INTERNATIONAL CONFERENCE RCIC'23
Redefining Community in Intercultural Context
Brașov, 3-5 August 2023

COMBAT MINDSET AS A COMMUNICATION PROCESS: TASK AWARENESS, PREPARATION AND EXECUTION

Adrian LESENCIUC*, Iasmina-Georgiana SAUCIUC*

*Department of Fundamental Sciences, Faculty of Air Security Systems, "Henri Coandă" Air Force Academy, Brasov, Romania

Abstract: *The purpose of this paper is to design Combat Mindset as a communication process, starting from the perspective of Johnson communicational model (1946/1975). Under these conditions, distinguishing between the preverbal stage in the perceptive dimension (as apperceptive preparation for the battlefield) and in the communicative one, we have engaged in making a set of measurements of some mental parameters to identify the level of preparation in accordance with the context. After a series of coordinated experiments, aiming at measuring the mental processing of specific tasks conveyed in English by native and non-native speakers (Panal, 2023), respectively visualizing the activation of brain areas in the mental processing and execution of military commands (Sauciuc, 2023), through this paper we aimed to identify the differences between the preverbal and the verbal or actional stage of the communication act in an exam within the basic military training module in the "Henri Coandă" Air Force Academy, using an EEG headset and specialized software for the appropriate measurement of the indicators regarding the preparation of the mental state in the two phases of the experiment.*

Keywords: *communication; Combat Mindset; frustration; relaxation; stress*

1. INTRODUCTION

We have tried to look at mental preparation for the immediate contingency (as well as for the battlefield) from a communicational perspective, as a sum of verbal and nonverbal reactions involving the body's response to environmental challenges. Communication sciences provide a fractional answer to this problem. By studying the verbal communication behavior, we can find a series of intelligible verbal reactions, but extremely few, in many instances even missing, as a result of passing through the filter of verbalization, i.e. going through the layers of the expression of preverbal emotions and the selection of those words that summarize the essence of the transmission, i.e. of those elements able to prevent a similar situation from happening. This verbal selection as part of a complex reaction was first studied by the American psychologist Wendell Johnson, but his work from 1946 became widely known only after 1960, after Wilbur Schramm created the premises for the convergence of important research on what constitutes the communication sciences act of birth as a distinct field of study, through the book *Mass Communication*. Wendell Johnson considered that both following the awareness of the fact that an event is taking place and following the transmission of the communicational content, the individual who is aware of the event or who receives the informative content has a similar reaction, which involves a series of imperceptible steps directly and the verbal or action-reaction later, as a result of filtering and controlling the reaction. The two communication partners in Johnson's model are Mr. A, in direct interaction with the event taking place (the perceptual dimension), respectively Mr. B, to whom Mr. A summarizes the information content (the actual communication dimension[1]). In order to highlight this common

[1] The model was later exploited by George Gerbner (1956:175), who refers to the two dimensions as the perception axis and the means and the axis of control. The contribution of Wendell Johnson (a researcher with a tarnished reputation after The Monster Study experiment), is an extremely important one in that it goes beyond the classical framework of analysis, that it deepens the study of communication from a communicational perspective, and that it foreshadows a new paradigm: "Basically, W. Johnson does not transfer Shannon's procedural model to the plane of human communication, but builds a new model, in which two dimensions intervene, thus anticipating Gerbner's studies, which explicitly delimit the two dimensions of the communication process: perceptive and communicative. Despite a complex approach, assuming the consideration, apart from language and gestures, of posture, facial expression, general body position, Johnson's functionalist model remains

reaction in terms of the response of the two actors of communication, both in the case of the one who receives the signals from the environment, and the one to whom these signals are communicated in summary, we transposed Johnson's communication model, emphasizing what is common in communication contagion:

1. An event occurs (any first-order fact serving as a source of sensory stimulation)
2. which stimulates Mr. A. through eyes, ears, or other sensory organs, and **the resulting**
3. **nervous impulses travel to** Mr. A**'s brain, and from there to his muscles and glands, producing tensions, preverbal "feelings," etc.,**
4. **which** Mr. A. **then begins to translate into words, according to his accustomed verbal patterns, and out of all the words he "thinks of"**
5. **he "selects," or abstracts, certain ones which he arranges in some fashion**, and then
6. by means of sound waves and light waves, Mr. A. speaks to Mr. B.,
7. whose ears and eyes are stimulated by the sound waves and light waves, respectively, and **the resulting**
8. **nervous impulses travel to** Mr. B.'s **brain, and from there to his muscles and glands, producing tensions, preverbal "feelings," etc.,**
9. **which** Mr. B. **then begins to translate into words, according to his accustomed verbal patterns, and out of all the words he "thinks of"**
10. **be "selects," or abstracts, certain ones, which he arranges in some fashion** and then Mr. B. speaks, or acts, accordingly, thereby stimulating Mr. A. -- or somebody else -- and so the process of communication goes on, and on -- with complications, as indicated in the accompanying text. (Johnson, 1946:472, *apud* Schramm, 1975:301-302)

The communication process, as it results from Wendell Johnson's research, is a repetitive, iterative one, assuming what, from a semiotic point of view, constitutes the premise of communication ad infinitum starting from the natural trace or emanation from the sign-object link in the semiotic series of Charles S. Peirce, or from the infinite semiosis it implies:

