



CHANGES IN THE PSYCHO-EMOTIONAL STATE INDICATORS OF WRESTLERS

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Abstract

The psycho-emotional states of miners before and after testing are examined in this article. The study assessed mood, exercise, and well-being indices. The U-criterion, Hedges' g, and a 95% confidence interval were used to examine the results after statistical analysis was used to compare the data gathered prior to and following the test.

The findings demonstrate a notable improvement in the miners' levels of activity and well-being. The test's efficacy is confirmed by the extremely high Hedges' g values for the changes in activity and well-being. Even if the mood shift was less pronounced, it still suggests a beneficial outcome.

This study illustrates how miners' psycho-emotional states affect their participation in sports. The findings highlight the necessity of creating psycho-emotional training to enhance athletes' mental and physical health.

Keywords: Miners; psycho-emotional state; well-being; activity; mood; U-criterion; Hedges' g; confidence interval; psychological preparation; sports activity; statistical analysis.

Introduction

The psycho-emotional state has a direct impact on athletes' overall performance, as well as their physical and psychological preparedness. Wrestlers with a high level of sporting mastery achieve better results by effectively regulating their psycho-emotional state. Efficient psychological preparation helps improve an athlete's feelings of well-being, mood, and activity level, thereby creating opportunities for the development of technical, tactical, and physical skills.



Studying changes in the psycho-emotional state makes it possible to identify factors that directly influence athletes' success.

Changes in the psycho-emotional state of highly skilled wrestlers demonstrate how their competitiveness, training, and recovery processes can be improved. With this in mind, the present study focuses on examining changes in wrestlers' psycho-emotional state, particularly by comparing indicators of well-being, activity, and mood. The study analyzes how the psycho-emotional state changes before and after testing, and determines how these changes affect the athlete's overall performance.

In the literature, athletes' level of well-being is considered an important psycho-emotional parameter across various fields of sport, including wrestling. Martens (1987), in his research, emphasized that well-being and psychological stability are key factors contributing to athletes' success. Athletes with a higher level of perceived well-being tend to achieve better results and manage stress more effectively. In their analysis, Gould and Udry (1994) demonstrated that improving an athlete's well-being can be achieved through effective regulation of the psycho-emotional state.

Motivation management in athletes plays a crucial role in achieving performance goals. Weinberg and Gould (2014), in their work, highlighted the role of motivation and its enhancement through stress management and improved well-being. Motivation continuously drives athletes forward and improves their psycho-emotional state.

Stress significantly affects athletes' mood, especially before high-intensity training sessions or competitions. Fletcher and Hanton (2001), in their study, provided a detailed analysis of the effects of stress on mood and methods of regulating the psycho-emotional state. Stress management techniques help improve wrestlers' mood, which in turn contributes to their success.

Gould and Udry (1994) demonstrated in their research that high performance outcomes can be achieved through effective regulation of athletes' psycho-emotional state. Similarly, Zizzi (2004) emphasized that improving the psycho-emotional state and managing mood can significantly increase athletes' potential to achieve high results.



Athletes' level of well-being and its regulation play an important role in helping them reach higher performance indicators. Fletcher and Hanton (2001), in their studies, highlighted the importance of well-being in the regulation of the psycho-emotional state.

Weinberg and Gould (2014) linked the level of activity with physical fitness in their research. According to them, increasing the level of activity helps improve an athlete's physical condition and also supports the regulation of the psycho-emotional state. For wrestlers, a high level of activity is essential, as it improves physical condition and contributes to achieving better results in competitions.

Martens (1987) studied the relationship between athletes' motivation and competitiveness and found that athletes with higher levels of motivation tend to achieve greater success. Wrestlers' motivation increases their competitiveness, which positively influences performance outcomes.

Gould and Udry (1994) investigated how stress management before and during competitions affects athletes' performance. Their research showed that effective stress and psycho-emotional regulation improves athletes' mood, which in turn helps them achieve higher results in competitions.

