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THE WAR OF THE FUTURE: THE ROLE OF CRITICAL THINKING AND COMMUNICATIVE TOLERANCE IN MILITARY COMMAND AND CONTROL

INTRODUCTION

Modern war is not just a confrontation of weapons but also a contest of intellects, strategies, and approaches to command and control. The Armed Forces of Ukraine are facing the challenge of waging war against an enemy with significantly greater human and material resources. The full-scale Russian-Ukrainian war, which has been going on since 2014 and escalated in 2022, requires new approaches to military training. Under such circumstances, the quality of officer training is of utmost importance. Scholar Volodymyr Horbulin, in his book “How to Defeat Russia in the War of the Future,” emphasizes that the key to achieving superiority is asymmetric actions that can create a synergistic effect (Horbulin, 2021). Not only advanced technical equipment but also a high level of intellectual and strategic training for military leaders is required.

In one interview, the then Commander-in-Chief of the Armed Forces of Ukraine, Valeriy Zaluzhny, used a well-known military expression: “A small Soviet army will never defeat a large Soviet army” (Zaluzhny, 2023). This statement demonstrates that traditional approaches copied from the Soviet military system are outdated. Today’s officer must be not only a commander but also a strategist with modern management skills, leadership qualities, strategic thinking, and a high level of critical thinking. The ability to analyze the situation, make reasonable conclusions, and avoid cognitive traps becomes the basis for effective leadership of military units (Osodlo, Rybchuk, 2023). In this context, communicative tolerance is also crucial, as it contributes to the cohesion of the army team, improves interaction between subordinates, and increases the efficiency of combat missions. The ability of officers to make strategic decisions and

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coordinate combat operations in complex environments is critical to securing victory in modern warfare.

Therefore, this article aims to analyze the role and relationship between critical thinking and communicative tolerance of officers of the Armed Forces of Ukraine, which directly impacts their level of leadership and managerial effectiveness.

OUTLINE OF THE MAIN MATERIAL

The study used theoretical methods: analysis of scientific publications, empirical methods: objective and subjective psychological methods, statistical methods: discriminant statistics, one-way analysis of variance (ANOVA), post-hoc analysis of group comparison, and correlation analysis.

The study involved 468 participants, officers of the Armed Forces of Ukraine, including combatants with military ranks ranging from captain to colonel and with a professional military service period spanning from 7 to 32 years. All participants voluntarily took part in the study. Their ages ranged from 28 to 54 years.

Two psychological techniques were used as psychodiagnostic tools: the Critical Thinking Test by L. Starkey (adapted by O. Lutsenko) and the Communicative Tolerance Test by V. Boyko. Let us now examine each of them separately.

The study was based on the Starkey Critical Thinking Test, one of the most popular psychodiagnostic tools aimed at assessing the level of cognitive skills of an individual (Starkey, 2004). The test was adapted in Ukraine by researcher Olena Lutsenko, who modified it to reflect the cultural, linguistic, and educational characteristics of Ukrainian respondents (Lutsenko, 2014).

The test assesses the level of critical thinking development in people of different ages and professional backgrounds. It is especially relevant for military personnel, managers, and professionals working in areas requiring analytical thinking and strategic decision-making.

The test assesses several key cognitive areas, including: analyzing arguments and identifying their strengths and weaknesses, recognizing logical fallacies and manipulations, evaluating the credibility and justification of presented facts, uncovering hidden assumptions, assessing the truthfulness and reliability of information sources, determining the correctness and soundness of conclusions, identifying cause-and-effect relationships, evaluating the degree of generalization in the information presented, making decisions and forming judgments, analyzing alternatives and selecting the optimal solution, recognizing ethical considerations in the decision-making process, and distinguishing between facts and assumptions.

The adapted Starkey Test consists of 27 questions, each with four possible answers, only one of which is correct. The test can be administered individually or in a group format. Each correct answer is worth 1 point. The maximum number of points is 27.