> Upon being interpreted, the representamen has the ability to trigger an **interpretant**, which in turn becomes a representamen by triggering another interpretant referring to the same object as the first representamen, and thereby allowing the first one to refer to the object. And so on, *ad infinitum*. (Peirce, 1990:274-275)

Obviously, we asked ourselves the question, from the perspective of preparation for the battlefield, what happens in the minds of people who receive signals from the environment, who are transmitted certain informational contents with a high degree of redundancy, or who prepare for unpredictable informational contents. Without engaging in intracranial measurements to differentiate, for example, the intensity of brain activity in the case of sender and receiver in the continuation of the Johnson model, we set out to identify what was considered until now in the communication sciences to be communicative ballast, in fact, the unseen part of the communication iceberg: the brain activity that leads to mental preparation for the unexpected and verbal filtering of communication content. In fact, understanding nonverbal communication should boil down to understanding the physiology of the central and peripheral nervous systems, the direct connections between stimuli types and implicit reactions. We aimed, therefore, through this paper, to highlight the way in which non-verbal activity in situations of mental preparation for the unexpected leaves visible traces, measurable indicators regarding the first phase of the synaptic arc, i.e. the electrical activity in the cranial box (without being able to highlight the chemical mechanism that makes it possible to excite the postsynaptic membrane). For this, we measured in certain experimental conditions the brain activity of some subjects prepared for the unpredictable and for a complex communicative response, which involves the resort to different signification systems.

2. PREMISES OF THE RESEARCH

The problem of measuring preverbal emotions is not, however, new. There are a number of relevant studies regarding communication by maintaining the stage of expressing emotions, without the need for verbal mediation, insufficient to convey the informational content in its complexity. Many of these studies focus, however, on highlighting the neural or psychological foundations in communication from the preverbal stage of children's development (Scheiner *et al.*,

confined to the mechanistic functionality, specific to the preparadigmatic thinking of the mid-20th century. In addition to machinist functionalism, the American researcher brings into discussion the two dimensions, to be exploited, given the perception of the act of communication as a complex, united product, the result of the organic condition of the communicator. Therefore, communication is mechanistically structured in an organic framework of production and reception through the psychological and the cultural (social) dimension. Thus, Johnson overcomes the closure of the mechanistic paradigm of communication, foreshadowing a new, organic paradigm" (Lesenciuc, 2017:111)

2002; Valloton, 2008; Scheiner & Fischer, 2011; Skerry & Spelke, 2014; Cong *et al.*, 2018; Ruba *et al.*, 2019; Ruba & Repacholi, 2019), involved in maternal communication (Lenzi *et al.*, 2009). Regarding the study of preverbal expressions in adults, most studies aimed at their psychoanalytic reconstruction (for example, Anthi, 1983) or psycholinguistic objectives. There is an obvious connection between these two major lines of research on the preverbal level of communication. From this last category of studies regarding the relations between thought and language, the work of Phyllis Schneider (1990) stands out, which brings together the Vygotskian and Piagetian perspectives on the connections between thought and language. Essentially, regarding the preverbal emotions in Wendell Johnson's studies, the focus is on these relationships and the type of predefinition.

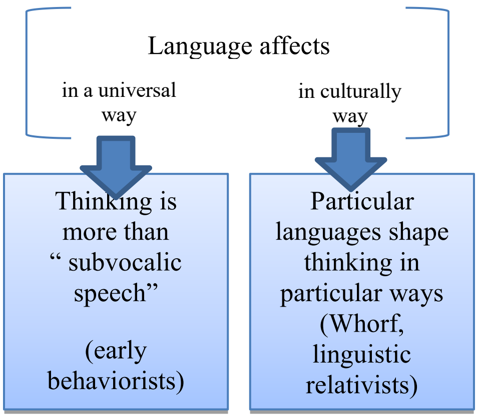

Fig.1. Effects of language on thinking (*apud* Schneider, 1990:3)

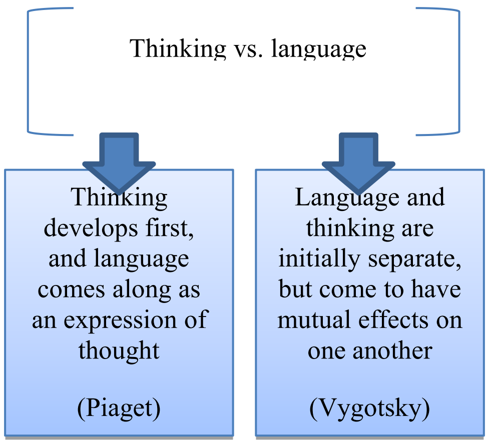

Fig.2. Thought-language relations (*apud* Schneider, 1990:3)

Schneider's summary scheme concerning the typologies of postulates regarding thought-language connections was useful for identifying possible directions for studying the mental preparation of the reaction (verbal or non-verbal), testing both the pattern of the effects of language on thinking, as well as that of thought patterns on language and action through the various experiments carried out.

Our study's interest is to highlight the preverbal level of communication in situations characterized by the unpredictability of the environment and by the need to be aware of the mission and configure the appropriate response. For this, we used the experiment method with the help of a useful tool for measuring brain waves, without invasive or painful procedures: EMOTIV+ EPOC EEG Headset, and related software: Emotiv Launcher, Emotiv BrainViz, Emotiv BCI, Emotiv PRO.

