

PRE-COMPETITION PSYCHOLOGICAL TRAINING IN COLLEGE JUMPING ATHLETES

TREINAMENTO PSICOLÓGICO PRÉ-COMPETIÇÃO EM ATLETAS UNIVERSITÁRIOS DE SALTO

ENTRENAMIENTO PSICOLÓGICO PREVIO A LA COMPETICIÓN EN ATLETAS UNIVERSITARIOS DE SALTO



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ABSTRACT

Introduction: The psychological state generates great effects on the athletes' results. Adequate psychological preparation in sports before competitions is fundamental for good performance. The high jump athlete tends to strengthen his physical training during pre-competition practice. However, due to the difficulty of psychological control, emotional variations may occur that significantly limit the technical level of his presentation. **Objective:** Analyze the psychological training program of college high jumpers on physical fitness and competition performance. **Methods:** The physical fitness and competition situation of 22 college high jumpers in track and field are discussed. In this paper, 11 cases were randomly selected as the experimental group, and the remaining 11 cases were used as a control group. There was no involvement in directed mental training. The control group received regular exercise training, while the experimental group had regular physical training accompanied by directed psychological training. The fitness and competition results in both groups of athletes before and after the test were evaluated statistically. **Results:** There was a significant difference in presentation performance between the experimental and control groups ($P < 0.05$). Improvements in physical performance were significant in the experimental group. **Conclusion:** Strengthening psychological training in athletes proved to be a critical factor in improving competition effectiveness. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Track and Field; Conditioning, Psychological; Universities; Athletes.

RESUMO

Introdução: O estado psicológico gera grandes efeitos no resultado dos atletas. A preparação psicológica adequada no esporte antes das competições é fundamental para um bom desempenho. O esportista de salto alto tende a fortalecer seu treinamento físico durante a prática pré-competição, porém, devido à dificuldade do controle psicológico, podem ocorrer variações emocionais que limitem significativamente o nível técnico na sua apresentação. **Objetivo:** Analisar o programa de treinamento psicológico dos saltadores de salto alto universitário sobre a aptidão física e o desempenho na competição. **Métodos:** Discute-se a qualidade física e a situação da competição de 22 saltadores universitários de salto alto de atletismo. Neste trabalho, 11 casos foram selecionados aleatoriamente como grupo experimental, e os 11 casos restantes foram utilizados como grupo de controle. Não houve envolvimento em treinamento mental direcionado. O grupo de controle recebeu treinamento de exercício regular enquanto o grupo experimental fez treinamento físico regular acompanhado de treinamento psicológico direcionado. Os resultados da aptidão física e da competição nos dois grupos de atletas antes e depois do teste foram avaliados estatisticamente. **Resultados:** Houve uma diferença significativa no desempenho da apresentação entre os grupos experimental e de controle ($P < 0,05$). As melhorias no desempenho físico foram significativas no grupo experimental. **Conclusão:** O fortalecimento do treinamento psicológico nos atletas revelou-se um fator crítico para melhorar a eficácia na competição. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Atletismo; Condicionamento Psicológico; Universidades; Atletas.

RESUMEN

Introducción: El estado psicológico genera grandes efectos en los resultados de los deportistas. La adecuada preparación psicológica en el deporte antes de las competiciones es fundamental para un buen rendimiento. El atleta de salto de altura tiende a reforzar su entrenamiento físico durante la práctica previa a la competición, sin embargo, debido a la dificultad del control psicológico, pueden producirse variaciones emocionales que limiten significativamente el nivel técnico en su presentación. **Objetivo:** Analizar el programa de entrenamiento psicológico de los saltadores de altura universitarios sobre la aptitud física y el rendimiento en la competición. **Métodos:** Se analiza la aptitud física y la situación de competición de 22 saltadores de altura universitarios en atletismo. En este trabajo, se seleccionaron al azar 11 casos como grupo experimental, y los 11 casos restantes se utilizaron como grupo de control. No hubo participación en el entrenamiento mental dirigido. El grupo de control recibió un entrenamiento regular de ejercicios, mientras que el grupo experimental realizó un entrenamiento físico regular acompañado de un entrenamiento psicológico dirigido. Se evaluaron estadísticamente los resultados de aptitud física y de competición en ambos grupos de atletas antes y después de las pruebas. **Resultados:** Hubo una diferencia significativa en el rendimiento de la presentación