Levels of critical thinking based on test results (according to L. Starkey):

- very high level (24–27 points) – well-developed skills of analysis, evaluation, and formation of logical conclusions; the person can recognize manipulations and make reasoned decisions;

- high level (19–23 points) – the person demonstrates good analytical skills but sometimes may not consider certain details or make hasty conclusions;
- medium level (14–18 points) – basic critical thinking skills, difficulties in distinguishing between reasoned and unsubstantiated statements;
- low level (9–13 points) – poor ability to critically analyze, a tendency to make decisions without proper justification, difficulty in identifying logical errors and manipulations;
- very low level (0–8 points) – lack of critical thinking skills, high trust in any information without verification, difficulty distinguishing between facts and subjective judgments, inability to analyze arguments.

L. Starkey's adapted critical thinking test is a valuable tool in professional education, particularly in military training and managerial competency development. Its widespread use opens up additional opportunities to improve teaching methods, develop leadership skills, and increase the efficiency of teamwork:

- introducing additional subcategories of critical thinking assessment to identify the individual characteristics of each respondent;
- use of the test to monitor the dynamics of cognitive skills development in military personnel during the educational process;
- use of the test in complex with other methods of assessing cognitive abilities, emotional intelligence, and communication competence;
- analysis of the correlation between the level of critical thinking and the success of decision-making in stressful situations (Ivankova, Tkachenko, 2010).

In our study, we used L. Starkey's critical thinking test alongside V. Boyko's communicative tolerance test. This allowed us to identify the relations between officers' cognitive and communication skills, which directly affect their ability to make strategic decisions, effectively manage subordinates, develop efficient communication, create effective military teams, and adapt to dynamic changes in the combat situation.

The Boyko Communication Tolerance Test is a psychological tool designed to assess an individual's tolerance level in interpersonal communication. This test evaluates how well a person deals with others' opinions and behaviors without displaying aggression or prejudice (Boyko, 2002).

The test consists of 45 statements (9 subtests with 5 statements each) describing various aspects of communication and behavior. The respondent is asked to evaluate how well each statement reflects their interactions with others.

The test measures communication tolerance through the following subtests:

1. The extent to which the respondent can accept or reject the individuality of another.
2. The extent to which the respondent tends to judge people based on their own "self."
3. To what extent is the respondent categorical or unchanging in their assessments of others.
4. To what extent can the respondent conceal or mitigate unpleasant impressions when faced with uncommunicative qualities of people.
5. To what extent is the respondent inclined to reshape and re-educate someone.
6. To what extent is the respondent inclined to adjust someone to themselves to try to make others comfortable.
7. To what extent does the respondent have a vindictive nature.

8. To what extent is the respondent tolerant to others' states of discomfort.
9. The level of the respondent's adaptive capabilities in interaction with people.

For each statement, the respondent rates their agreement on a four-point scale from 0 (strongly disagree) to 3 (strongly agree). A higher score indicates a lower level of communicative tolerance (inverted scale), meaning the person is less tolerant of others in this aspect of relationships. On the contrary, the lower the scores on a particular behavioral trait, the higher the level of communicative tolerance in this aspect of relationships with people.

The general characteristics of a high level of communication tolerance are openness to communication, respect for other people's opinions, the ability to control one's emotions, flexibility in communication, and the ability to adapt to different types of people. In terms of behavior, this is reflected in the ease of finding a common language with others, avoiding conflicts, an objective attitude to criticism, trying to remain calm and constructive even when communicating with a rude and aggressive interlocutor, the ability to listen and maintain a conversation without interrupting the interlocutor and avoiding categorical judgments.

The medium level of communicative tolerance is characterized by tolerance of others, but in certain situations, such a person may show intolerance. Such a person is inclined to impose their own opinions but may concede if the interlocutor's arguments are convincing. Sometimes, the person is irritated or critical of others but tries to avoid conflicts. They can tolerate other people's opinions at the behavioral level but defend their position categorically on controversial issues. They usually behave peacefully, but they can become irritated in emotional situations. If the interlocutor has different views, they sometimes react with skepticism or slight irony. They prefer an open communication style, but sometimes, they unconsciously display stereotypical thinking. They may raise their voice in conflict but usually calm down quickly.