In the pretest phases, we chose to study the effects of language on thinking from the perspective of cultural (linguistic) relativism, because the behaviorist hypothesis is contradicted by countless studies. I coordinated a research undertaken by student D.C. Panal conducted on a group of seven subjects (cadets of some Air Force academies), native English speakers (from the U.S.) and non-native speakers (from Bulgaria, Estonia, Greece, Italy, and Romania) regarding the processing of tasks transmitted in English, in a specialized language appropriated – the standard phraseology of communication –, strongly redundant, with the purpose

> to understand the English language when the communication between the pilot and the air traffic controller is devoid of standard phraseology, but to analyze how neural connections are produced and where in the brain they are located, when native speakers, but also non -natives, listen to instructions in English (Panal, 2023:96),

of the reaction times of native and non-native English speakers, respectively. The results were eloquent both in terms of the reaction times of the native speakers (regardless of gender, with relatively equal scores) and, above all, in terms of the brain activity of the native and non-native speakers. Following the areas of the cerebral cortex assigned to language processing, it is illustrative of the intensification of brain activity in these areas, illustrated by the increased intensity of electrical activity (the first phase of the synaptic arc) in the case of non-native speakers, who require a greater effort of language processing. In the minds of the subjects, this activity intensifies, which from the perspective of communication sciences can be called intrapersonal (non-verbal) communication. The measurements made are more in line with the public language hypothesis of thought than with the Mentalese hypothesis and, regarding Schneider's projection, more in line with Piaget's hypothesis than Vygotsky's. In the case of native subjects, the “intrapersonal communication” stage, involving higher cerebral energy consumption, is reduced to simple interactions. Therefore, in the case of natives, the response becomes automatic and no energy is consumed at the level of the cerebral cortex.

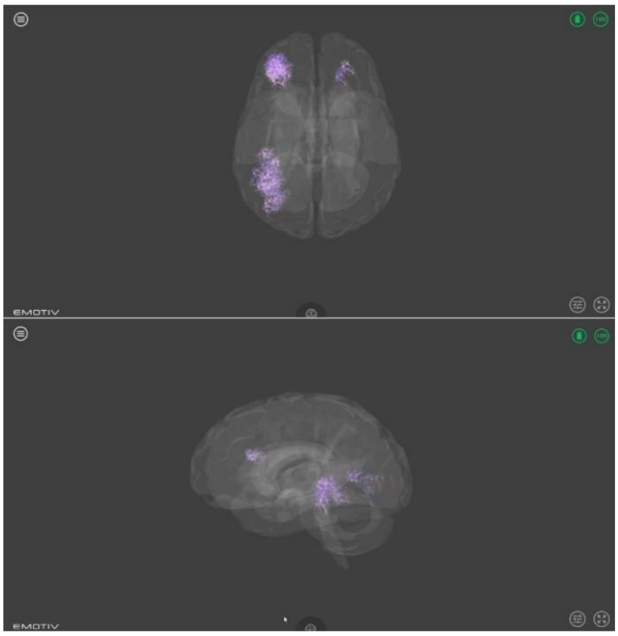

Fig.3. Brain activity of a native speaker, in side and top view (*apud* Panal, 2023:101)

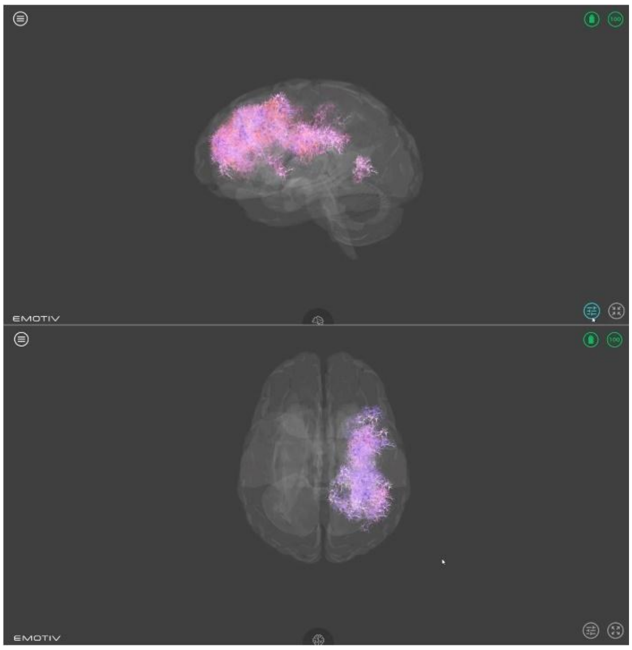

Fig.4. Brain activity of a non-native speaker, in side and top view (*apud* Panal, 2023:110)