entre los grupos experimental y de control ($P < 0,05$). Las mejoras en el rendimiento físico fueron significativas en el grupo experimental. **Conclusión:** El refuerzo del entrenamiento psicológico en los atletas resultó ser un factor crítico para mejorar la eficacia de la competición. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptores: Atletismo; Condicionamiento Psicológico; Universidades; Atletas.

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INTRODUCTION

Compared with other sports, the high jump is more autonomous. There are also high demands on the athlete's precision and stability during competition. In sports competitions, the psychological state of high jumpers significantly influences competition performance. Adequate psychological preparation before the high jump competition is the primary condition for good results.¹ High jumpers tend to strengthen their physical training during pre-competition practice. The athlete's poor psychological control ability can easily lead to emotional ups and downs in the competition process. This can lead to abnormal performance of the athlete in the game. This paper analyzes the psychological training program of college high jumpers before the competition. This paper discusses the influence of the psychological training of college high jumpers before the competition on their performance and physical quality.

METHOD

Experimental subjects

A total of 22 high jumpers were selected as subjects in this paper. In the experiment, 11 cases were used as the test objects, and the remaining 11 cases were used as the control group.² The average age of the athletes was 18.22 ± 3.25 .

Test procedures and methods

Test comparison method

Before the test, the t method was used to test the physical fitness of the two groups of players (Table 1). The test data showed no significant difference between the two groups in physical fitness indicators such as the 100-meter run, the standing ten-step jump, the shot put after the shot, and the 60-meter run. Before the psychological intervention, there was no significant difference in the physical fitness indicators between the two groups of athletes ($P > 0.05$).

Test procedure

The training progress, frequency, testing standards, training equipment, etc., are the same for both groups. The control group received no targeted training. The experimental group took regular physical training and targeted psychological training. The 11 contestants in the experimental group were fully psychologically prepared before the competition.³ This article adopts different psychological training methods according to the individual differences of each athlete. This allows athletes to participate in the game with the best psychological quality. The specific work includes 1) Determining the work objectives of the competition and formulating the competition plan. Before the

Table 1. Physical fitness status before the experiment.

Group	Test Group	Control group	T-test
n	11	11	
Height/cm	179.21±1.98	179.03±1.98	P>0.05
100m run/s	10.69±0.14	10.88±0.08	P>0.05
Standing 10-step jump/m	31.19±0.5	30.66±0.3	P>0.05
Rear shot put/m	12.87±0.5	13.06±0.2	P>0.05
60m run/s	6.93±0.1	7.02±0.05	P>0.05

start of the game, coaches and players should conduct a comprehensive study of the opponent's strength, psychological characteristics, physical characteristics, and technical and tactical characteristics together with relevant psychologists. Athletes make positive and negative performance predictions about their opponents. (2) Stimulate the enthusiasm for the competition. Psychologists translate the immediate motivation of athletes into the social drive to win honors for groups and schools. Before the competition, the players will be arranged into a competition one by one. Coaches and psychologists deliberately pressure players and pay attention to their mental state. Coaches and psychologists analyze athlete performance to prevent and eliminate Clarke, and the "choking phenomenon." (3) Exercise your willpower and mood. Athletes use the method of memory representation to recall past successful exercises and sensory performance, and competition performance of each jump. In high jump training, coaches use cold control, transformation control, and reinforcement control to strengthen the emotional control of athletes. This enhances the athlete's feel and control of the movement technique.