A low level of communicative tolerance is inherent in people who are intolerant of opinions and behaviors that differ from their own. They often criticize others, impose their point of view, and are inclined to strong emotional reactions in communication and conflict. In their behavior, they become quickly irritated by the peculiarities of the interlocutor (manner of speech, accent, style of thinking, etc.). They often use sarcasm, and criticize the interlocutor instead of constructive dialog. They interrupt others, considering their own opinion more important. They do not admit mistakes and have difficulty accepting arguments that contradict their beliefs. They show aggression in communication (raise their voice, may speak harshly or insultingly). They are prone to accusations and emotional pressure on the interlocutor in conflict situations. They have strong prejudices and stereotypes about others (by age, gender, nationality, military rank, etc.). It should be noted that the author of the test does not provide clear quantitative and qualitative indicators but only notes that the higher the number of points, the lower the level of communicative tolerance inherent in the personality, and the maximum number of points that can be obtained – 135, indicates absolute intolerance to others, which is hardly possible for a normal person. Likewise, it is incredible to receive zero points, which is evidence of tolerance for everyone in all situations. On average, the respondents scored 40 points for heads of units, 43 points for nurses, and 31 points for teachers.

The test's author also suggests focusing on which of the 9 behavioral traits mentioned above have the highest total scores, ranging from 0 to 15 points. The higher the score for a particular trait, the less tolerant a person is towards others in that relationship aspect. Conversely, the lower the score for a specific trait, the greater the tolerance in that relationship aspect (Shevchenko, 2016).

The significant sample size ($n = 468$), as well as the high reliability level and validity of these methods, allow us to offer our quantitative and qualitative indicators of the study of communicative tolerance of the Armed Forces of Ukraine. Thus, at the initial stage of results calculation, we checked for compliance with the law of normal distribution using the Kolmogorov-Smirnov λ -criterion, and calculated the mean values (μ) and standard deviations (σ) for each scale. Thus, it is possible to calculate the qualitative indicators of the scale using the formula $\mu \pm \sigma$ (Moskalov, Lysenko, 2023, pp. 93–95). According to L. Starkey's critical thinking test, the average score obtained was 16.96 ± 3.95 , while, based on V. Boyko's test of communicative tolerance, the average score was 36.64 ± 15.80 . Values that fall within this interval qualitatively correspond to the "Medium" level, while those that fall outside the "High" and "Low" ranges, respectively (for the "Communicative Tolerance" methodology, it is the other way around). After making the necessary calculations, we have the following quantitative and qualitative indicators (Table 1):

Table 1

No.	Tests	Levels		
		High	Medium	Low
1.	L. Starkey's Critical Thinking Test	22–27	13–21	0–12
2.	V. Boyko's Test of Communicative Tolerance	less 21	21–53	more 53

Therefore, the results were distributed among the respondents as follows (Table 2):

Table 2

Test	Level	Number (n)	Percentage (%)	Mean value (μ)	Standard deviation (σ)
L. Starkey's Critical Thinking Test	High	120	26	21.95	1.81
	Medium	252	54	16.73	1.60
	Low	96	20	11.34	1.46
	Total	468	100	16.96	3.95
V. Boyko's Test of Communicative Tolerance	High	102	22	15.97	6.03
	Medium	300	64	37.86	8.11
	Low	66	14	66.05	7.23
	Total	468	100	36.64	15.80

A correlation analysis was conducted using Pearson's linear correlation coefficient to determine the degree and direction of the relationship between the level of critical thinking and communicative tolerance. The results showed an inverse correlation between these variables ($r_{xy} = -0.434$, $p < 0.01$). Considering that the scale of communicative tolerance is inverted, this indicates that respondents with a high level of critical thinking are more likely to demonstrate a high level of communicative tolerance, are

ready to accept different points of view, and are open to interacting with people with other social and cultural backgrounds.