A similar experiment is the one concerning the action response in the situation of the execution of frontal instructional movements. Based on a series of previous researches (Lesenciuc & Sauciuc, 2022), I coordinated this experiment carried out by the student I.G. Sauciuc (2023), through which we followed the activation of brain areas in the mental processing and execution of military commands. The complex research highlighted the activation and synchronization of alpha, beta and gamma waves in the two cerebral hemispheres in the case of the eight investigated subjects (all Romanians, students at the “Henri Coandă” Air Force Academy) and allowed the differential mapping of brain areas in the case of subjects with more experienced in frontline training movements (graduates of national military colleges) relative to subjects with less experience (graduates of civilian colleges). The differences between the two categories of subjects are relevant: in the case of those with less experience we find a lower activity of alpha waves, due to the fact that they have difficulties in reaching the state of relaxation/ intellectual comfort in the preparation of the movement, but a more pronounced one of the waves beta, predominantly present in the auditory cortex, in the parieto-temporo-occipital associative area and, in particular, in the limbic area:

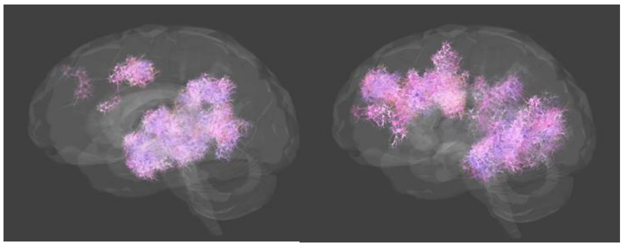

Fig.5 Active alpha and beta waves in the auditory cortex and the parieto-temporo-occipital associative area (5a), respectively in the limbic area (5b) in the case of students with less experience (apud Sauciuc, 2023:169)

Intense brain activity, especially in the limbic area, is the index of inexperience and the need to regulate emotions in relation to stressful situations, resulting in the intensification of::

> [...] alpha and beta waves in the limbic areas during movement due to the increased emotional and cognitive demands of the task. The limbic system is involved in regulating emotions, motivation, and memory, being activated in response to new or challenging stimuli, which are some possible reasons why less experienced military personnel show more active limbic areas during a movement. Thus, motor anticipation can be influenced by emotional factors because they can influence the individual's motivation and attention. In general, emotions affect both the ability to plan and execute movements and

how they are perceived and interpreted or performed. Students with less experience show a high level of stress, and their brains are not in a state of mental peace, but in an alert state, as you can also observe the activation of these waves in the area of the attention-specific dorsolateral prefrontal cortex (Sauciuc, 2023:169).

The results highlight major differences in the mapping of brain areas active during frontal instructional movements between the two categories of subjects, which can be extrapolated beyond those achieved in the previous study: the more important the experience in the linguistic or practical activity, the more the activity of the cerebral cortex is less and the response reaction, verbal or action, more precise.

3. MISSION AWARENESS

3.1 Description of the experiment. In more complex military actions, response reaction means considering both the potential verbal and actional communication response. Therefore, situations of mental preparation from a communication perspective are not limited to Starting from this consideration, we considered a communication situation that simulates the emotion of preparation for a real, unforeseen situation, which also involves the use of complex (including linguistic) codes, and the action response, both useful in making the optimal decision. We designed the conduct of the experiment in two successive phases: before entering the military topography exam – oral, individual exam, conducted in the field, assuming the solution of a useful topography problem in a tactical situation projected on the map –, respectively during the exam. The central objective of this experiment was to illustrate the preverbal level of communication in situations characterized by the unpredictability of the requirement (the subjects being different and covering the entire subject) and by the need to be aware of the requirement and to configure the appropriate complex response to it. Therefore, the goal was to identify the need for mental preparation in the preverbal level of communication, the one that makes the difference between success and defeat (Yanilov & Boe, 2014:10-11). Therefore, concentration, awareness of reactions to stressors and adequate mental preparation are essential – Yanilov and Boe identify five mental training strategies: "visualization, goal setting, positive self-talk, combat mind-set (courage, determination, aggression) and relaxation" – but, until the implementation of these strategies, it is important to adequately measure the indicators regarding the preparation of the mental state in the two phases of the experiment. We used the same tool, the EMOTIV+ EPOC EEG headset, and the Emotiv BCI software, which highlights states and types of brain activity by correlating the values of the intensity of electrical activity at the level of the cerebral cortex, that is, using EEG frequencies to identify (1) the level of engagement or cognitive and emotional involvement of the subject (*Engagement*, En), associated with frequencies in the gamma band (30-40Hz); (2) the level of stimulation, enthusiasm, interest, positive emotions of the subject (*Excitement*, Ex), associated with the frequencies in the alpha (8-15 Hz) and beta (15-30 Hz) wave band; (3) the level of frustration or dissatisfaction of the subject (*Frustration*, Fo), associated with frequencies in the alpha band (8-15 Hz); (4) the level of interest, curiosity, openness to stimuli, tasks, the level of alert attention and higher mental activity (*Interest*, In), associated with frequencies in the beta band (15-30 Hz) and in the gamma band (30-40 Hz); (5) the level of relaxation and calmness of the subject (*Relaxation*, Re), associated with frequencies in the alpha wave band (8-15 Hz) and (6) the level of anxiety, stress or tension of the subject (*Stress*, St), associated with frequencies in beta band (15-30 Hz). Five subjects underwent these successive measurements.

3.2 Results and interpretation. By collecting this information, we followed the correlation of the collected values and the correlation between them and the exam results, but, in particular, the identification of the differences between the pre-verbal and the verbal or action level of the communicative act called the surveying exam.