Zizzi (2004) examined the impact of physical fitness on mood and demonstrated how mood influences athletes' overall condition, including their success. Wrestlers' physical preparedness has a significant effect on performance outcomes through mood regulation.

Psycho-emotional state regulation also affects the recovery process of athletes. Weinberg and Gould (2014), in their studies, discussed the importance of psycho-emotional factors in optimizing athletes' recovery process. Effective recovery is closely linked to the athlete's psycho-emotional state.

Fletcher and Hanton (2001) highlighted that changes in the psycho-emotional state and its influence on athletes' overall performance are highly significant. Variations in well-being and mood directly affect athletes' general performance levels.

Gould and Udry (1994) studied the impact of psycho-emotional regulation on athletes' performance. They found that such regulation helps control stress and mood levels, leading to improved outcomes in competitions.



The psycho-emotional state also plays an important role in athletes' ability to make quick decisions. Weinberg and Gould (2014), in their research, emphasized that athletes with a high level of psycho-emotional stability are more successful in making fast and effective decisions.

Zizzi (2004) investigated the relationship between physical activity and psychological stability. The study showed that physical activity enhances athletes' psychological stability, which in turn improves overall performance.

Fletcher and Hanton (2001) demonstrated the relationship between motivation and well-being. Athletes with higher levels of motivation also experience improvements in their sense of well-being, which in turn affects their overall performance.

The above literature review highlights the importance of managing athletes' psycho-emotional state and its impact on sports performance. These studies contribute to a broader understanding of the role of psycho-emotional preparation in achieving high results among wrestlers. The findings confirm that research on athletes' stress management, motivation enhancement, and improvement of well-being is crucial for increasing overall success.

Research aim:

To study changes in the psycho-emotional state of wrestlers and to determine the impact of these changes on their professional practical physical activity.

Research Tasks:

1. To assess the psycho-emotional state of wrestlers and determine indicators of their well-being, activity, and mood.
2. To analyze changes in psycho-emotional state indicators and identify their relationship with physical workload and working conditions during professional activity.
3. To develop scientifically based recommendations and practical approaches aimed at improving the psycho-emotional state of wrestlers.

The defined research tasks serve to achieve the set scientific objectives and are aimed at assessing and improving the psycho-emotional state of wrestlers through evidence-based approaches. In this process, the SAN (Well-being–Activity–



Mood) psychodiagnostic test methodology was used to determine respondents' functional and emotional states.

During the study, participants expressed their current state using a multi-level rating scale. This scale was based on a (3, 2, 1, 0, 1, 2, 3) index system and consisted of 30 pairs of opposite descriptive adjectives. It reflected characteristics such as level of mobility, speed and tempo of activity, strength and energy, health status, level of fatigue, and emotional condition (mood). Respondents were asked to select and mark the number that most accurately described their current state. In the process of data processing, the test results were grouped into three main indicators:

- Well-being (health status) – questions 1, 2, 7, 8, 13, 14, 19, 20, 25, 26;
- Activity level – questions 3, 4, 9, 10, 15, 16, 21, 22, 27, 28;
- Mood state – questions 5, 6, 11, 12, 17, 18, 23, 24, 29, 30.

For evaluation, the sum of scores for each indicator was calculated, and then the average value was obtained by dividing the total by 10. According to the assessment criteria, a score of 1–3.4 indicates an unfavorable state of the respondent, 3.5–4.4 reflects a variable or moderate level, while 4.5 and above indicates a generally good psycho-emotional state.

In order to assess the psycho-emotional state of the control group workers, pre-test (TO) and post-test (TK) results were analyzed using the SAN (Well-being–Activity–Mood) test. The obtained results showed that some positive changes were observed in the control group as well; however, these changes were not manifested equally across different indicators (see Table 1).

