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Article

Analyzing the Interplay Between Competition State Anxiety, Motor Motivation, and Coping Styles Among Adolescent Track and Field Athletes

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Abstract: The relationship between competition state anxiety, motor motivation and coping styles of adolescent track and field athletes in China was investigated using interview and questionnaire research methods. The results showed that the mean scores of cognitive state anxiety and somatic state anxiety were lower in junior track and field athletes who had entered the echelon for a short period of time than in older athletes, and the opposite was true for state self-confidence; there were highly significant differences and significant differences in the identity regulation and introjection regulation dimensions of motor motivation; and there were significant differences in the focused problem-solving coping dimension of coping style. This paper proposes an algorithm for classifying athletic visual mirrors based on sequential model mining. This paper focuses on two issues - feature extraction and definition of semantic rules. In the feature extraction stage, the track and field video footage is automatically segmented into a series of identifiable sequences of athletic events, and then each type of behavioral event is identified using a mechanically learned algorithm. There were no significant differences between the three age groups in terms of race state anxiety, identity regulation and introjection regulation, and no significant differences in coping styles. There were no significant differences in the anxiety of competition status, motivation and coping styles among youth athletes of different sport levels. The results showed the effectiveness of the present algorithm for classifying track and field video cameras.

Keywords: Motor motivation, Field athletes, Natural ecology, Competition state anxiety

1. Introduction

Competition state anxiety, motivation to exercise, and coping styles are three important psychological concepts. Most studies have shown that positive coping enables individuals to effectively mitigate the impact of stress on mental health, while negative coping does not effectively mitigate this impact [1]. Negative coping is positively associated with anxiety and depression scores, while positive coping is negatively associated with anxiety and depression scores [2]. When faced with stressors, athletes who adopted more positive coping strategies were less likely to experience anxiety and depression, while athletes who adopted more negative coping strategies were more likely to experience anxiety and depression [3].

There are few domestic and international studies on whether there are differences in athletic motivation, coping styles, and anxiety among adolescent track and field athletes by age, level, and years of training [4]. The purpose of measuring the current status of competition state anxiety, motor motivation and coping styles in youth track and field athletes is to analyze whether there are differences in motor motivation, coping styles and anxiety among youth track and field athletes depending on their age, level and years of training, in order to provide useful assistance for the psychological training of youth track and field athletes [5,6].

Anxiety is not only the most common problem among athletes, but it is also one of the problems that sports teams and coaches are eager to solve. The level of arousal and the level of anxiety of athletes can directly affect the level of performance and the performance of athletes in competitions. Both sports psychologists and coaches pay great attention to competition anxiety [7]. Research on the factors influencing athletic competition anxiety has focused on the effects of personal factors (expectations and motivation, cognitive level, fear of failure, perfectionism, and low self-confidence) and situational factors (competition, stress, and geography and field equipment) on anxiety [8].

On the other hand, athletic motivation is an important factor influencing athletes' mood and performance. As an important psychological factor, motivation enables athletes to actively engage in sports activities, ensuring that they can effectively complete their training tasks, improve their athletic ability, and achieve excellent results in competitions [9].

Goal orientation theory is an important component of sport motivation theory. Goal orientation theory suggests that there are two kinds of goal orientations that athletes have when performing sports activities: one is to place more importance on the process of sports activities, called task goal orientation, and the other is to place more importance on the results of sports activities, called self-goal orientation [8]. Task-directed athletes usually focus their attention on whether their abilities are improved and how well they have mastered their sport skills, and task-directed athletes prefer to choose challenging tasks because they can inspire perseverance and continuous improvement [10]. Therefore, athletes with task-oriented tendencies do not worry too much about their competitiveness, but focus more on how to accomplish the task rather than the outcome of the task, and when such individuals achieve success or win the competition, they attribute their victory to their own efforts and diligence [9]. In contrast, athletes with self-goal orienting tendencies usually take others' perceptions of themselves as the standard for their activities and take the results of the competition as the yardstick for their success or failure. Athletes with self-directing tendencies are more willing to choose tasks that they are sure they can control when choosing tasks, and if they win in a competition, they will attribute their victory to their ability, and if they fail in a competition, they will attribute the failure If they fail in the competition, they attribute the failure to the difficulty of the task they chose. Goal orientation theory suggests that a goal is a standard of behavior that an individual establishes before engaging in an activity that he or she expects to achieve in a future time period [11,12]. As an important part of goal orientation theory, it is particularly important to clarify the intrinsic goal orientation tendencies of athletes in order to gain a deeper understanding of their activity behavior.