During the exam, S1 departed from the level of the following values: 64% En, 87% Ex, 81% Fo, 53% In, 58% Re and 79% St. During the course of solving the subject, the values became 60% En, 98% Ex, 75% Fo, 62% In, 60% Re and 64% St, which indicates an intensification of enthusiasm, generated by the desire to complete the subject, against the background a slight relaxation. At the end of the measurements during the exam, with the communication of the grade, the levels of excitement and interest decreased consistently, in parallel with the decrease in the level of frustration, which reached the lowest rates in the entire range of values: 43% En, 68% Ex, 22% Fo, 58% In, 52% Re and 40% St. At the reception of subject two, the trend of evolution was preserved in the case of almost all values, except for the level of engagement, reaching the following indicators: 61% En, 18% Ex, 19% Fo, 57% In, 70% Re and 38% St. Until the end of the evaluation, S1 recorded higher values at the level of engagement, i.e. a maintenance of the level of interest, against the background of an increase in the relative values for the level of relaxation: 70% En, 29% Ex, 24% Fo, 46% Lin, 70% Re and 39% St. S1 showed a moderate level of engagement, maintaining his focus until the first partial note was communicated, and responded quickly and correctly, processing information in a short time and making appropriate decisions. The stage of preverbalization suggests relatively low-intensity brain activity related to a high level of instruction and appropriate communicative reactions.

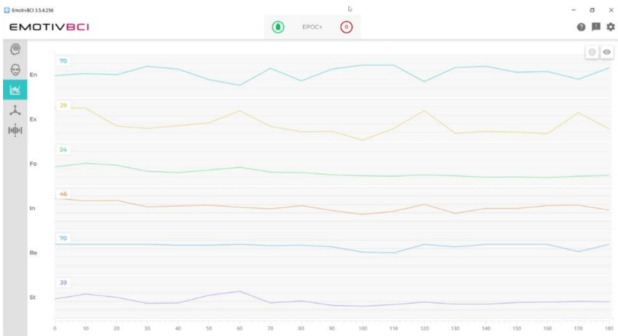

Fig.6 S1 mental states during the exam

Upon receiving the subject, S2 had relatively low parameters, 50% En, 42% Ex, 42% Fo, 44% In, 43% Re, and 29% St, indicating a moderate level of involvement and stress. With the reception and processing of the first subject, the student kept his parameters, except for the level of excitement, 52% En, 70% Ex, 48% Fo, 51% In, 54% Re and 52% St, to later alter the values of engagement and excitement against the backdrop of moderate relaxation 66% En, 50% Ex, 44% Fo, 47% In, 22% Re and 28% St, with small variations regarding excitement in terms of mental reasoning and mapping of of the answer: 41% En, 60% Ex, 49% Fo, 57% In, 70% Re and 47% St. As in the case of S1, the final values indicatea a significant decrease in the engagement and enthusiasm of S2, but in the conditions of maintaining, however, a high level of stress: 39% En, 53% Ex, 61% Fo, 65% In, 70 % Re and 76% St. The subject had a fluctuating level of concentration, he felt the tension of the exam and did not get rid of the stress even at the end, he had a slower pace of solving the tasks, presenting difficulties and partially fulfilling the exam requirements, the marking being consistent with the level of knowledge, and the state of mind foreshadowing the answer.

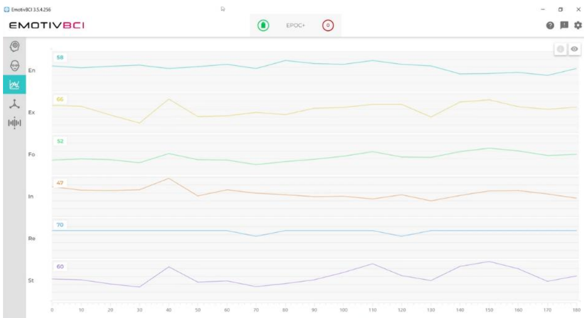

Fig.7 S2 mental states during the exam

S3 had initial difficulties in understanding the requirements of the first subject, registering moderate levels of the parameters: 53% En, 95% Ex, 62% Fo, 56% In, 69% Re and 39% St, except for emotional tension, which was also maintained at giving the answer quickly, and moving, also quickly, to subject two: 64% En, 98% Ex, 61% Fo, 57% In, 69% Re and 36% St. We noticed an increase in the level of engagement and interest, values that varied after the elaboration and indication on the map of the answer for subject two, with the mention of maintaining a very high level of excitement: 45% En, 99% Ex, 46% Fo, 68% In, 49% Re and 34% St. Although he had initial difficulties in understanding the requirement in the first subject, the student adapted quickly, engaged at an increasing pace and managed stress well, responding promptly and fully focused on the subject.