Table 1 SAN Test Indicators of Control Group Workers

Tests	TO (n=37)	TK (n=37)	Differences, %	U- criterion	Δ (Differences)	Hedges' g	95% Confidence Interval	
							Lower	Upper
<i>well-being</i>	3,3±0,15	3,7±0,12	12,5	81	0.40	-2.94	-3.60	-2.29
<i>activity</i>	4,1±0,12	4,8±0,12	17,1	78	0.70	-5.83	-6.88	-4.79
<i>mood</i>	3,2±0,13	3,3±0,17	3,1	79	0.10	-0.66	-1.13	-0.19



The well-being indicator before the experiment was 3.3 ± 0.15 points, while after the experiment it reached 3.7 ± 0.12 points. This represents an increase of 12.5%. The absolute difference ($\Delta=0.40$) indicates a certain positive shift in the workers' overall subjective functional state. Hedges' g effect size was -2.94, which reflects a very large effect. A 95% confidence interval ranging from -3.60 to -2.29 indicates the stability of this change.

A significant change was also observed in the activity indicator. In the pre-experimental period, it was 4.1 ± 0.12 points, while after the experiment it increased to 4.8 ± 0.12 points. This corresponds to a 17.1% increase. The absolute difference ($\Delta=0.70$) represents the largest change among the indicators in the control group. The Hedges' g value of -5.83 indicates a very large effect size. A 95% confidence interval from -6.88 to -4.79 confirms the statistical reliability of these changes. These results suggest a certain improvement in the workers' functional activity and psychophysiological adaptation to the work process.

The mood indicator showed relatively small changes. Before the experiment, this indicator was 3.2 ± 0.13 points, while after the experiment it was 3.3 ± 0.17 points. The change amounted to 3.1%, with an absolute difference of $\Delta=0.10$. The Hedges' g value of -0.66 corresponds to a small to moderate effect size. A 95% confidence interval ranging from -1.13 to -0.19 indicates that although there is a positive shift in mood, its magnitude is lower compared to the other indicators.

Overall, the SAN test results of the control group workers demonstrated a positive dynamic in the post-experimental period. The greatest change was observed in the activity indicator, followed by the well-being indicator. The mood indicator showed comparatively smaller changes. This suggests that even in the control group, psycho-emotional improvements may occur to some extent due to factors such as time effects, adaptation to the work process, or general organizational conditions.

At the same time, the relatively low dynamics of the mood indicator suggests the need to implement specifically targeted pedagogical or psychological interventions aimed at improving emotional stability and psychological satisfaction. Thus, although the changes observed in the control group reflect an overall positive trend, not all components of the psycho-emotional state developed at the same level.

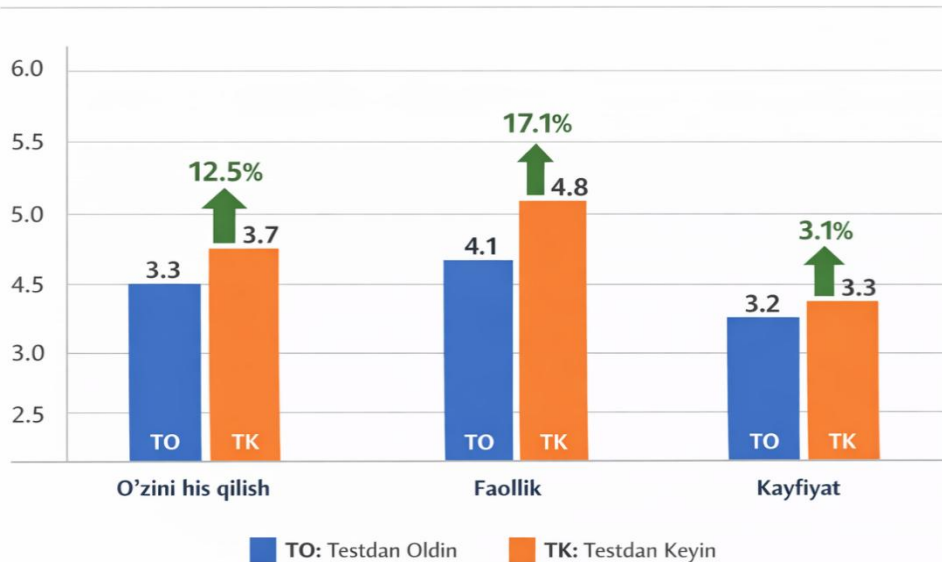


Figure 1. Dynamics of SAN Test Indicators of Control Group Workers Before and After the Experiment

