping in evaluation» (there is a tendency to compare a candidate with the stereotype of an «ideal employee», which each expert has his/her own and may differ greatly from the actual requirements of the job). These errors are associated with the reliance on expert assessments, which are subjective in nature.

In order to objectify the assessment, it is proposed to identify such a property of professional selection as differentiation in the methodological approaches to its organisation [8]. That is, the scope and composition of the methods included in the professional selection procedure can be significantly transformed depending on the goals and objectives of the selection or on the type of activity, type of workplace, list of existing harmful external factors, etc. This approach may introduce a certain order into the organisation of the professional selection procedure.

The problem of organising professional selection was addressed by the authors of this publication [9]. The importance of organisational measures is emphasised in many works by contemporary authors. However, these issues in each of the studies are considered fragmentarily and often as theoretical developments. Therefore, it is currently relevant to develop specific approaches to the organisation of the professional selection procedure for its further improvement.

The aim of the study is to develop a «cascade» method of professional selection of military personnel.

Materials and methods of research

A substantive analysis of modern approaches to the organisation of psychophysiological selection, involving approaches from the theory of complex systems analysis.

Results of research and their discussion

Professional selection is a rather complex and lengthy procedure. It requires not only the use of equipment that is rather complicated in this particular case, but also the expenditure of significant time efforts by a large number of highly qualified specialists who evaluate the test results. Given the fact that the amount of work on vocational selection is constantly increasing due to the significant spread of professions involving increased danger, it is necessary to optimise the vocational selection procedure in various ways.

One of these areas, which require little material and intellectual investment, is organisational measures. The use of such measures has certain advantages:

- organisational measures can be implemented quite quickly, which significantly speeds up the process of obtaining the final result – determining a person's professional suitability;
- organisational measures do not require the use of additional special equipment, as they do not violate the technology for identifying persons professionally suitable for work in a particular profession;
- the measures under discussion do not require the additional development of new criteria for professional suitability, as the existing criteria are sufficient and do not require additional intellectual, time and material resources.

The essence of the proposed organisational measures is to restructure the technology of professional selection, which is aimed at gradually eliminating applicants for a job in a particular profession at various intermediate stages of the selection procedure. This approach has a number of advantages compared to the traditional occupational selection technology. Firstly, it reduces the amount of work required to determine the degree

ISSN 2223-6775, Ukrainian Journal of Occupational Health, 2022, 18 (4), 320–328

of a person's professional suitability. Secondly, the time required to conduct research for a certain contingent of people unfit to work in a given profession is reduced. Thirdly, the time required for highly qualified psychophysiologists to analyse the data obtained from the applicant for the profession is reduced. Fourthly, the period of use of the equipment required for selection is reduced. Fifthly, the total time, material and technical, and intellectual costs of the professional psychophysiological selection procedure are reduced.

The implementation of the proposed organisational measures is associated with the allocation of such blocks of professional selection, during each of which it is possible to identify persons unsuitable for this profession. Further research into the psychophysiological qualities of these individuals is inappropriate. Thus, at each stage of such a «cascade» selection, persons who are not suitable for performing duties in a particular profession are eliminated.

A detailed description of the requirements set by the profession and the number of specialists to be selected can serve as a starting point for the development of «cascade» organisational measures. An in-depth analysis of these requirements will allow to identify specific discrete stages of cascade selection, each of which will result in the division of the entire flow of applicants for work in the profession into two «arms»: those suitable and those unsuitable for work in the profession. Persons suitable for work in a given profession should be subjected to further study of their psychophysiological qualities at the next stages of the «cascade» of organisational measures. People who are not suitable for this type of activity fall out of the general flow. They may be offered a job in another area of professional activity. The data on the number of required specialists is used to stop further work at any stage of the «cascade», which significantly reduces the amount of selection work performed.

The details of developing a «cascade» organisation of professional selection should be considered with the help of an example (Figure). Suppose it is necessary to select a group of military operators who perform monotonous work in difficult environmental conditions. In order to develop such a «cascade» of professional selection technologies, it is first of all necessary to pay attention to the fact that it should be a military specialist, which imposes certain restrictions on the set of his/her professionally important qualities.

These qualities can be conditionally divided by the method of their assessment into psychological (responsibility, discipline, organisational and analytical skills, ability to predict the situation, stress resistance, etc.) and psychophysiological qualities that are assessed instrumentally (high speed of decision-making depending on the situation, which to some extent reflects the functional mobility of nervous processes, physical endurance, high mental stability – based on the strength and stability of nervous processes, concentration and switching of attention, high level of decision-making). At this stage of the «cascade», a number of people can be identified who, due to their psychological and psychophysiological qualities, cannot serve in the army or perform combat operations in extreme situations. Other applicants are submitted for examination at the next stage of the «cascade».