Fig.8 S3 mental states during the exam

S4 had somewhat similar input parameters to S3, with moderate levels for three of the indicators, but with a very high level of excitement counterbalanced by a high level of stress (highest among all subjects): 62% En, 99% Ex , 80% Fo, 58% In, 70% Re and 90% St. At the time of the elaboration of the answer to the first topic, the parameters indicating frustration, tension and stress began to decrease, while the level of excitement remained high, 54% En, 99% Ex, 67% Fo, 60% In, 67% Re and 47 %St. The trend was also maintained at the time of the elaboration of the answer to subject two, with a maximum concentration: 100% Ex, the other parameters being: 65% En, 67% Fo, 46% In, 62% Re and 40% St. Uncertain about the answer to topic two, S4 showed the greatest swings in the range of values, increasing frustration and stress and decreasing the level of concentration: 39% En, 53% Ex, 61% Fo, 65% In, 70% Re and 76% St. S4 had an oscillating behavior overall, with states of concentration compensating for the high level of stress but only in the case of the first subject, later emotional levels worsening the state and suggesting, by decreasing the level of involvement and concentration, a state of fatigue or uncertainty.

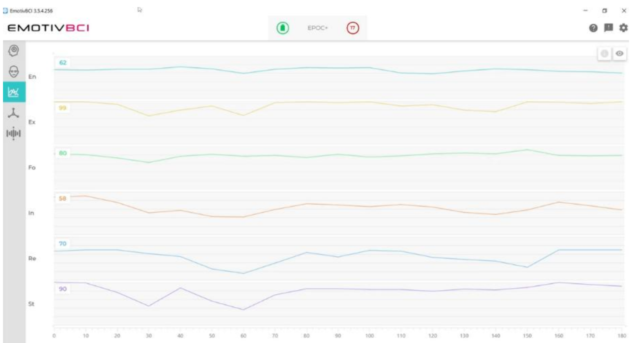

Fig.9 S4 mental states during the exam

S5 entered the exam relaxed, with below average parameter values: 33% En, 57% Ex, 42% Fo, 28% In, 66% Re and 58% St, the highest being, however, the stress level. During the solution of the first subject, the values registered a slight increase, including the stress level, the most important being the increase in the excitement level: 34% En, 91% Ex, 54% Fo, 65% In, 52% Re and 72% St. Stuck in finding a solution, the subject lost his concentration, the values dropping to low levels, except for a maintenance in the same parameter of the stress level: 18% En, 21% Ex, 46% Fo, 55% In, 72% Re and 58% Getting out of the jam with the help of the teacher's questions improved the indicators, but led to an increase in the level of stress and frustration indicators: 39% En, 53% Ex, 61% Fo, 65% In, 70% Re and 76% St. Without confidence in the correctness of the answer provided, S5 recorded the following indicators, keeping the increasing trend of the stress index: 27% En, 82% Ex, 72% Fo, 44% In, 70% Re and 86% St. With fluctuations in involvement and concentration, with a constant increase in stress level, without being convinced of the correctness of the answer, S5 showed a mix of involvement, concentration, frustration, uncertainty, probably also on the background of fatigue.

Fig.10 S5 mental states during the exam

During the exam, students had different reactions and behaviors. The levels of the values measured using the Emotiv BCI software varied in relation to the level of training, the degree of involvement in solving the task and, obviously, the previous mental state. Before the exam, the levels of the six indicators were more pronounced, and the variations in values occurred over longer intervals and more times. For example, the maximum values for the engagement state were between 70% and 94%, as opposed to those in the examination period, which were between 39% and 71%. Also, the minimum values were in the value range of 37-66% during the waiting period, and during the exam between 19-38%. This indicator is illustrative of the level of concentration and involvement of students in the pre-examination phase, much higher than during the exam. Regarding the state of excitement, the values were relatively constant, higher during the period of mental stress, during the examination, with maxima between 76-100%, compared to 42-99%, and with minima between 11 and 95%, versus 2-77%. Thus, the level of stimulation and positive emotions varied more and over longer intervals during the examination period as a result of different intellectual demands and related emotional involvement. The state of frustration was maintained in identical parameters, with maximum values between 25 and 93% and minimum values between 16 and 79% during the waiting period, and with maximum values between 61 and 81% and minimum values between 19 and 46% during the exam. We note the constancy of this parameter, except for the variation interval during the exam, of 62% percentage in the case of a single subject. The state of interest had the same tendency as that of excitement, of a slight increase in values during the exam period, with maxima between 62 and 77% and minima located between 28 and 56%, unlike the waiting period, in which the values were ranging between highs 55-67% and lows 34-47%. The increase in the level of interest in learning the content of the subjects can be associated with the level of involvement in solving the task and with the concentration on the subject itself. The state of relaxation assumed the smallest variations between the two phases of the assessment of cerebral activity indicators: maximums of 68-70% during the waiting period and 69-70% during the examination and minimums of 29-56% during the waiting period and 15-52 % during the exam. The subjects showed the tendency to relax and stabilize the values especially in the final phase of the examination, proving the ability to manage the stress and emotions associated with the examination. There are subjects who managed to maintain a constant level of relaxation during the whole exam (e.g. S1), which denotes an adequate mental preparation to approach this stressful situation. Arriving at this last indicator, the state of stress, the manifest tendency was that of a decrease in the level from the waiting period, with maxima between 37 and 94% and minima between 21 and 78%, compared to the exam period, with maxima between 39 and 90% and minimums between 22 and 58%, which can be seen in the mirror with the relaxed state. We note the sharp increase of this parameter during the exam for subject S5, who, unlike his colleagues, in whom the state of stress decreased with involvement in the exam, increased the level of anxiety and registered a lower level of concentration. The importance of stress management was also found in the values of the grades obtained by the subjects in the exam.