Figure 1 illustrates the pre-test (TO) and post-test (TK) results of the SAN test indicators—well-being, activity, and mood—among the control group workers. According to the results, a positive increase was observed across all indicators. The greatest improvement was recorded in the activity indicator, which increased from 4.1 to 4.8 points (17.1%). The well-being indicator rose from 3.3 to 3.7 points, representing a 12.5% increase. The mood indicator showed a relatively small change, increasing from 3.2 to 3.3 points (3.1%).

Overall, the results indicate that even in the control group, there was a positive dynamic in certain components of the psycho-emotional state; however, the degree of change was not uniform across all indicators. The most pronounced improvement was observed in functional activity.

To assess the psycho-emotional state of the workers in the experimental group, pre-test (TO) and post-test (TK) results of the SAN (Well-being–Activity–Mood) test were analyzed. The obtained results indicate significant positive changes in the psycho-functional state of the experimental group workers.



The “well-being” indicator increased from 3.2 ± 0.17 points before the experiment to 4.7 ± 0.15 points after the experiment. As a result, this indicator increased by 46.88%. The absolute difference ($\Delta=1.5$) was recorded. The effect size, Hedges’ $g = 9.36$, indicates a very large effect. A 95% confidence interval ranging from 7.78 to 10.93 demonstrates a high level of stability in these changes.

A significant positive dynamic was also observed in the “activity” indicator. In the pre-experimental period, it was 4.1 ± 0.17 points, while after the experiment it reached 5.5 ± 0.18 points. This represents an increase of 34.15%. The absolute difference was $\Delta=1.4$. The effect size, Hedges’ $g = 7.99$, also reflects a very large effect. A 95% confidence interval from 6.63 to 9.36 confirms the statistical reliability of these changes.

Table 2 SAN Test Indicators of Experimental Group Workers

Tests	TO (n=37)	TK (n=37)	Differences, %	U- criterion	Δ (Differences)	Hedges' g	95% Confidence Interval	
							Lower	Upper
<i>well-being</i>	3,2±0,17	4,7±0,15	46.88	30	1.5	9.36	7.78	10.93
<i>activity</i>	4,1±0,17	5,5±0,18	34.15	35	1.4	7.99	6.63	9.36
<i>mood</i>	3,5±0,14	4,8±0,19	37.14	32	1.3	7.79	6.45	9.13

The “mood” indicator also showed a significant improvement. Before the experiment, it was 3.5 ± 0.14 points, while after the experiment it reached 4.8 ± 0.19 points. The increase amounted to 37.14%. The absolute difference ($\Delta=1.3$) was recorded. The effect size, Hedges’ $g = 7.79$, also indicates a very large effect. A 95% confidence interval ranging from 6.45 to 9.13 confirms a high level of reliability of the results.

Overall, the SAN test results of the experimental group workers demonstrated high-level positive changes across all components of the psycho-emotional state. The greatest improvement was observed in the well-being indicator, followed by mood and activity indicators. These results indicate that the pedagogical or psychological interventions applied during the experiment were effective in improving the workers’ psycho-emotional state.