The next stage of the study was a one-way analysis of variance (ANOVA), which is used to test statistically significant differences between the mean values of three or more groups on one variable. In our case, the dependent variable is communication tolerance according to V. Boyko's test, distributed over 9 subtests and a total scale, and the independent variable (factor) is the level of critical thinking (high, medium, low) according to L. Starkey's test.

The null hypothesis (H_0): the mean values of communicative tolerance for each of the 9 subtests and the overall scale do not differ between the three levels of critical thinking.

Alternative hypothesis (H_1): at least one of the mean values is significantly different.

The prerequisites for conducting a one-way analysis of variance were to check the normality of distributions using the Kolmogorov-Smirnov λ -criterion and the homogeneity of variances using the Levene test. The results obtained using the SPSS 26.0 statistical package are shown in Table 3.

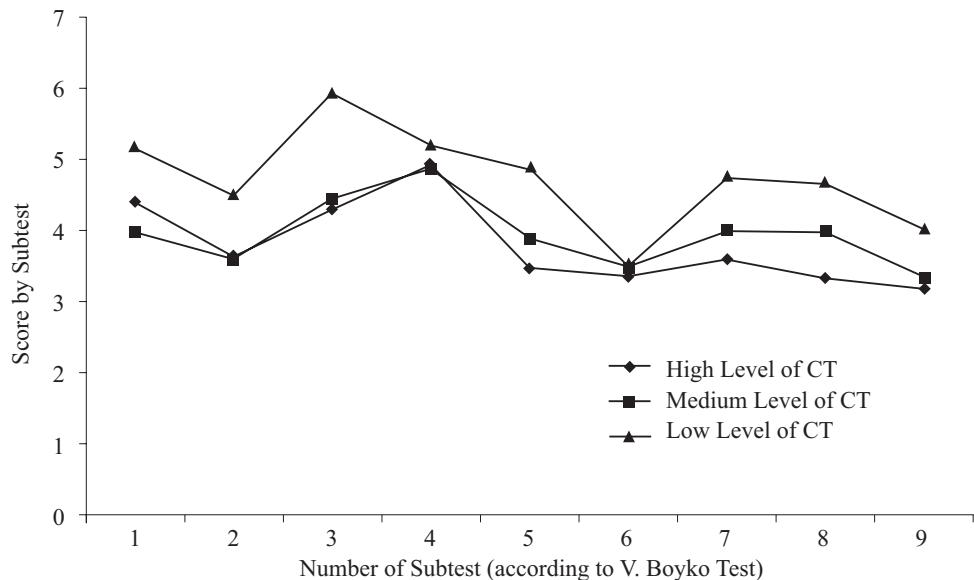
Table 3

Scale	Level	Group Statistics				One-Way ANOVA	
		N	Mean	Std. Dev	Groups	F	Signif.
1	2	3	4	5	6	7	8
Subtest 1 – rejection or misunderstanding of a person's individuality	High	120	4.40	2,321	Between Groups	10,974	,000
	Medium	252	3.98	1,980	Within Groups		
	Low	96	5.16	2,163	Total		
	Total	468	4.33	2,154			
Subtest 2 – using oneself as a benchmark when assessing others	High	120	3.63	2,405	Between Groups	4,084	,017
	Medium	252	3.60	2,885	Within Groups		
	Low	96	4.50	2,730	Total		
	Total	468	3.79	2,756			
Subtest 3 – categoricness or conservatism in evaluating people	High	120	4.30	2,400	Between Groups	15,141	,000
	Medium	252	4.45	2,442	Within Groups		
	Low	96	5.94	2,525	Total		
	Total	468	4.72	2,521			
Subtest 4 – inability to conceal unpleasant feelings	High	120	4.90	2,416	Between Groups	,702	,496
	Medium	252	4.87	2,202	Within Groups		
	Low	96	5.19	2,336	Total		
	Total	468	4.94	2,285			
Subtest 5 – the aim to reshape and re-educate the partner	High	120	3.45	2,344	Between Groups	10,590	,000
	Medium	252	3.89	2,241	Within Groups		
	Low	96	4.88	2,420	Total		
	Total	468	3.98	2,352			
Subtest 6 – the aim to customize a partner for yourself	High	120	3.35	2,307	Between Groups	,147	,863
	Medium	252	3.49	2,481	Within Groups		
	Low	96	3.50	2,624	Total		
	Total	468	3.46	2,463			
Subtest 7 – inability to forgive others for their mistakes	High	120	3.60	2,277	Between Groups	5,492	,004
	Medium	252	4.00	2,687	Within Groups		
	Low	96	4.75	2,551	Total		
	Total	468	4.05	2,584			