Table no 1 Variation of parameters during the waiting p eriod and the examination

Engagement (En)		maximum value [%]	minimum value [%]	variation range [%]
pending subjects	S1	94	66	28
	S2	70	44	26
	S3	71	60	11
	S4	76	37	39
	S5	78	45	33
subjects during the exam	S1	70	43	27
	S2	67	36	31
	S3	64	45	19
	S4	71	33	38
	S5	39	18	21
Excitement (Ex)		**maximum value [%]**	**minimum value [%]**	**variation range [%]**
pending subjects	S1	42	6	36
	S2	77	34	43
	S3	99	77	22
	S4	72	2	70
	S5	78	41	37
subjects during the exam	S1	98	18	80
	S2	76	24	52
	S3	99	95	4
	S4	100	11	89
	S5	91	21	70
Frustration (Fo)		**maximum value [%]**	**minimum value [%]**	**variation range [%]**
pending subjects	S1	34	16	18
	S2	56	29	27
	S3	93	79	14
	S4	25	20	5
	S5	61	44	17
subjects during the exam	S1	81	19	62
	S2	61	42	19
	S3	62	46	16
	S4	81	21	60
	S5	72	42	30
Interest (In)		**maximum value [%]**	**minimum value [%]**	**variation range [%]**
pending subjects	S1	55	34	21
	S2	56	40	16
	S3	67	47	20
	S4	60	36	24
	S5	66	40	26
subjects during the exam	S1	62	46	16
	S2	65	40	25
	S3	68	56	12
	S4	77	46	31
	S5	65	28	37
Relaxation (Re)		**maximum value [%]**	**minimum value [%]**	**variation range [%]**
pending subjects	S1	70	50	20
	S2	68	42	26
	S3	70	29	41
	S4	70	52	18
	S5	70	56	14
subjects during the exam	S1	70	52	18
	S2	70	15	55
	S3	69	49	20
	S4	70	45	25

	S5	70	52	18
Stress (St)		maximum value [%]	minimum value [%]	variation range [%]
pending subjects	S1	51	21	30
	S2	67	37	30
	S3	94	78	16
	S4	37	28	9
	S5	92	49	43
subjects during the exam	S1	79	38	41
	S2	76	22	54
	S3	39	34	5
	S4	90	35	55
	S5	86	58	28

In conclusion, the results obtained in this study indicate that the states of engagement, excitement, frustration, interest, relaxation and stress of the students before and during the surveying exam present certain patterns and trends. Based on the data obtained, the following conclusions can be drawn regarding these states of the five students. The state of engagement was more pronounced while waiting for the exam, suggesting an increased level of involvement and commitment to the exam, however, it decreased during the exam, which can be attributed to the stress and anxiety associated with the pre-assessment process. the exam. The state of excitement showed lower values during the waiting period and intensified during the exam, indicating that the students experienced an increase in enthusiasm and positive emotions when they started to solve the work tasks. The state of frustration was more pronounced during the exam, being associated with the high level of requirements, with the pressure and stress of the exam or even with external factors. The moderate or high level of frustration felt by students during the exam may suggest that they are engaged and focused on the tasks and requirements of the exam. Frustration can be the result of an active attempt to concentrate and engage effectively in solving exam tasks, even if this involves extra work or increased effort. However, the students were able to focus on the exam tasks effectively despite a moderate or high level of frustration. The state of interest was maintained during the exam and may suggest that the students showed a high level of interest and curiosity towards the topics and content of the exam, maintaining their motivation during the assessment. The state of relaxation was maintained during the exam, having values similar to its waiting period. This indicates that students were able to maintain a level of composure during the exam, which can be beneficial for performance and managing associated stress. The state of stress presented lower values compared to the state of relaxation at both times, but was still present and registered, with one exception, a slight decrease during the course of the examination. This finding indicates that stress was present at the examination but was managed to some extent and the level of relaxation contributed to the reduction of perceived stress. Perception and evaluation of the exam context can influence the level of variation in emotional and cognitive states. For example, waiting for the exam to start involves more uncertainty and anxiety, but a constancy of values, in contrast to the exam itself, during which performance stress and time pressure produced greater variations in emotional and cognitive states. Allowing for exceptions, they generally found similar patterns of variation. The marginal exceptions, which we will exemplify, are S1, calm and relaxed, unlike S5, whose stress level increased during the examination.

4. CONCLUSIONS

The results of the research highlighted the importance of the preverbal stage and the need for mental preparation in order to elaborate the complex verbal and/or action (intentional nonverbal) response, complemented by unintentional nonverbal communication. The differences are conclusive and highlight the need for military training to solve work tasks. Therefore, this previous mental preparation and awareness of the task, understanding the context, maintaining the high level of interest and concentration on the task, in parallel with the reduction of frustration, anxiety, panic, is necessary. The research revealed that each subject exhibited different levels of engagement, excitement, frustration, interest, relaxation and stress during the exam. Approaches and emotional states were influenced by the previous mental state, the preparation for the task – mindset –, the received task and the ability to concentrate to solve the subjects. Monitoring and understanding these aspects demonstrated the importance of adaptability (as a result of previous mental preparation) and different reactions of students in an exam, and approaches and emotional states had an impact on academic performance. Understanding students' levels of engagement, excitement, frustration, interest, relaxation and stress provides important clues about how these states affect cognitive abilities and performance in a concrete situation with a certain amount of unpredictability (task type). By identifying and analyzing these states, research can provide relevant information for improving the learning and assessment process in military higher education institutions. The acceleration or efficiency of learning presupposes, consequently, the previous mental preparation (Yanilov & Boe, 2014:1-11) in relation to the actual communication situation - combat mindset seen as a multistage communication process - and the acceleration or efficiency of learning through simulation training and through stimulation of neural activity (Dugan, 2020:218).