Goal orientation theory suggests that an athlete's intrinsic goal-oriented tendencies influence the athlete's behavior in engaging in physical activity. In terms of effort, athletes with task-oriented tendencies practice continuously in order to be able to master a particular movement or technique, and they will gradually experience a sense of self-efficacy and rising self-confidence in the process of performing the exercises [13]. Self-directed athletes tend to show a high level of effort only when the effort they put in is conducive to others' positive evaluation of their ability, and vice versa, because self-directed individuals base their subjective ability and self-confidence on comparison with others rather than on technical improvement. In terms of

affective experience, task-oriented athletes will have more positive affective experiences than self-oriented athletes, and task-oriented athletes also have more optimistic future expectations than self-oriented athletes in terms of their level of expectation of the future [14]. Currently, there is a large body of theoretical and empirical research indicating that task orientation is a more desirable goal-directed state that is positive, active, and more beneficial for athletes to engage in a sport activity or task, whereas self-direction is a negative, fragile, and undesirable goal-directed state that is detrimental for athletes to engage in a sport activity or task [15].

However, there are relatively few studies on the relationship between goal orientation theory in sports motivation and athletes' pre-game anxiety. By reviewing a large amount of literature, it is shown that there are large differences in athletes' goal orientation and its effects on anxiety in different sports, and most of the studies on track and field are conducted with elective students as research objects, and there are fewer studies on professional athletes, which lack theoretical support. Therefore, whether there is a close relationship between goal orientation and pre-competition anxiety in track and field professional athletes and what kind of relationship there is deserve to be further explored.

2. Related Work

Sports competition anxiety is a relatively hot topic in sports psychology research at home and abroad, mainly because it is closely related to sports performance. 60s, the research on anxiety reached a climax abroad and has been studied as a hot spot by researchers, and these studies were mainly conducted in three aspects: multidimensionality of anxiety, pre-competition anxiety, and the effect of competition on anxiety . This was demonstrated by [15] in both a survey of outstanding young wrestlers. A survey of skydivers found that the peak of anxiety in experienced skydivers occurred when they boarded the aircraft [16], whereas the peak of anxiety in inexperienced skydivers occurred when the "ready" signal was given before the jump. [17] found that the anxiety levels of the best young wrestlers increased before the competition, but decreased significantly once they entered the first few minutes of the competition. There was a significant difference in anxiety change between athletes with higher levels of competition trait anxiety compared to those with lower levels of competition trait anxiety, with the former showing higher levels of anxiety than the latter. A single-factor scale to measure individual achievement goal orientation was investigated by [18]. However, the reliability and validity of the single-factor scales were not well tested, so their validity in measuring individual achievement goal orientation needs to be further verified. Subsequently, [19] developed several multi-factor scales to measure individual goal orientations based on single-item scales, and used modern measurement and statistical methods such as reliability and validity tests, exploratory factor analysis, and validation analysis to make the developed multi-factor scales more effective in measuring individual achievement goal orientations. In [20], a multi-factor scale was developed to measure achievement goal orientation based on the three-factor structural model theory of achievement goal orientation, which consists of 11 factors measuring learning goal orientation and achievement goal orientation respectively.

3. Classification of Athletic Events

According to the rules of track and field, there are three distinct differences in sports events: background motion changes, background lighting changes, and number of targets. Each aspect and its extracted feature vectors are described in detail below:

Background motion variation: In athletics, the background motion varies greatly and in various directions due to the fast movement of athletes or the flight of thrown objects. Therefore,

the experiments focus on the analysis of background motion.