The next stage of the «cascade» is related to the study of working conditions that may be harmful. The first phase of such a study should be the identification of a set of harmful factors.

Then, by modelling possible situations of exposure to the selected factors on the applicant's body, it is necessary to analyse the degree of this exposure and draw a conclusion about their significance

ISSN 2223-6775, Ukrainian Journal of Occupational Health, 2022, 18 (4), 320–328

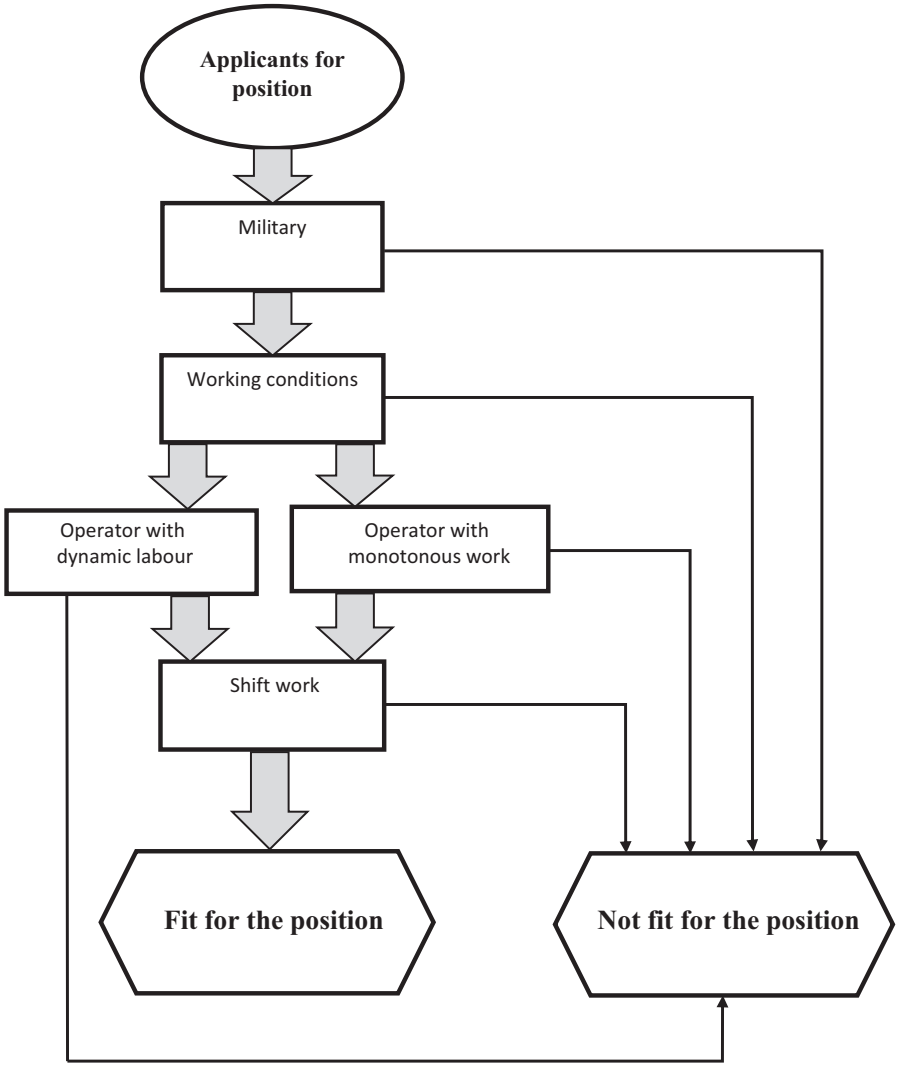

Figure. Scheme of the «cascade» organisation of professional selection

or not. For example, to analyse the level of tolerance of the applicant to prolonged exposure to high temperatures. In the first case, it is necessary to move on to the next stage of the assessment of the applicant's professional suitability for the position, while in the second case, it is necessary to complete further assessment.

The next step in the professional selection process involves testing the applicant for the position of operator. It should be noted that the work of a modern military serviceman in most cases involves operating various technical means, as the technical support of the Armed Forces of Ukraine is constantly improving. Therefore, the service of a military specialist is usually associated with operator activities. However, operator activities can be very diverse. It can include elements of homogeneous work (observer operators, guards, snipers, etc.) or continuous dynamic activity (driver, light drone operator, etc.), which undoubtedly affects the professionally important qualities of a specialist. We have previously shown that operators can have the

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quality of being either resilient to monotonous work or unstable to this activity [10]. It is clear that the performance and reliability of professional activities of servicemen who are resistant to monotonous work will be better and more stable. Therefore, it is these people who should be selected to perform homogeneous work. There are special psychological and psychophysiological methods for this procedure.

