

# A Study on the Correlation between Athletes' Sports Training Work-Related Rumination and Competitive Motivation

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**Abstract:** Sports training work-related rumination refers to thinking about events related to sports training even after training, which can have both negative and positive effects on sports training. The strong level of competitive motivation affects to some extent the effectiveness of individual athletes' daily sports training and sports participation performance. It is a key motivational indicator that influences sports athletes' competitive achievements. In this study, 235 (257 in total, 235 valid) active athletes of Jiangxi provincial sports teams were used as subjects by using literature, psychometric, mathematical and statistical methods, and logical analysis. Little research has been conducted on athletes' work-related rumination. There is a lack of research on how it relates to competitive motivation. The purpose of this study is to reveal the intrinsic relationship between work-related rumination and competitive motivation in sports training.

## 1. Introduction

In the fierce competition in competitive sports today, with the world records constantly being set, athletes are competing at a higher and higher level. It results in increasing competitive pressure on athletes. Coaches or instructors also have stricter requirements for sports training. More and more athletes are troubled by training and continuous thinking after sports training, and the number of athletes like this is constantly increasing. The phenomenon that employees cannot let go of their work after work is called work-related rumination [1]. Most of the scholars have focused on workplace personnel, and few studies have been conducted on athletes as a specific profession. Therefore, in conjunction with the concept of work-related rumination, the phenomenon of athletes subconsciously recalling training contents after sports training is considered as sports training work-related rumination. In sports training, coaches pay more attention to athletes' psychological training and emphasize the adjustment of short-term problems during competition training. However, sports training work-related rumination forms a long-term effect on athletes. Negative sports training work-related rumination will form long-term psychological stress, which will seriously affect the quality of athletes' daily rest and recovery [2]. Well-handled sports training work-related rumination is likely to become positive rumination. On the contrary, it will become negative if it is not guided well. Therefore, athletes work-related rumination is a very important psychological problem that restricts and affects sports training and sports competition.

### 1.1 The Definition of Sports Training Work-Related Rumination

Rumination, commonly known as chew the cud, is the act of many early herbivores of returning food that has not been fully digested from the animal's stomach to the mouth for re-chewing. Researchers later found that a similar phenomenon, called rumination, occurs in the process of cognitive thinking. The earliest concept of rumination was introduced in the 1990s. There are many definitions of rumination, the most widespread one defines rumination as the idea of thinking in order to solve a problem, to achieve a goal. These reciprocal thoughts occur even if the conditions of the external environment that produce them are absent [3]. Research in the direction of rumination has often been led by medical and mental health science. Many psychological problems

have been associated with rumination as a causative factor in their development, such as depression, anxiety [4], negative self-denial, loss of control, and feelings of loss.

Work-related rumination was first proposed by Cropley and Zijlstra in 2011. It refers to one or more repetitive thoughts related to work problems. Rumination at work was considered negative. However, a 2011 study by Michalianou found that people don't always replay negative work events. They sometimes recall positive work-related images in search of ways to complete tasks and achieve goals [5]. Work-related rumination refers to the fact that there is still a constant thinking about work related issues in situations where non-working hours are not required. In the case of the positive view of rumination, Cropley team combined the results of the interview and factor analysis, and put forward the two aspects of work ruminating: affective rumination and problem-solving pondering [6]. The two are the focus of the rumination (emotion vs. problem resolution).

The concept of work-related rumination in sports training is not yet relevant. Integrating the concept of work-related rumination with the training characteristics of athletes, this study defines sports training work-related rumination as: it belongs to a kind of work-related rumination, which is the internal influence of athletes who continue to think about the events related to sports training even during non-training periods and their own expectations and disappointments about sports training performance. It includes two dimensions from the content of rumination: affective rumination and sports training problem-solving rumination.