1	2	3	4	5	6	7	8
Subtest 8 – intolerance of physical or mental discomfort of the partner	Hight	120	3.33	2,474	Between Groups	6,365	,002
	Medium	252	3.98	2,779	Within Groups		
	Low	96	4.66	2,905	Total		
	Total	468	3.95	2,762			
Subtest 9 – inability to adapt to partners.	Hight	120	3.18	2,129	Between Groups	3,954	,020
	Medium	252	3.33	2,357	Within Groups		
	Low	96	4.00	2,290	Total		
	Total	468	3.43	2,301			
GENERAL LEVEL OF COMMUNICATIVE TOLERANCE	Hight	120	34.13	14,890	Between Groups	9,115	,000
	Medium	252	35.58	15,598	Within Groups		
	Low	96	42.56	16,213	Total		
	Total	468	36.64	15,817			

Based on the one-factor analysis of variance (ANOVA) of the data obtained using V. Boyko's test of communicative tolerance, three profiles of communicative tolerance were built according to the levels of critical thinking (Figure 1).

Fig. 1. Communicative tolerance profiles of officers by three levels of critical thinking (CT)



Note: 1 – rejection or misunderstanding of a person's individuality, 2 – using oneself as a benchmark when assessing others, 3 – categoricalness or conservatism in evaluating people, 4 – inability to conceal or mitigate unpleasant feelings when confronted with uncommunicative qualities of a partner, 5 – the aim to reshape and re-educate the partner, 6 – the goal of customizing the partner to make them comfortable, 7 – inability to forgive others for their mistakes, 8 – intolerance of physical or mental discomfort of the partner, 9 – inability to adapt to partners.

The obtained results (Table 3) show statistically significant differences for all subtests except for subtests 4 and 6 ($p \leq 0.05$). Still, the results of the ANOVA do not reveal which groups have a difference and how significant it is. So, the Post Hoc Test

was conducted, and a statistical method was used after the principal analysis (usually ANOVA) to identify which groups have statistically significant differences. The Scheffé test was used because it allowed us to work with groups with significantly different numbers. The results are presented in Table 4.

Table 4

Communicative tolerance (Dependent Variable)	Levels critical thinking (I)	Levels critical thinking (J)	Mean Difference (I-J)	Signif.
1	2	3	4	5
Subtest 1 – rejection or misunderstanding of a person's individuality	Hight	Medium	,424	,195
		Low	-,756	,033
		Hight	-,424	,195
		Low	-1,180	,000
	Medium	Hight	,756	,033
		Medium	1,180	,000
		Hight	,030	,995
		Low	-,875	,067
	Low	Hight	-,030	,995
		Low	-,905	,023
		Hight	,875	,067
		Medium	,905	,023
Subtest 2 – using oneself as a benchmark when assessing others	Hight	Medium	-,152	,854
		Low	-1,638	,000
		Hight	,152	,854
		Low	-1,485	,000
	Medium	Hight	1,638	,000
		Medium	1,485	,000
		Hight	,031	,993
		Low	-,287	,656
	Low	Hight	-,031	,993
		Low	-,318	,510
		Hight	,287	,656
		Medium	,318	,510
Subtest 4 – inability to conceal unpleasant feelings	Hight	Medium	-,443	,224
		Low	-1,425	,000
		Hight	,443	,224
		Low	-,982	,002
	Medium	Hight	1,425	,000
		Medium	,982	,002
		Hight	-,138	,881
		Low	-,150	,906
	Low	Hight	,138	,881
		Low	-,012	,999
		Hight	,150	,906
		Medium	,012	,999
Subtest 5 – the aim to reshape and re-educate the partner	Hight	Medium	-,400	,371
		Low	-1,150	,005
		Hight	,400	,371
		Low	-,750	,052
	Medium	Hight	1,150	,005
		Medium	,750	,052
		Hight	,031	,993
		Low	-,287	,656