For example, according to the background motion (horizontal or vertical), it can be determined whether the athlete is doing forward or jumping motion, and the background motion speed can also reflect the athlete's motion speed. In this paper, we define motion features to represent the motion of the background, which are defined as follows:

Assume that the video size is $M \times N \times T$, M, N denotes the video resolution, and T denotes the video sequence length. The frame image is divided into K, L blocks, and the size of each block is $h \times v$, where $h = M/K, v = N/L$, and the number of macroblocks in each block is represented by C, as shown in Figure?? ($K = L = 5$), and each block is processed as follows:

Where MV_{ij} denotes the motion vector of the macroblock at position (i, j), $\theta \in [0, 2\pi]$denotes the direction of the motion vector, and if c_x denotes the component of the motion vector of the cth macroblock in the horizontal direction (x), $c_y$denotes the component of the macroblock in the vertical direction (y), and ρ denotes the intensity of the motion of the macroblock c, then

$$\rho = \sqrt{c_x^2 + c_y^2}, \theta = \arctan(c_y/c_x), \tag{1}$$

$\rho(\rho \in [0, \rho_{\max}])$ is quantified into R Eq. (1) equal-interval intervals, and then histograms are made for ρ, θ respectively:

$$\text{Hist}_{\ q} = \frac{1}{T}\sum_{t=1}^{T} n(t, q) q \in [1, Q], \tag{2}$$

$$\text{Hist}_{\ r} = \frac{1}{T}\sum_{k=1}^{T} n(l, r) \quad r \in [1, R], \tag{3}$$

where $n(t, p)$ denotes the number of motion vectors in interval q in the t th frame coordinate system, and $n(t, r)$ denotes the number of ρ quantized to the r th interval in the t th frame coordinate system .

The motion vectors in the block are evaluated by calculating the expected value (μ) and variance (s) in the x, y directions, and thus the intensity of the motion in the block is evaluated as follows:

$$\mu_x = \frac{1}{T}\sum_{t=1}^{T}\sum_{i=1}^{C} c_{x,i}^{t}, \sigma_x^2 = \frac{1}{T}\sum_{t=1}^{T}\sum_{i=1}^{c}\left(c_{x,i}^{t} - \mu_x\right)^2, \tag{4}$$

where $c_{x,i}^{t}$ represents the component of the motion vector of the i -th macroblock in the block in the s -direction at frame t . The same treatment is done for the y-direction.

Background lighting changes: in some sports events, lighting changes are very obvious.

For example, in the javelin throwing, the lens is aimed at the javelin from the ground to the air, and the illumination is significantly darker when flying in the air compared to the ground. In the experiment, we use the Block Intensity Comparison Code (BICC) to represent this change, which is defined as follows:

The mean value of luminance of each block is $\overline{X(l)}, l \in \{1, 2, ..., K \times L\}$, then:

$$\overline{X(l)} = \sum_{i=1}^{h \times v} x_i/(h \times v). \tag{5}$$

Then the BICC coding of the frame image can be expressed by Eq5, where $1 \leqslant m \leqslant K \times L, 2 \leqslant n \leqslant K \times L - 1$.

$$y\left[(m-1) \times (K \times L) + n + \frac{m(m+1)}{2}\right]. \tag{6}$$

Number of targets: The number of moving targets in the video varies due to the difference in items or the adjustment of the video footage. In this paper, we define the color histogram feature of chunking to distinguish the number of targets, which is defined as follows:

Suppose the frame size is $M \times N$, and the frame is divided into $K \times L$ blocks, each block size is $h \times v$, where $h = M/K, v = N/L, x_{ir}, x_{ig}, x_{ib}$ denotes the value of R, G, B components corresponding to the i-th pixel point in the block, respectively, and p denotes the number of histogram blocks, with $HIST_{m,n,P}$denoting the color histogram of the n th block in the frame, whose $m \in \{r, g, b\}, n \in [1, k \times k], p \in [1, p]$, p_m denoting the color component m corresponding to the p histogram block. quantization range, then:

$$HIST_{m,n,P} = \sum_{i=1}^{h \times v} (x_{i,m,n} \in p_m). \tag{7}$$

4. Sequence Pattern-based Classification

4.1. Sequence Mining basic Concepts

Let $I = \{i_1, i_2, ...i_n\}$ be the set of all items . The set of items is a non-empty set of items, i.e., the non-empty set $X \subseteq I$ is called the set of items.