## **1.2 Relative Theories of Working Rumination**

The current work-related rumination theory has five main points: (1) Goal Progress Theory was proposed by Martin in 1996, which believes that the individual's rumination is a cognitive way, the purpose of which is self-management, stemming from the goal cannot be achieved. (2) Cognitive activation theory of stress (CATS) is a comprehensive theory of stress that proposes that coping with stressors leads to different levels of physio-psychological arousal, depending on response outcome expectancies. CATS distinguishes between negative and positive outcome expectations, depending on whether the resulting response is expected to deal with the situation with a negative or positive outcome. (3) Drive theory suggests that individuals behave to reduce internal tension. Motivation provides the driving force for behavior, and the stronger the motivation, the more energy there is to drive the behavior, and the stronger and more persistent the behavior. The drive theory focuses on the biological perspective to explain human behavior, which has limitations. Therefore, it is slowly decaying. (4) Marray was the first to propose the achievement motivation theory in 1938. He identified the individual's motivation as a kind of need. It is believed that individual's motivation achievement consists of success-seeking motivation and failure-avoidance motivation. He believed that namely, seeking success motivation, the possibility of success and the value of reasons for success 3 factors influence individual motivation. (5) Self-Determination Theory (SDT) is a comprehensive framework to understand the extrinsic and intrinsic motivations that can sustain sport participation and how various motivations are differently related to sport participation and the benefits derived from sport participation. Doing something that is inherently fun or enjoyable is intrinsic motivation, and doing something to achieve a certain purpose is extrinsic motivation because it leads to a separable outcome.

## **1.3 Introduction of Measurement Tools**

In this study, the sports training rumination questionnaire was selected as the measurement tool. Sports training rumination was the reflection of work-related rumination among special groups in the field of sports training. The Work-Related Rumination Questionnaire (WRRQ) compiled by Cropley et.al. proposed two dimensions of work-related rumination: Affective Rumination (AR) and Problem-Solving Pondering (PSP). The two were distinguished by the focus (affective vs. problem solving) and validity (negative vs. positive) of the rumination content. The questionnaire has applicability to the general working population, but not to the sports training work-related rumination assessment of athletes. On the basis of ensuring the basic content structure of work-related rumination measurement, this study revised the questionnaire. According to the item

expression of the WRRQ, on the basis of guaranteeing the original item evaluation content, the job expression was replaced by the expression of sports training work. This questionnaire was revised to respect the original questionnaire and conform to the athletes' expression habits. The revised dimensions retained the original scale dimensions, the questions were changed from the original 10 questions to 11 questions, and a new question 6 was added to the scale as a lie detector question, only to identify the validity of the questionnaire. The dimension of questions 1-5 is affective rumination, and the dimension of questions 7-11 was problem solving. To ensure the scientific validity of the revised measurement instrument, the revised sports training work-related rumination questionnaire was re-examined for reliability, validity, and discrimination. The reliability values of this questionnaire: total score Cronbach's total coefficient was 0.791, affective rumination sub-dimension was 0.901 and problem-solving rumination sub-dimension was 0.899; validity scale validity correlation coefficient of each sub-item ranged from 0.856-0.921 with a mean value of 0.889. Internal validity: correlation coefficient within affective rumination ranged from 0.528-0.849. On the differentiation index, the difference between the scores of the two groups reached a significant level of 0.001 for each item. This indicates that this measurement questionnaire has high internal consistency reliability, retest reliability and validity, good reliability and stability, and meets the requirements of psychometrics for scale reliability. All the items of this scale are designed for athletes' training work-related rumination, so it is named "Sports Training-Work-Related Regurgitation Questionnaire (ST-WRRQ)".

The Competitive Motive Inventory (CMI) has a high reliability and validity. Its scale measures 5 dimensions. The five dimensions are social recognition (reflecting the degree of the individual's strong desire to be recognized by others), competitive level improvement (reflecting the degree of the individual's desire to improve athletic performance), recreation (reflecting the degree of the individual's desire to have recreation during training and competition), perceptual experience (reflecting the degree of the individual's positive affective acquisition during competition experience), and effort orientation (reflecting the degree of the individual's desire to compete seriously and hard). The scale is embodied by 34 entries. The scale reliability and validity were measured using the retest method with a mean  $\alpha=0.59$ . The Competitive Motive Inventory was standardized in China with 38 questions.

## 2. The Study Method

In this study, the relationship between sports training work-related rumination and competitive motivation of athletes was studied by taking sports training work-related rumination and sports motivation as the research objects. Its subjects were selected from active athletes in Jiangxi Province, aged 12 years and above (including 12 years), with a mean age of  $16.41 \pm 2.57$  years. Since younger athletes under 12 years of age have a poorer cognitive level and do not have the ability to answer the questionnaire in this study, that age was excluded from the subjects. The athletic level of recruited athletes included national athletes of Jiangxi provincial sports team, national level-1 athletes, national level-2 athletes and the following level athletes. The details of the subjects are shown in Table 1.