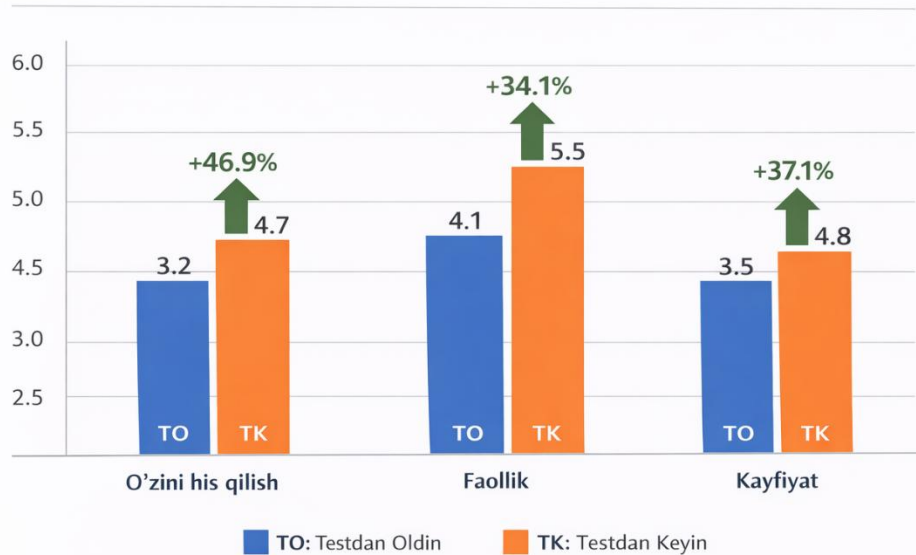


Figure 2. Dynamics of SAN Test Indicators of Experimental Group Workers Before and After the Experiment

Figure 2 compares the pre-test (TO) and post-test (TK) SAN test indicators—well-being, activity, and mood—of the experimental group workers. The results show a significant positive increase across all indicators.

The greatest improvement was observed in the well-being indicator, which increased from 3.2 to 4.7 points (46.9%). The activity indicator rose from 4.1 to 5.5 points, representing a 34.1% increase. The mood indicator improved from 3.5 to 4.8 points, increasing by 37.1%.

Overall, the results demonstrate that the interventions applied in the experimental group were effective in improving the workers' psycho-emotional state. The significant positive dynamics across all SAN test components confirm the effectiveness of the experimental program.



Table 3 SAN Test Indicators of Control Group (CG) and Experimental Group (EG) Workers After the Pedagogical Experiment, Points

Tests	CG (Before experiment)	EG (After experiment)	Differences, %	U- criterion	Δ Difference	Hedges' g	95% Confidence Interval	
							Lower	Upper
<i>well-being</i>	3,7±0,12	4,7±0,15	46.88	7.0	1.0	9.36	7.78	10.93
<i>activity</i>	4,8±0,12	5,5±0,18	34.15	2.0	0.7	7.99	6.63	9.36
<i>mood</i>	3,3±0,17	4,8±0,19	37.14	7.0	1.5	8.32	6.90	9.74

After the pedagogical experiment, the psycho-emotional state of workers in the control group (CG) and experimental group (EG) was compared using the SAN test. The obtained results showed that the experimental group demonstrated higher values across all indicators compared to the control group.

The “well-being” indicator in the control group was 3.7 ± 0.12 points, while in the experimental group it was 4.7 ± 0.15 points. The difference ($\Delta = 1.0$ point) corresponds to a 46.88% increase. The effect size, Hedges' $g = 9.36$, indicates a very large effect. A 95% confidence interval ranging from 7.78 to 10.93 confirms the high reliability of this difference.

A similar advantage of the experimental group was observed in the “activity” indicator. In the control group, this indicator was 4.8 ± 0.12 points, whereas in the experimental group it reached 5.5 ± 0.18 points. The absolute difference was $\Delta = 0.7$ points, representing a 34.15% increase. The effect size, Hedges' $g = 7.99$, also reflects a very large effect. A 95% confidence interval from 6.63 to 9.36 confirms the stability of these results.

The “mood” indicator also showed a significant difference. In the control group, it was 3.3 ± 0.17 points, while in the experimental group it reached 4.8 ± 0.19 points. The absolute difference ($\Delta = 1.5$ points) corresponds to a 37.14% increase. The effect size, Hedges' $g = 8.32$, indicates a very large effect. A 95% confidence interval ranging from 6.90 to 9.74 confirms that this difference is statistically reliable.

Overall, after the pedagogical experiment, the SAN test results of the experimental group workers were significantly higher than those of the control group. In particular, the substantial differences in well-being and mood indicators demonstrate that the pedagogical interventions applied during the experiment

were effective in improving the workers’ psycho-emotional state. These results confirm the practical effectiveness of the developed methodology.