Definition 1: An event is a non-empty set of items, and a sequence is an ordered set of items, that is, a sequence is an ordered list of events. Generally, the sequence $b = \langle b_1, b_2, ...b_n \rangle$, where the event s_1 occurs before s_2 , is denoted as $s_1 < s_2$.

4.2. Sequence Pattern Rule base Building

First, a training video is labeled by the above method to form a sequence s, which is an ordered list of multiple motion events. In this way, a large number of training videos are labeled to form a sequence database S. At the same time, in these classification datasets, each sequence has a class flag c, so as to obtain a set of classified training video sequences (6 classes in the experiment). Then we use sequence pattern mining to mine all the characteristic frequent sequence patterns for each class of videos. In our experiments, we mine all the frequent k-sequences that satisfy the minimum support for each classified video set by GSP algorithm. After finding all the frequent sequences, the frequent sequences are used to generate sequence rules. The if-then format is used to make the judgment. The left side of the rule is the feature sequence pattern, and the right side is the classification to which the video belongs. Suppose it is a feature sequence, is a class flag, and the classification rule is a rule of the form $\alpha \Rightarrow c$.

Once the classification rule base is formed, it can be used to match the video sequences for classification. By counting the number of times the input sequence contains feature sequences of each class, the confidence level that the video belongs to that classification is determined. The calculation formula is as follows:

$$\text{confidence}(c_i) = \sum \text{support}(m_i, \alpha)/\text{count}(c_i). \tag{8}$$

Let the class flags of each class be $c_i (i = 1, 2, ..., n)$. Where m_i denotes a feature sequence in the set of class c_i feature sequences. α denotes the input sequence. $\sup port(c, \alpha)$ is the number of times the sequence α contains m_i, and $count(c_i)$ denotes the total number of feature sequences in the set of feature sequences of class c_i.

5. Study Subjects

Male athletes aged 16 to 18 in track and field were the subjects of the study. The number of athletes in each age group was 22 at 16 years old, 23 at 17 years old, and 16 at 18 years old;

30 athletes had been training in the second tier team for 1 to 2 years, and 31 athletes had been training for more than 3 years; 25 athletes were in the first tier and 36 athletes in the second tier.

The number of participants in the test was 61, and 61 forms were collected after the test, with a 100% return rate and 100% test efficiency. From the data in Table 1, we can see that the state anxiety, somatic state anxiety and state self-confidence of youth track and field athletes all obeyed normal distribution.

	M	SD	MIN	MAX	Z	P
Cognitive state anxiety	18.97	5.65	9.01	33.02	0.620	0.840
Somatic state anxiety	15.96	5.25	7.99	29.05	0.815	0.520
State self-confidence	26.65	5.21	14.33	35.87	0.776	0.597

Table 1. Descriptive Statistics of Competition state Anxiety in Youth Athletics Athletes

The data in Table 2 shows that the internal motivation, identity regulation, internal projection regulation, external constraint, no motivation, and total motivation scores of youth track and field athletes follow a normal distribution.

	M	SD	MIN	MAX	Z	P
Internal motivation	72.99	12.15	37.02	90.98	0.575	0.912
Identity regulation	18.79	4.45	11.02	27.99	0.787	0.564
Introjected regulation	22.98	5.95	7.11	35.03	0.582	0.999
External constraints	11.09	3.75	4.01	28.05	0.808	0.531
No motivation	17.11	8.21	7.09	35.18	0.878	0.461
Total motivation score	115.02	36.37	16.08	188.01	0.807	0.534

Table 2. Descriptive Statistics of Youth Track and Field Athletes' Motivation

From Table 3, it can be seen that youth track and field athletes' coping focused on problem solving (PC), coping focused on emotions, avoidance coping (AC), and transcendental coping (TC) all follow a normal distribution.