High Jump Trajectory Prediction of Spatiotemporal Graph Attention Network

This paper decomposes discrete time points into motion segments of several time sections. The motion segment contains the critical position, speed, etc., of the athlete in that segment. This article treats it as a physical system. This paper predicts the sports state of the athlete from the historical movement track and movement state.⁴ The high-jump track prediction problem can be regarded as a complex time-series prediction problem, which is to predict and reason based on the position of the critical points of the athlete in a certain period in the competition.

$$f(r)^{r+R} = f(f(r)^{r-1}, f(r)^{r-2}, \dots, f(r)^{r-R_{obs}}, \lambda_m, R, 0, 1, 2, \dots, R_{pred}, m = 0, 1, 2, \dots, K) \quad (1)$$

$$f(r)_j^r = (\alpha_j^r, \beta_j^r, \gamma_j^r), j = 1, 2, 3, 4, 5 \quad (2)$$

$$f(r)^r [f(r)_1^r, f(r)_2^r, f(r)_3^r, f(r)_4^r, f(r)_5^r] \quad (3)$$

$$h(f(r)_1^r, f(r)_2^r, f(r)_3^r, f(r)_4^r, f(r)_5^r, \lambda_m) \leq 0, m = 0, 1, 2, \dots, K \quad (4)$$

$f(r)^r$ represents the time when the critical body part R_{pred} of the player in time r is predicted. R_{obs} represents the number of historical moments observed in the record. At a specific time point r , this paper uses the jumping motion state and trajectory of the previous R_{obs} time points to predict the movement path of point R_{pred} in the future. λ_m is a parameter related to the moving path. G is the number of each parameter. f is the motion path diagram of the high jump. $f(r)_j^r$ is the key point of the player in the r time. $j = 1, 2, 3, 4, 5$ represents the left and right ears, left shoulder, left hip, left foot, right foot, and the center of gravity of the torso. h represents the swing distance of various critical parts of the human body.⁵ Other joint points determine the oscillation amplitude of the joint point.

Each joint point has its way of moving, such as displacement, velocity, acceleration, etc. We use *LSTM* to capture the movement of each node. Use *M - LSTM* to express *LSTM*. This paper inserts point $f(r)_j$ into a fixed vector c_j^r . This vector is an input of *LSTM* units:

$$c_j^r = \delta(\alpha_j^r, \beta_j^r, \gamma_j^r; Q_{cc}) \quad (5)$$

$$L_j^r = MLSTM(L_j^{r-1}; c_j^r; Q_L) \quad (6)$$

$\delta(\cdot)$ is an embedded function. Q_{cc} is the embedded weight L_j^r is the hidden state of *M - LSTM* at time step r . These parameters are shared among all the nodes Q_L is the weight of *M - LSTM*.

Mathematical analysis methods

The test results are expressed as the mean \pm standard value. This paper uses the statistical software Excel2010 and SPSS20.0 to analyze the obtained data.

Ethical Compliance

Research experiments conducted in this article with animals or humans were approved by the Ethical Committee and responsible authorities of Science and Technology College Gannan Normal University and University of Perpetual Help System Dalta following all guidelines, regulations, legal, and ethical standards as required for humans or animals.

RESULTS

The first psychological training experiment

Table 2 shows the comparison of the high jump and pre-competition performances between the control group and the experimental group.⁶ The comparison of competition results was statistically significant ($P < 0.01$). After the first period of psychological training, the athletic performance of the experimental group improved.

The second phase of the psychological training test

After the second phase of psychological training, the physical fitness indexes of the three items in the experimental group were significantly higher than those before the second phase of the experiment. There was also improvement in the control group, but the increase was minimal.⁷ The results were much lower than the experimental group. There were significant differences ($P < 0.01$) in the three physique indicators between the two groups of athletes (Table 3). There was a significant difference between the experimental and control groups' performance. The improvement of the experimental group was more significant than the initial level. The control group's results showed a specific decrease relative to the initial level. It shows that psychological training dramatically improves the performance of high jumpers. (Table 4)

DISCUSSION

Factors that affect the psychological state before the game

The track and field long jump competitions differ from athletes' regular training. Athletes' desire to win is so strong that they are susceptible to everything. This makes their psychology more tense and sharp. The tense atmosphere of the competition scene will put a lot of psychological and physical pressure on the players. This can make a big difference in their mood. The mood of the players will change to varying degrees during the game.