Table 1 the Information Table of Subject Athletes

athletes' information	category	number	percentage
gender	male	158	67%
	female	77	33%
level	elites	27	11%
	national level-1	51	22%
	national level-2 and below	157	67%

### 2.1 Results of a Sub-Dimensional Correlation Test between Athletes' Training Work-Related Rumination and Competitive Motivation

Multi-factor and bivariate correlation analysis was used to analyze the relationship between sports training work-related rumination and the 2 dimensions and competitive motivation and the 5 dimensions. The results are shown in Table 2.

Table 2 Correlation Analysis Between the Dimensions of Sports Training Work-Related Rumination and the Sub-Dimensions of Competitive Motivation (n=235)

	AR	PSP	STWRR	SA	IP	EM	EE	EO	CM
AR	-								
PSP	-0.147	-							
STWRR	0.534**	0.758**	-						
SA	-0.289**	0.013	-0.179	-					
IP	0.006	0.447**	0.387**	0.02	-				
EM	0.045	0.022	0.048	0.02	-0.024	-			
EE	-0.215*	0.127	-0.033	0.277**	0.179	-0.253**	-		
EO	-0.062	0.276**	0.195*	-0.055	-0.108	0.104	-0.083	-	
CM	-0.166	0.472**	0.295**	0.434**	0.718**	0.315**	0.380**	0.303**	-

From the data in Table 2, the total score of sports training work ruminant was significantly correlated with the total score of competitive motivation; the total score of sports training work ruminant was significantly correlated with the competitive level improvement dimension and the effort orientation dimension. Total competitive motivation score is significantly correlated with problem solving dimension. The affective dimension of sports training work rumination is significantly related to the social approval dimension and the perceptual experience dimension. The problem-solving dimension of sports training work rumination is significantly related to the competitive level improvement dimension and the effort orientation dimension. There was no significant correlation between any of the other dimensions.

## 2.2 Correlation between Sports Training Work Rumination and Competitive Motivation of Athletes under Extreme Grouping Conditions

To better understand the effect of sports training rumination on competitive motivation of athletes, a comparative analysis was conducted using the extreme grouping method. The extreme grouping method refers to taking 27% above and 27% below as the cut-off point in a normal distribution, i.e., when it is possible to make the difference between the two groups as large as possible, we will make the number of the two groups as large as possible. The optimal percentage is slightly larger or smaller than 27% when the distribution is flatter or steeper than the normal curve.

### 2.2.1 Test for Correlation between High and Low Groups of Sports Training Work Rumination and Competitive Motivation

The results were ranked in order of calculating the total score of sports training work-related rumination. The top 27% of individuals with the highest scores formed the high group and the bottom 27% of individuals with the lowest scores formed the low group. The scores of the high and low groups were compared by independent samples t-test. The relationship between sports training work-related rumination and competitive motivation and its dimensions was tested, and the results are shown in Table 3.

Table 3 Comparison Table Of Competitive Motivation in High and Low Groups of Training Work-Related Rumination (Stwrr Low n=63 Stwrr High n=63)

	STWRR low score group(M±SD)	STWRR high score group(M±SD)	T	P
SA	21.45±2.03	20.62±2.53	1.375	0.174
IP	19.59±4.55	25.62±3.22	5.830	0.000
EM	12.79±1.89	13.10±2.22	0.572	0.570
EE	19.00±1.53	18.97±1.76	0.079	0.937
EO	17.17±2.66	18.76±1.96	2.586	0.013
CM	95.07±8.28	101.10±6.21	3.140	0.003