	M	SD	MIN	MAX	Z	P
Concentrated problem solving coping (PC)	22.68	3.99	11.78	29.87	0.771	0.598
Concentrated emotion coping (EC)	22.33	3.41	14.13	28.99	0.768	0.602
Avoidance coping (AC)	18.78	3.69	11.01	25.88	0.837	0.497
Transcendental coping (TC)	17.68	3.97	5.91	25.99	0.701	0.723

Table 3. Descriptive Statistics of Youth Track and Field Athletes' Coping Styles

The results of the t-test on competition state anxiety of youth track and field athletes with different years of training showed that the mean scores of cognitive state anxiety and somatic state anxiety of youth track and field athletes with 1 to 2 years of training were lower than those of youth track and field athletes with more than 3 years of training, and the mean scores of state self-confidence were higher than those of youth track and field athletes with more than 3 years of training, but there was no significant difference between youth track and field athletes with 1 to 2 years of training and those with more than 3 years of training in these three dimensions (Table 4). However, there was no significant difference between youth track and field athletes with 1 to 2 years of training and those with more than 3 years of training in these three dimensions (Table 4).

	1 to 2 years(N=30),(M±SD)	3 years(N=31),(M±SD)	t	p
Cognitive state anxiety	17.91±5.35	19.88±5.63	-1.366	0.198
somatic state anxiety	15.95±4.87	15.82±5.62	-0.028	0.988
state self-confidence	27.31±5.36	26.01±4.92	0.872	0.369

Table 4. Comparison of the differences in State Anxiety Among Youth Track and Field Athletes with Different Training Years

The results of the t-test on the motivation of youth track and field athletes with different years of training showed that there were highly significant and significant differences in the dimensions of identity regulation and introjection regulation; there were no significant differences in internal motivation, external constraints, no motivation and total motivation scores. This indicates that youth track and field athletes with 1 to 2 years of training tend to be more likely to have identity regulation and introjected regulation in their motivation (Table 5).

	1 to 2 years(N=30),(M±SD)	3 years(N=31),(M±SD)	t	p
Internal motivation	72.01±11.87	68.79±12.41	1.065	0.298
Identity regulation	20.55±4.19	17.35±3.88	2.915	0.049
Introjected regulation	24.56±6.12	20.98±4.87	2.071	0.052
External constraints	11.85±4.11	11.02±2.56	1.784	0.117
No motivation	17.35±9.18	16.59±7.41	0.181	0.879
Total motivation score	118.14±38.88	110.71±34.02	0.783	0.451

Table 5. Comparison of the Differences in Motivation Among Youth Track and Field Athletes with Different Training Years

A -test of the coping styles of youth track and field athletes with different years of training showed that there was a significant difference between youth track and field athletes with different years of training in the coping style of focused problem solving coping dimension, = 2. 061 ($t < 0.05$); there was no significant difference in the dimensions of focused emotional coping, avoidance coping and overcoming coping. This indicates that adolescent track and field athletes with one to four years of training tend to prefer focused problem-solving coping in their coping style (Table 6).

	1 to 2 years(N=30),(M±SD)	3 years(N=31),(M±SD)	t	p
Concentrated problem solving coping (PC)	22.89±3.52	22.47±2.97	2.059	0.033
Concentrated emotion coping (EC)	22.67±3.61	21.98±3.36	0.857	0.417
Avoidance coping (AC)	18.92±3.61	18.39±4.23	0.268	0.826
Transcendental coping (TC)	17.99±4.52	15.98±3.61	0.117	0.125

Table 6. Comparison of Coping Styles of Youth Track and Field Athletes with Different Training Years

The results of the -test and multiple mean test LSD on the competition state anxiety of youth track, and the F-values in the three dimensions were $F = 1.\ 451$ ($P > 0.05$), $F = 1.893$ ($P > 0.05$), $F = 1.\ 469$ ($P > 0.05$). The mean scores of cognitive state anxiety and state self-confidence were lowest in the U_18 age group, followed by the U_ 16 age group, and the mean scores of cognitive state anxiety and state self-confidence were highest and lowest in the U_17 age group; the mean scores of somatic state anxiety were lowest in the U_18 age group and highest in the U_17 age group. The mean scores of somatic state anxiety were the lowest in the U_18 age group, the second highest in theU_17 age group, and the highest in the U_16 age group (Table 7).