In some cases, they experience "emotional resonance." This usually happens in the pre-match preparation phase. Adverse emotional reactions can occur when players don't do a good shot or jump. This will cause high psychological tension and lead to excitement in the cerebral

Table 2. Comparative study before and after the first psychological training experiment.

Group	n	Original grade	Pre-match results	Competition results	Mental state
Test Group	11	1.79 \pm 0.02	1.84 \pm 0.04	1.86 \pm 0.03	Good self-control and emotional stability
Control group	11	1.87 \pm 0.04	1.88 \pm 0.15	1.85 \pm 0.04	Slightly fluctuating mood, poor self-control
T-test		p>0.05	p>0.05	P<0.01	

Table 3. Physical fitness status in the second phase.

Group	Test Group	Control group	T-test
n	11	11	
Height/cm	180.2 \pm 1.49	180.2 \pm 1.19	p>0.05
100m run/s	10.59 \pm 0.01	10.89 \pm 0.02	P<0.01
Standing 10-step jump/m	33.17 \pm 0.59	31.19 \pm 0.69	P<0.01
Rear shot put/m	13.37 \pm 0.1	13.56 \pm 0.69	p>0.05
60m run/s	6.73 \pm 0.1	7.13 \pm 0.08	P<0.01

Table 4. Comparison of high jumpers in the second stage with the control group.

Group	n	Pre-match results	Competition results	Mental state
Test Group	11	1.96 \pm 0.11	1.99 \pm 0.32	Substantial control and emotional stability
Control group	11	1.96 \pm 0.25	1.98 \pm 0.04	Weak will, the trance of perception
T-test		P<0.01	P<0.01	

cortex. Excessive agitation can cause changes in the body. Tension hardens the body's muscles and reduces the ability to feel and think. The athlete's psychological quality is the personality, psychological state, and psychological state that is a critical factor of the athlete's competition consciousness. Some players have substantial emotional fluctuations and are easily excited, which leads to emotional loss of control. Some players are agile, responsive, and adaptable.⁸ When a player fails in high school, jumping unexpectedly, his mental state will be significantly affected. This phenomenon is called "expectancy neurosis." Temporary physical and psychological disorders due to an unexpected failure. This eventually led to athletes questioning their performance. Few people watch the game during training, so the atmosphere is also very dull. The atmosphere at the game is something that athletes have never experienced in training. All of this will change the mentality of the players.

Mental training and self-regulation

The human brain and skeletal muscles have a set of "mutually contagious" mechanisms. Athletes can tune their brains by exercising their bodies. Competitors can make some simple gestures in situ when performing simple physical movements. Contents include arm swing, leg swing, shoulder lift, waist lift, turning, and other techniques. This can reduce the impact of negative emotions and restore their mental state.

A phenomenon refers to athletes' conscious and active use of action phenomenon cues to adjust their mental state. Before you start jumping, recite a few movement essentials. The athlete then concentrates all of his energy on the next try. At the same time, the athlete's formulas strive to be accurate, concise, and in line with their style and characteristics. The athlete tries to recreate the most successful one in his mind, realizing that moment's physical and mental state. This stimulates the activation of various senses, such as kinesthesia, vision, hearing, etc., so that the cerebral cortex can smoothly transmit commands to the muscles that control the muscles. Athletes increase the precision and confidence of their movements through this recall process.

CONCLUSION

The experimental and control groups showed significant differences in the competition before and after the experimental intervention. The experimental group who received psychological training made significant progress in competition performance. Performance in the

control group, which had not received psychological training, was lower than before. Targeted mental training is the key to improving your competitive level.

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