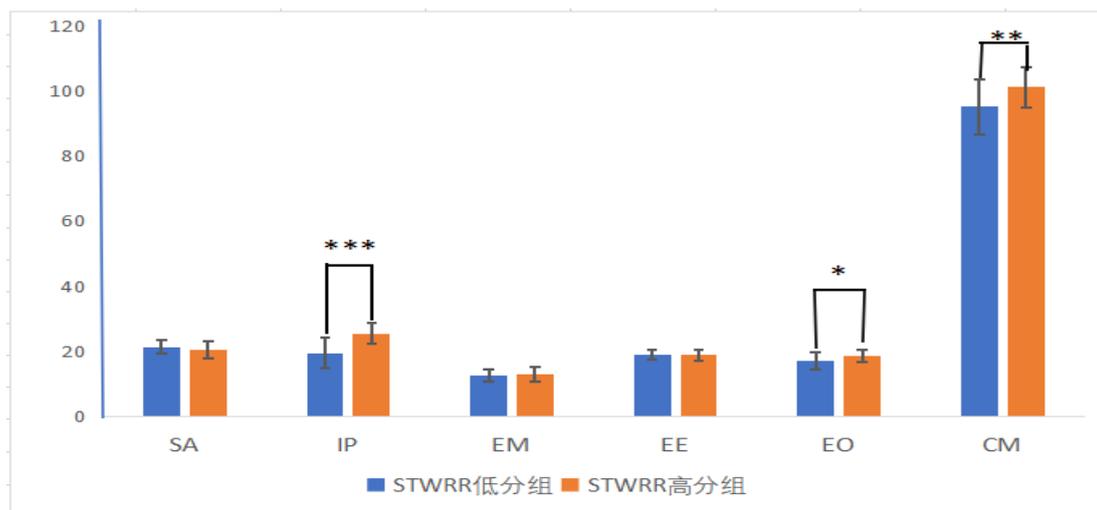


Figure 1 Comparison of Competitive Motivation Between High and Low Groups of Training Work-Related Rumination

As can be seen from Figure 1, in terms of competitive level improvement, there was a highly significant difference between the low and high groups of sports training work-related rumination ( $T=5.830$ ,  $P=0.000 < 0.001$ ); in terms of effort orientation, there was a significant difference between the low and high groups of sports training work-related rumination ( $T=2.586$ ,  $P=0.013 < 0.05$ ); in terms of total competitive motivation, there was a significant difference between the low and high groups of sports training work-related realization ( $T=3.140$ ,  $P=0.003 < 0.01$ ). regurgitation low subgroup was significantly different from the high subgroup ( $T=3.140$ ,  $P=0.003 < 0.01$ ).

### 2.2.2 Examining the Correlation between High and Low Affective Rumination and Competitive Motivation of Athletes

To further explore the influence of the sub-dimensions of sports training work rumination on competitive motivation, the two sub-dimensions of affective rumination and problem-solving rumination were explored separately by extreme grouping to explore the correlation between the two sub-dimensions on motivation.

Table 4 Competitive Motivation Comparison Table of Affective Rumination(Ar Low n=63 Ar High n=63)

	AR low score group(M±SD)	AR high score group(M±SD)	T	P
SA	21.90±2.48	20.17±1.96	2.932	0.005
IP	23.45±4.94	23.55±3.94	0.088	0.930
EM	12.34±2.21	13.17±2.42	1.360	0.179
EE	19.55±1.43	18.62±1.65	2.292	0.026
EO	17.90±2.32	17.86±2.60	0.053	0.958
CMI	99.03±6.95	98.41±6.74	0.345	0.731