5. ACKNOWLEDGEMENTS

This article is funded by EEA grants 2014-2021 through the project Combat Mindset Training for Romanian Military Students (CoMind) 21-COP-0012.

The authors thank dr. Cosmin Dugan for providing the tools necessary to carry out the research and Maj. Adrian Bălău for permission to carry out the experiment within the "Military Topography" exam.

BIBLIOGRAPHY

1. Anthi, Roar. (1983). Reconstruction of Preverbal Experiences. *Journal of the American Psychoanalytic Association.* Vol.31, no.1. 33-59
2. Cong Y.-Q.; Junge, C.; Aktar, E.; Rajmakers, M.; Franklin, A. & Sauter, D. (2018). Pre-verbal infants perceive emotional facial expressions categorically. *Cognition and Emotion.* Vol.33, no.3. 391-403.
3. Dugan, Cosmin Dragoș. (2020). *Neuroargumentarea în epoca cognitizării, între competiție și sinergie. Optimizarea performanțelor umane pentru personalul de securitate națională și profesii de elită.* Foreword by Cristian Barna. Bucharest: Military Publishing House.
4. Gerbner, George. (1956). Towards a general model of communication. *Audio Visual Communication Review*. 4. 171-191.
5. Johnson, Wendell. (1975). The Communication Process and General Semantic Priciples. În Wilbur Schramm, *Mass Communication*, 2nd edition. Urbana: University of Illinois Press.
6. Lenzi, D.; Trentini, C.; Pantaro, P.; Macaluso, E.; Iacoboni, M.; Lenzi, G.L. & Ammaniti, M. (2009). Neural Basis of Maternal Communication and Emotional Expression Processing during Infant Preverbal Stage. *Cerebral Cortex.* Vol.19, no.5. 1124-1133.
7. Lesenciuc, Adrian. (2017). *Teorii ale comunicării.* 3rd edition. Brașov: Air Force Academy Publishing House.
8. Lesenciuc, A. & Sauciuc, I.G. (2022). Conștiință și identitate a militarului în executarea mișcărilor de instrucție de front. De la protoself la conștiință extinsă. *Paradigma Conștiinței – abordări interdisciplinare* Symposium. 4th Edition. Iași: The Romanian Academy. "Gheorghe Zane" Institute of Economic and Social Research.
9. Panal, Dumitru Claudiu. (2023). *Efectele dimensiunii socio-lingvistice asupra comunicării pilot-controlor de trafic aerian*. BA Thesis, coordinated by prof Adrian Lesenciuc, PhD. Brasov: "Henri Coandă" Air Force Academy.
10. Ruba, A.L.; Meltzoff, A.N. & Repacholi, B.M. (2019). How do you feel? Preverbal infants match negative emotions to events. *Developmental Psychology.* Vol.55, no.6. 1138-1149.
11. Ruba, A.L. & Repacholi, B.M. (2019). Do Preverbal Infants Understand Discrete Facial Expressions of Emotions? *Emotion Review.* Vol.12, no.4. 235-250.
12. Sauciuc, Iasmina-Georgiana. (2023). *Neuroștiința comunicării: Abordări contemporane în studiul și înțelegerea proceselor de semnificare.* BA Thesis, coordinated by prof Adrian Lesenciuc, PhD & Alexandru Keresztes, PhD. Brasov: "Henri Coandă" Air Force Academy.
13. Scheiner, E.; Hammerschmidt, K.; Jϋrgens, U. & Zwirner, P. (2002). Acoustic Analyses of Developmental Changes and Emotional Expression in the Preverbal Vocalizations of Infants. *Journal of Voice.* Vol.16, no.4. 509-529.
14. Scheiner, E. & Fischer, J. (2011). Emotion Expression: The Evolutionary Heritage in the Human Voice. In W. Welsch, W. Singer & A. Wunder (eds), *Interdisciplinary Anthropology. Continuing Evolution of Man.* Cham: Springer Verlag. 105-129.
15. Schneider, Phyllis. (1990). Language, thinking, and communication: A developmental psycholinguistic perspective. *Language, Thought, and Communication Symposium.* . Sacramento, CA: Western Speech Communication Association Convention.
16. Skerry, A.E. & Spelke, E.S. (2014). Preverbal infants identify emotional reactions that are

incongruent with goal outcomes. *Cognition.* Vol.130, no.2. 204-216.
17. Valloton, C.D. (2008). Signs of emotion: What can preverbal children "say" about internal states? *Infant Mental Health Journal*. Vol.29, no.3. 234-258.
18. Yanilov, Eyal & Boe, Ole. (2014). *Combat Mindset and Mental Conditioning. Instructor Course (MCIC) Manual.* KMG