REVIEWS AND NOTES

Cosmin Dragoș DUGAN, *Neuroaugmentarea în epoca cognitizării. Între competiție sinergie. Optimizarea performanțelor umane pentru personalul de securitate națională și profesii de elită*[1], Bucharest, Military Publishing House, 2020

Review by Alexandra POPESCU*

The central element of the book "Neuro-augmentation in the age of cognition" is represented by the study of the role of the techniques and instruments specific to the practice of neuro-augmentation in optimizing human performance, focusing on the military field, without limiting exclusively its focus on it. From this perspective, the author's approach can be considered a structured and documented approach conducted in Romania on the cognitive optimization and neuro-augmentation, the final goal of the research process described in the process being to develop an autochthonous vision regarding the development and implementation of programs to increase/optimize the performance of the personnel employed in the field of national security.

In an increasingly competitive society, where intelligence, creativity and originality are central factors in the process of evaluating human performance, the pressure to reach maximum potential led to the creation of a culture of improving cognitive, emotional and behavioural performances. Cognitive performance optimization and neuro-augmentation have crystallized especially in recent decades as distinct and specialized branches within the concept of human performance optimization (HPO), focusing on achieving maximum performance, in ethical and medical safety conditions. In this context, the book represents a first step in the development and identification of

[1] *Neuroaugmentation in the age of cognition. Between competition and synergy. Optimizing human performance for national security personnel and elite professions*.

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neuro-augmentation as one of the study branches of neuroscience, trying to stimulate university research in this field throughout the presented results, highlighting the need to develop the operational neuroscience domain in Romania, as an integrative and interdisciplinary approach.

The book begins with an introductory chapter that presents the main theories which deal with the studied subject (dataism, transhumanism and singularity), which is complemented by a chapter dedicated to the definition, by making a brief literature review, of the three concepts operated within the research process: (a) the optimization of human performance – captures the Romanian perspective on defining this concept; (b) operational neuroscience – defined from the perspective of optimizing human performances in order to identify the role they play in the development of recruitment and motivation strategies for the personnel; (c) cognitive optimization and augmentation (neuro-augmentation) – defined from the perspective of military personnel.

Furthermore, the third chapter deals with the ethics of neuro-augmentation, which is addressed in terms of the widespread implementation of the techniques and methods for human performance optimization, fact that would attract controversy about the reasons, used methods and possible consequences of this particular practice, as well as about how public opinion would receive it. The fourth chapter focuses on identifying the role that neuro-augmentation, as a science and procedure, can play as a component of the process of evaluation and measurement of human performance specific to the personnel hired in institutions of national security, by analysing and describing evaluation models derived on the civil area from precision and personalized medicine initiatives, in order to be able to establish which are the parameters currently used to evaluate neurocognitive and emotional states and performances.

The fifth chapter presents in detail the methods and techniques used for optimization and neuro-augmentation that can be applied to military personnel, highlighting the practical applications which have been developed within several institutions of national security, the interest these institutions shown into developing such applications

(proven by the investments and funds allocated to research in this particular field), the inclusion of provisions on neuro-augmentation within official doctrinal documents and the experimental use within current military practice.

In order to achieve a unitary perspective on the basis of the theoretical information presented in the first five chapters, useful for the reader to construct an overview on the studied topic, the sixth chapter presents a detailed description of the applicability of the neuro-augmentation in the field of national security throughout (a) a presentation of the applicability of this practice for the optimization of certain higher mental processes or cognitive functions (memory, attention, concentration etc.) for military professions, (b) a presentation of applicability for civilian professions, (c) a discussion of unconventional aspects of human performance, with applicability in the field of national security and (d) a presentation of the applicability of neuro-augmentation for various weapons and military specialties.

One of the most interesting and original sections of this book is represented by the seventh chapter, which aims to demonstrate the utility and the positive impact of real-time performance measurement, as well as the application of neuro-augmentation methods and techniques in the activities conducted by security officers at airport checkpoints. Starting from the hypothesis that the implementation of a cognitive optimization program within the activity conducted by airport security officers will led to a measurable improvement of neurovisual performances, the author conducts an experiment on three stages in order to identify the most relevant performance indicators that can be measured in real-time and a proposal for a cognitive optimization and augmentation able to improve the performances of the process of visual targets identification. Therefore, the experiment consisted of a series of small-scale experiments, as follows: (1) exploratory study aimed at conducting a probabilistic identification of brain areas that are critical for the neurovisual performance of airport security officers; (2) evaluation of the means used to obtain the performance parameters in conditions as similar as possible to the operational ones – for this study the author used a sample made up of inexperienced subjects (civilian employees who had not

previously carried out activities specific to airport officers and who were not trained in this particular domain); (3) the main experiment aimed at demonstrating the positive impact determined by the optimization program on visual target identification performance throughout the identification of brain activation patterns and the calculation of the individual visual performance of airport security officers.

In this context, the chapter dedicated to conclusions highlighted the fact that the cognitive optimization and neuro-augmentation methods and techniques differ in terms of operating principles, action and administration conditions, specificity, recommendations etc. A simple classification considers the degree of accessibility, complexity and intrusiveness – from "classic" and well-known methods such as nutritional interventions, physical training techniques, sleep optimization, neuroergonomics, advanced techniques of psychotherapy and personal development, cognitive training, etc. to more sophisticated methods such as pharmacological stimulation (nootropic), neuromodular or transcranial stimulation techniques.

The orchestration of these methods and techniques in customized optimization and augmentation programs is being performed by groups of experts (doctors, psychologists, coaches) under de umbrella of multi-layered neuroprotective strategies that include prevention, optimization, augmentation and recovery measures adapted to individual phenotypic and genotypic particularities. Another form of capitalization is represented by the precise countermeasures designed to counteract the biological and psychological effects resulted from occupational/professional exposure to aggressive factors and high-risk situations.

The ability to directly connect the finite human mind to an artificial partner with unlimited virtual development potential is a revolutionary technological breakthrough, if it can ever be safely operationalized. The ethical, legal, practical issues, presented in detail in the book, are commensurate with the potential benefits, especially since many aspects of human-artificial intelligence collaboration are unprecedented in human history.

The development and integration of neurotechnologies and artificial intelligence in the military field aims to achieve advanced man-

machine collaborative solutions. This hybrid approach, metaphorically called the "centaur" type, tries to virtualize the hardware elements, while they will be "cognized" by advanced artificial intelligence solutions. Assisted human operations are based on the use of systems that expand human physical capabilities (mainly exoskeletons), but the robotic offer is very creative.

Developing efficient and secure neuro-augmentation programs for intelligence personnel allows a possible re-approach to the issue of classical HUMINT, understood in the form of exploiting individual skills and access to relevant information. The book, basing on the literature review process and discussions with experts, analyses the concept of "neuro-HUMINT", limited to the concerns of a state or non-state entity to optimize the individual and collective physical, psychological and behavioural abilities of human sources.

The book is a plea for the ethical and constructive use of the concept of human performance and artificial intelligence optimization and calls for the establishment of a lexicon dedicated to cognitive optimization and neuro-augmentation in the Romanian research community, as well as for an interdisciplinary approach to doctoral research topics in the field of neurosciences for the development of original and pragmatic local visions, based on research that responds to intrinsic needs.