The results of the F -test and LSD of multiple means test on athletic motivation of youth athletes in different age groups showed that there were significant differences between youth

	U_16(N=16)M±SD	U_17(N=23)M±SD	U_18(N=22)M±SD	F	p
Cognitive state anxiety	16.98±5.52	21.01±5.97	17.98±6.68	1.552	0.261
somatic state anxiety	14.01±3.97	16.23±5.56	17.29±4.32	1.982	0.163
state self-confidence	28.33±4.36	26.22±5.68	26.97±5.52	1.478	0.245

Table 7. Comparison of the Differences in State Anxiety in Competition Among Youth Track and Field Athletes in Different Age Groups

athletes of different age groups in the dimensions of identity regulation and introjection regulation with $F = 4.\ 406$ ($P < 0.05$) and $F = 4.226$ ($P < 0.05$), respectively. The LSD of the multiple mean test showed that there was a significant difference between U_17 and U_13 on the dimensions of identity regulation, introjection regulation, and unmotivation with $P < 0.05$, a highly significant difference between U_15 and U_13 on identity regulation with $P < 0.01$, and a significant difference on introjection regulation with $P < 0.01$. There was a significant difference between U_15 and U_13 for identity regulation, $P < 0.01$, and a significant difference for introjection regulation, $P < 0.05$ (Table 8).

	U_16(N=16)M±SD	U_17(N=23)M±SD	U_18(N=22)M±SD	F	p
Internal motivation	72.33±8.97	67.31±13.14	72.06±12.32	1.165	0.347
Identity regulation	18.11±3.55	17.75±3.68	21.09±5.12	4.521	0.019
Introjected regulation	21.03±4.98	21.59±6.02	25.97±5.25	4.276	0.021
External constraints	10.32±3.36	10.58±3.01	13.13±3.69	1.697	0.221
No motivation	13.21±5.86	17.69±8.22	19.15±9.88	2.709	0.081
Total motivation score	126.88±27.11	106.21±35.32	115.25±43.56	1.456	0.257

Table 8. Comparison of Differences in Athletic Motivation of Youth Track and Field Athletes in Different Age Groups

The results of F -test and LSD of multiple means test on the coping styles of youth track and field athletes in different age groups showed that there was no significant difference in the coping styles of youth track and field athletes in different age groups.

The results showed that youth track and field athletes in different age groups, with F values of $F = 1.\ 314$ ($P > 0.\ 05$), but the LSD results of the multiple mean test showed that there was a significant difference between U_17 and U_13 in the dimension of beyond coping, with $P < 0.05$. This indicates that youth track and field athletes in the U_13 age group were more inclined to transcend coping than youth track and field athletes in the U_17 age group in terms of coping style (Table 9).

	U_16(N=16)M±SD	U_17(N=23)M±SD	U_18(N=22)M±SD	F	p
Concentrated problem solving coping (PC)	22.49±3.51	22.12±3.99	23.75±4.02	1.149	0.287
Concentrated emotion coping (EC)	23.91±3.05	22.01±3.58	22.15±3.69	1.037	0.289
Avoidance coping (AC)	18.07±3.85	19.85±3.98	18.23±3.36	1.635	0.217
Transcendental coping (TC)	16.35±2.89	17.18±3.97	17.89±5.53	2.761	0.082

Table 9. Comparison of the Differences in Coping Styles Among Youth Track and Field Athletes in Different Age Groups

The results of the t -test on the competition state anxiety of youth track and field athletes of different sport levels showed that the mean scores of cognitive state anxiety and somatic state anxiety were relatively low and the mean scores of state self-confidence were relatively high in youth track and field athletes of level 2 and above, but there was no significant difference (Table 10).