Another stage of the professional selection process determines the applicant's suitability for the position, taking into account the degree of monotony of the future activity. This involves assessing the level of resistance to monotonous work, evaluating the applicant's speed, attention span, short-term and long-term memory, cognitive abilities, etc. If the applicant receives high marks in terms of suitability to perform monotonous work, he or she continues the test. Otherwise, the applicant is declared unfit for work under the terms of the position and further tests are terminated.

Another important characteristic of work is the ability to work night shifts. The fact is that a person who can easily tolerate night work should have an appropriate chronotype [11], which significantly affects the operator's performance. Establishing a chronotype whose owner is more tolerant of night work is an important task of professional selection. When performing such an analysis of the psychophysiological qualities of job applicants, some of them may be determined to be unsuitable. The last stage of the professional selection process is dedicated to this very topic.

Thus, at each stage of the «cascade» selection process, individuals are identified who are unfit to perform their professional duties in a particular position. These individuals are not subjected to further research, which is valuable not only from an ethical point of view. In this case, the time of qualified psychophysiologists and the material costs of the organisation are freed up for other tests.

If we compare the above provisions on the organisation of professional selection, we can state that modern literature sources describe somewhat different methods. It is noted that the development of a system of professional psychological selection should be based on a number of principles [12]. One of them is the principle of the relativity of the criteria for an individual's suitability to perform professional duties. These criteria cannot be clearly fixed, but must change depending on certain conditions, characteristics of management systems, environmental factors, the permissible training period, and socio-economic opportunities for choice. Operational and psychological analysis is performed by sequentially dividing the tasks and functions of a vocational system, from complex to simple actions and operational units of information. At the same time, logical, spatial and temporal connections between individual components are determined each time, i.e. a more detailed algorithm of the specialist's activity is built. The essence of the algorithmic analysis of the professional activity performed is to decompose the work process into qualitatively elementary components, determine their logical interconnection and specify the list of activities that have a certain psychophysiological meaning.

Alongside with the general solidarity with the opinion of the authors of this research, it is still necessary to make some comments. Firstly, an extreme reductionist approach to solving the problem of professional selection is not entirely appropriate, since the in-depth division of activities into components loses a holistic view of the activity itself. Such a loss leads to a decrease in the reliability of conclusions about the professional suitability of a job applicant. Secondly, the development of

ISSN 2223-6775, Ukrainian Journal of Occupational Health, 2022, 18 (4), 320–328

suitability criteria that must change depending on certain conditions and characteristics of management systems, as well as other factors, is practically impossible due to the huge amount of work required to support these developments. Therefore, it is more rational, both from a theoretical and practical points of view, to organise professional selection taking into account major blocks in the analysis of the profession: suitability for one or another field of activity, suitability for work in difficult environmental conditions, suitability for operator activity, suitability for variable activity, etc.

As noted in our previous works, the analysis of organisational schemes and methods of professional psychophysiological selection in its in-depth consideration revealed many problems that still need to be addressed [13]. It showed the unresolved nature of a number of important problems of professional selection on the one hand and the great economic, moral and scientific importance of organisational approaches on the other one. This indisputable fact proves the value of further developments in the direction of improving organisational approaches to professional psychophysiological selection.

Conclusions

1. The authors justify a «cascade» approach to professional psychophysiological selection, where at each stage the persons who are unsuitable for performing professional duties in a particular position and under certain conditions are identified. These persons do not undergo further research, which allows freeing up the time of qualified psychophysiologists and financial costs for other work. The advantages of such a selection procedure in comparison with traditional approaches are determined.
2. By modelling possible situations of exposure to certain factors on the applicant's body to perform work in extreme conditions, it is necessary to analyse the degree of this exposure and conclude on its (in) significance (the level of tolerance of the applicant to prolonged exposure to high temperatures, the ability to operate various technical means, work with elements of homogeneous work or continuous dynamic activity, etc.), which undoubtedly affects the professionally important qualities of a specialist.
3. The analysis proves the possibility and value of improving the procedure for conducting professional psychophysiological selection with the use of «cascade» selection techniques.

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ORCID ID of co-authors and their contribution to the preparation and writing of the article:
Kalnysh V. V. (ORCID ID 0000-0002-5033-6659) – hypothesis, writing of the article;
Nagorna A. M. (ORCID ID 0000-0003-3311-7523) – wrote the article, formulated the conclusions;
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Contact person: Kalnysh Valentyn Volodymyrovych, PhD of Biology, Professor, Laboratory of Epidemiological Research, Occupational Pathology and Occupational Health Monitoring, State Institution «Kundiiev Institute of Occupational Health of NAMSU», 75, Saksaganskoho Str., Kyiv, 01033. Tel.: + 38 0 67 348 81 43.
E-mail: vkalnysh@ukr.net