1	2	3	4	5
Subtest 8 – intolerance of physical or mental discomfort of the partner	Hight	Medium	-,651	,100
		Low	-1,331	,002
	Medium	Hight	,651	,100
		Low	-,680	,117
	Low	Hight	1,331	,002
		Medium	,680	,117
Subtest 9 – inability to adapt to partners	Hight	Medium	-,158	,823
		Low	-,825	,032
	Medium	Hight	,158	,823
		Low	-,667	,053
	Low	Hight	,825	,032
		Medium	,667	,053
GENERAL LEVEL OF COMMUNICATIVE TOLERANCE	Hight	Medium	-1,458	,700
		Low	-8,438	,000
	Medium	Hight	1,458	,700
		Low	-6,979	,001
	Low	Hight	8,438	,000
		Medium	6,979	,001

In general, the results of all subtests (except for subtests 4 and 6) and the overall scale show that there are no statistically significant differences in the level of communicative tolerance between the groups with high (n=120) and medium (n=252) levels of critical thinking. However, statistically significant differences are observed between the groups with low (n=96), medium, and, particularly, high levels of critical thinking. These results demonstrate that a low level of critical thinking causes low communication tolerance and confirm the hypothesis of a close relationship between the cognitive and social aspects of personality. Respondents with medium and high levels of critical thinking demonstrate significantly higher results of communicative tolerance. There is no clear linear relationship between these two levels and no statistically significant difference. Therefore, when using the L. Starkey's test, we should pay attention to respondents who demonstrated a low level of critical thinking (scored less than 12 points) since such officers demonstrate not only a low level of cognitive abilities but also insufficient communication skills which will not contribute to the formation of such an officer as a leader.

The results of subtests 4 and 6 indicate no changes in the level of communicative tolerance based on the level of critical thinking. This is likely because these two subtests focus on studying the metacognitive behavior of the individual—specifically, the ability to realize, control, and regulate their own cognitive and emotional-volitional processes, as well as the ability to observe their feelings, evaluate them, and adjust their behavioral strategies in communication, work, or everyday life.

CONCLUSIONS

The study confirmed a close relationship between the level of critical thinking and communicative tolerance of officers of the Armed Forces of Ukraine. A high, and

sometimes even medium, level of critical thinking contributes to greater openness to alternative viewpoints, the ability to communicate effectively with subordinates and colleagues, and the ability to quickly adapt to dynamic changes in the combat situation. Officers with critical thinking can make well-considered decisions in the face of uncertainty, which is a crucial factor in modern military conflicts; these officers also have a high level of communication tolerance, which, together with critical thinking, are signs of high leadership potential. On the contrary, a low level of critical thinking often correlates with rigidity of judgment, limitedness, subjectivity, less flexibility in decision-making, and less willingness to work in teams.

Modern war requires a new quality of military personnel – officers-leaders who can analyze information, make well-considered decisions, and interact effectively within military teams. The development of critical and strategic thinking, as well as communicative tolerance, should become a priority in military education, which will allow training commanders capable of ensuring effective command and control of troops and making optimal decisions in conditions of uncertainty.