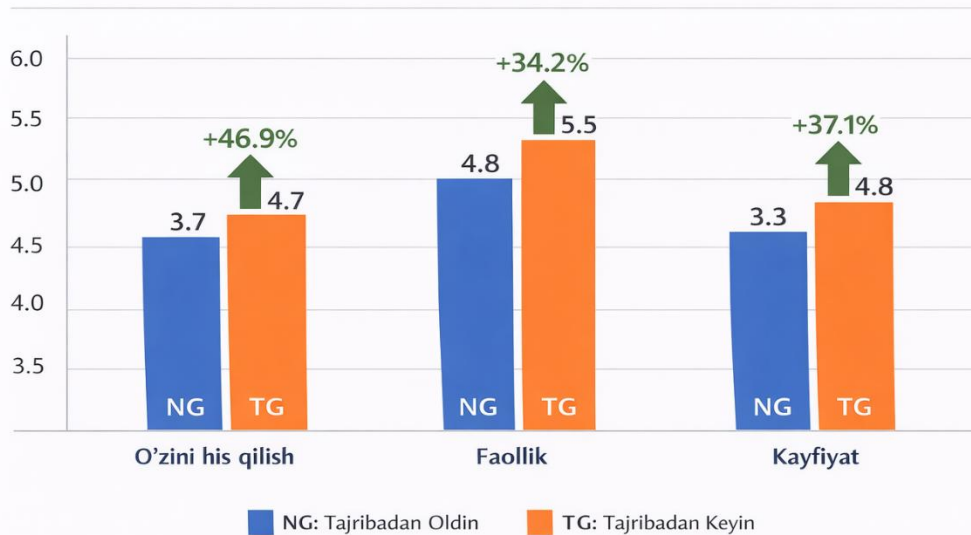


Figure 3. Comparative Analysis of SAN Test Indicators in Control Group (CG) and Experimental Group (EG) After the Pedagogical Experiment

Figure 3 compares the SAN test indicators (well-being, activity, and mood) of the control group (CG) and experimental group (EG) workers after the pedagogical experiment. The results show that the experimental group demonstrated higher values across all indicators compared to the control group.

In particular, the well-being indicator was 3.7 points in the control group and 4.7 points in the experimental group, showing a 46.9% increase. The activity indicator improved from 4.8 to 5.5 points, corresponding to a 34.2% increase. The mood indicator increased from 3.3 to 4.8 points, showing a 37.1% improvement.

Overall, the results presented in the figure indicate that the pedagogical interventions applied in the experimental group were highly effective in improving the workers’ psycho-emotional state. The superiority of the experimental group is clearly observed across all SAN test components.



Conclusion

This study was conducted to assess workers' psycho-emotional state and to determine the effectiveness of pedagogical intervention measures using the SAN (Well-being–Activity–Mood) test. During the research process, pre-test and post-test results were analyzed in both the control group (CG) and experimental group (EG).

The obtained results showed that although some positive changes were observed in the control group over time, their level remained relatively low. The greatest improvement was recorded in the activity indicator, while changes in the mood indicator were comparatively small. This suggests that improvements in some components of the psycho-emotional state in the control group may be attributed to natural adaptation processes.

In the experimental group, however, a significant positive dynamic was observed across all SAN test indicators. In particular, high levels of improvement were recorded in well-being (46.9%), mood (37.1%), and activity (34.1%). The high effect size (Hedges' g) values confirm that the pedagogical interventions applied during the experiment had a significant impact on improving the psycho-emotional state of the workers.

The final comparative analysis between the control and experimental groups also demonstrated the superiority of the experimental group across all indicators. This scientifically confirms the effectiveness of the developed pedagogical approach or methodology in improving workers' psycho-emotional state.

Overall, the results of the study indicate that the application of targeted pedagogical interventions plays an important role in enhancing psycho-emotional stability, improving functional state, and increasing work efficiency among workers. The findings of this research can be used in industrial enterprises to optimize work processes, monitor workers' psychofunctional state, and create a healthy working environment.

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