The results of t -tests on the motivation of youth track and field athletes of different sport levels showed that the mean scores of youth track and field athletes below Level 2 were higher

	Level 1(N=14)(M±SD)	Level 2(N=47)(M±SD)	t	p
Cognitive state anxiety	16.89±4.97	18.67±5.58	1.585	0.139
somatic state anxiety	14.13±5.82	16.52±5.53	1.589	0.142
state self-confidence	27.62±6.58	26.87±4.96	-1.159	0.252

Table 10. Comparison of the Differences in Motivation Among Youth Track and Field Athletes with Different Training Years

than those of Level 1 youth track and field athletes in all dimensions of motivation, but there was no significant difference with t values of $t = 0.\ 376$ ($P > 0.05$), $t = 1.\ 310$ ($P > 0.05$), $t = 1.\ 551$ ($P > 0.05$), $t = -0.\ 876$ ($P > 0.05$), $t = 1.\ 650$ ($P > 0.05$), $t = -0.\ 406$ ($P > 0.05$), $t = 0.\ 876$ ($P > 0.05$), $t = 1.\ 650$ ($P > 0.05$), and $t = -0.\ 406$ ($P > 0.05$), respectively (Table 11).

	Level 1(N=14)(M±SD)	Level 2(N=47)(M±SD)	t	p
Internal motivation	68.89±11.02	71.23±11.59	0.412	0.817
Identity regulation	17.58±4.09	19.96±5.58	1.425	0.187
Introjected regulation	21.01±5.12	23.56±6.10	1.559	0.214
External constraints	11.02±3.42	11.35±3.95	0.889	0.451
No motivation	14.02±3.17	18.59±9.51	1.598	0.210
Total motivation score	118.51±29.36	115.25±37.98	-0.421	0.677

Table 11. Comparison of the Differences in Motivation of Youth Track and Field Athletes by Sport Level

6. Conclusion

1. In the dimension of identity regulation of athletic motivation, youth track and field athletes with shorter training years were more inclined to identity regulation; there were significant differences among youth track and field athletes in different age groups, and youth track and field athletes aged 16 to 18 years were more inclined to identity regulation.
2. Youth track and field athletes with shorter training years were more inclined to introjected conditioning; 16-year-old track and field athletes were more inclined to introjected conditioning; 17-18-year-old track and field athletes were more inclined to unmotivated conditioning.
3. On the focused problem-solving coping dimension of coping, adolescent track and field athletes with shorter training years tended to focus on problem-solving coping; 17-year-old track and field athletes tended to transcend coping more than 18-year-old athletes.

Data Availability

The experimental data used to support the findings of this study are available from the author upon request.

Conflicts of Interest

The author declared no conflicts of interest regarding this work.