The study showed a significant positive correlation between critical thinking and communicative tolerance. This opens up new opportunities for using these tools in the professional psychological selection of officers for leadership positions and in psychological training and leadership development programs for military leaders. Further research should focus on the influence of various factors that contribute to the formation of leadership potential in the military environment and develop practical recommendations for increasing the level of communicative tolerance and critical thinking among military personnel.

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ABSTRACT

The article deals with the influence of critical thinking and communicative tolerance on the efficiency of military management. The empirical analysis of the correlation between the cognitive and communication skills of officers of the Armed Forces of Ukraine is carried out. The study involved 468 officers with combat experience and extensive service records. The correlation analysis revealed a positive correlation between a high level of critical thinking and indicators of communicative tolerance, which, in turn, contribute to improved cohesion within army teams, enhanced decision-making efficiency, and the development of managerial competencies of officers.

Particular attention is focused on the correlation between a low level of critical thinking and an increase in the rigidity of judgments, subjectivity in assessments, a tendency to cognitive bias, and difficulties in team interaction. The results of a one-way analysis of variance (ANOVA) confirmed statistically significant differences in the levels of communicative tolerance between officers with high, medium, and low levels of critical thinking.

The obtained results emphasize the need to integrate special training programs to develop critical thinking and communicative tolerance into the military training system. The practical application of these techniques can significantly improve the quality of military leadership, the level of leadership among officers, and the ability of military units to function efficiently in modern warfare.

Keywords: Critical thinking, communication tolerance, military management, leadership, strategic thinking, decision-making, military education, cognitive skills

WOJNA PRZYSZŁOŚCI: ROLA MYŚLENIA KRYTYCZNEGO I TOLERANCJI KOMUNIKACYJNEJ W SYSTEMIE DOWODZENIA I KIEROWANIA SIŁAMI ZBROJNYMI

STRESZCZENIE

Artykuł analizuje wpływ myślenia krytycznego oraz tolerancji komunikacyjnej na efektywność zarządzania w strukturach wojskowych. W artykule przeprowadzono empiryczną analizę zależności pomiędzy kompetencjami poznawczymi a umiejętnościami komunikacyjnymi oficerów Sił Zbrojnych Ukrainy. W badaniu uczestniczyło 468 oficerów posiadających doświadczenie bojowe oraz wieloletni staż służby. Analiza korelacyjna wykazała dodatnią zależność pomiędzy wysokim poziomem myślenia krytycznego a wskaźnikami tolerancji komunikacyjnej,

które z kolei sprzyjają zwiększeniu spójności zespołów wojskowych, podniesieniu efektywności procesu decyzyjnego oraz rozwojowi kompetencji przywódczych oficerów.

Szczególną uwagę zwrócono na zależność pomiędzy niskim poziomem myślenia krytycznego a nasileniem sztywności sądów, subiektywnością ocen, skłonnością do błędów poznawczych oraz trudnościami w interakcji zespołowej. Wyniki jednoczynnikowej analizy wariancji (ANOVA) potwierdziły statystycznie istotne różnice w poziomie tolerancji komunikacyjnej pomiędzy oficerami o wysokim, średnim i niskim poziomie myślenia krytycznego.

Uzyskane wyniki podkreślają konieczność włączenia do systemu kształcenia wojskowego specjalistycznych programów szkoleniowych ukierunkowanych na rozwój myślenia krytycznego oraz tolerancji komunikacyjnej. Praktyczne wdrożenie tych rozwiązań może w istotny sposób przyczynić się do podniesienia jakości przywództwa wojskowego, rozwoju kompetencji dowódczych oficerów oraz zwiększenia zdolności jednostek wojskowych do efektywnego działania w warunkach współczesnych konfliktów zbrojnych.

Slowa kluczowe: myślenie krytyczne, tolerancja komunikacyjna, zarządzanie wojskowe, przywództwo, myślenie strategiczne, podejmowanie decyzji, edukacja wojskowa, umiejętności poznawcze.