References

1. Peng, F. and Zhang, L.W., 2021. The relationship of competitive cognitive anxiety and motor performance: testing the moderating effects of goal orientations and self-efficacy among Chinese collegiate basketball players. *Frontiers In Psychology, 12*, p.685649.
2. Popových, I., Rodchenkova, I., Lukjanchenko, M., Yurkiv, Y., Bilous, R., Shevchenko, N. and Hoian, I., 2024. Anxiety as a multifaceted phenomenon within the motivational orientation of junior athletes. *Journal of Physical Education and Sport, 24*(3), pp.521-532.
3. Gómez-López, M., Courel-Ibáñez, J. and Granero-Gallegos, A., 2021. Profiles of motivation, fear of failure and anxiety in young handball players: A cross-sectional study. *International Journal of Sports Science & Coaching, 16*(3), pp.658-669.
4. Barbosa-Granados, S., Arenas-Granada, J., Urrea, H., García-Mas, A., Reyes-Bossio, M., Herrera-Velásquez, D., Nanez, J. and Aguirre-Loaiza, H., 2022. Precompetitive anxiety in young swimmers: Analysis of the perceived competition difficulty (Ansiedad precompetitiva en nadadores juveniles: Análisis desde la percepción del nivel de dificultad competitivo). *Retos, 45*, pp.651-659.
5. Campbell, E., Poudevigne, M., Irving, R., Dilworth, L., Abel, W. and Bailey, J., 2020. Psychophysiological stress and performance in Jamaican junior track and field athletes. *Performance Enhancement & Health, 8*(2-3), p.100171.
6. Granados, S.H.B., Granada, J.A.A., Urrea, H., Mas, A.G., Bossio, M.A.R., Velásquez, D.A.H., Nanez, J. and Loaiza, H.H.A., 2022. Precompetitive anxiety in young swimmers: analysis of the perceived competition difficulty. *Retos: Nuevas Tendencias En Educación Física, Deporte Y Recreación,* (45), pp.651-659.
7. Reid, C.O.R.R.I.N.A., Larson, A.B.I.G.A.I.L. and Debeliso, M.A.R.K., 2020. Pre= practice and pre-competition state anxiety among preadolescent female gymnasts: A pilot study. *Journal of Physical Education Research, 7*, pp.09-19.
8. Rutkowska, K., Gierczuk, D. and Buszta, M., 2020. Selected psychological factors in elite Greco-Roman wrestlers at various levels of competition. *Journal of Physical Education and Sport, 20*, pp.2277-2282.
9. Fry, M.D., Hogue, C.M., Iwasaki, S. and Solomon, G.B., 2021. The relationship between the perceived motivational climate in elite collegiate sport and athlete psychological coping skills. *Journal of Clinical Sport Psychology, 15*(4), pp.334-350.
10. Morales-Sánchez, V., Caballero-Cerbán, M., Postigo-Martín, C., Morillo-Baro, J.P., Hernández-Mendo, A. and Reigal, R.E., 2022. Perceived motivational climate determines self-confidence and precompetitive anxiety in young soccer players: Analysis by gender. *Sustainability, 14*(23), p.15673.
11. Sanader, A.A., Petrović, J.R., Bačanac, L., Ivković, I., Petrović, I.B. and Knežević, O., 2021. Competitive trait anxiety and general self-esteem of athletes according to the sport type and gender. *Primenjena psihologija, 41*(3), pp.277-307.
12. Gabrys, K. and Wontorczyk, A., 2023. Sport anxiety, fear of negative evaluation, stress and coping as predictors of athlete's sensitivity to the behavior of supporters. *International Journal of Environmental Research and Public Health, 20*(12), p.6084.
13. Rogowska, A.M., Tataruch, R., Niedźwiecki, K. and Wojciechowska-Maszkowska, B., 2022. The mediating role of self-efficacy in the relationship between approach motivational system and sports success among elite speed skating athletes and physical education students. *International Journal Of Environmental Research And Public Health, 19*(5), p.2899.
14. Vesković, A.V. and Stamenković, D., 2022. Relationship of intensity and directional interpretation of precompetitive anxiety with coping frequency and coping effectiveness. *Fizička kultura, 76*(1), pp.47-57.

15. Doron, J. and Martinent, G., 2021. Dealing with elite sport competition demands: an exploration of the dynamic relationships between stress appraisal, coping, emotion, and performance during fencing matches. *Cognition and Emotion, 35*(7), pp.1365-1381.

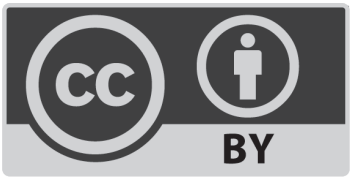
16. Kuçuk Kiliç, S., 2020. Relationship between psychological resilience and stress coping strategies in karate athletes. *Revista de Artes Marciales Asiáticas, 15*(2), pp.59-68.

17. Liu, Y. and Hai, W., 2021. Analysis of Athletic performance, psychology and athletic satisfaction for sport and life in China. *Revista De Psicología Del Deporte (Journal of Sport Psychology), 30*(3), pp.264-275.

18. Strand, B., Lauer, L. and Paige, M., 2022. Failure Response and Coping among Female Collegiate Athletes. *Athens Journal of Sports, 9*(3), pp.175-194.

19. Seyedi, M., Mohammadi Nejati, F., Dana, A. and Esmaeili, M., 2022. A Comparison Between Sports Motivation and Social Physique Anxiety between Blind and Visually Impaired Elite Athletes in Individual and Team Sports. *International Journal of Motor Control and Learning (IJMCL), 4*(2), pp.26-30.

20. Marín-González, F.H., Portela-Pino, I., Fuentes-García, J.P. and Martínez-Patiño, M.J., 2022. Relationship between sports and personal variables and the competitive anxiety of Colombian elite athletes of Olympic and Paralympic sports.*International Journal of Environmental Research and Public Health, 19*(13), p.7791.



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