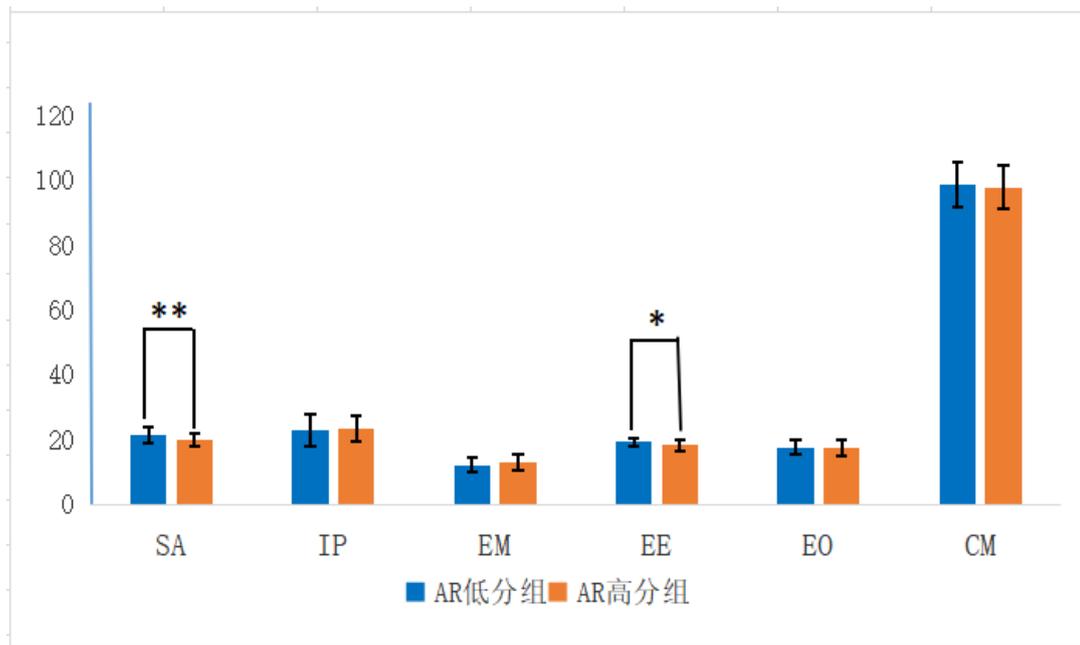


Fig.2 Comparison Chart of Competitive Motivation between High and Low Groups of Affective Rumination

### 2.2.3 Examining the Correlation between High and Low Problem-Solving Pondering and Competitive Motivation

The total scores of problem-solving pondering rumination were ranked, and the scores of high and low groups of each entry were compared using the extreme grouping method with an independent samples t-test. The relationship of problem-solving pondering rumination on competitive motivation and its dimensions was tested and the results are shown in Table 5.

Table 5 Comparison Table Of Competitive Motivation for High and Low Groups of Problem-Solving Pondering(Psp Low n=63 Psp High n=63)

	PSP low score group(M±SD)	PSP high score group(M±SD)	T	P
SA	21.48±1.84	21.59±2.53	0.178	0.859
IP	19.52±4.82	25.83±3.52	5.694	0.000
EM	12.90±1.80	13.03±2.57	0.237	0.814
EE	18.76±2.03	19.10±1.69	0.702	0.486
EO	17.41±2.88	19.14±1.71	2.770	0.008
CMI	94.83±8.85	101.79±5.12	3.668	0.001

Figure 3 shows that different groups of problem-solving pondering have extremely significant differences in the improvement of competitive level (T=5.694, P=0.000<0.001). There were significant differences in effort orientation among different groups in problem-solving pondering (T=2.770, P=0.008<0.01); There was a significant difference in the overall level of competitive motivation among different groups (T=3.668, P=0.001).

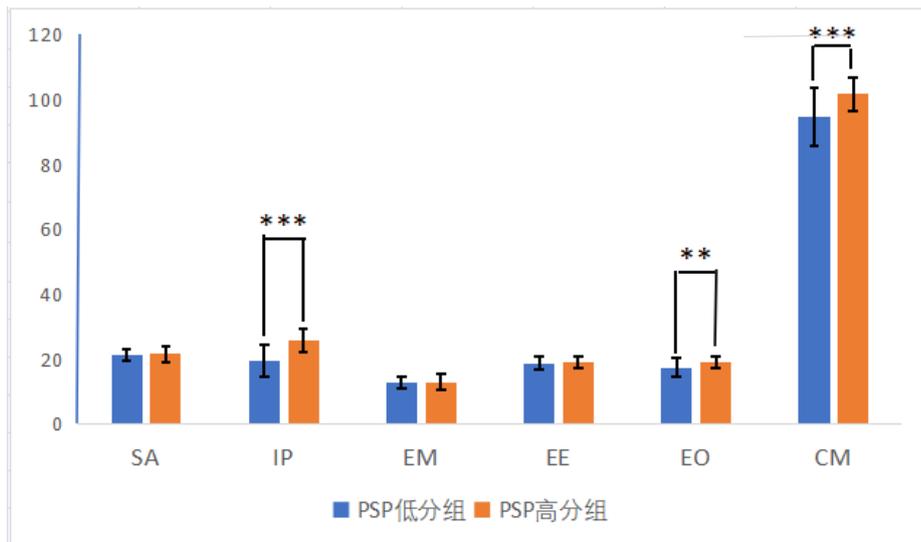


Fig.3 Comparison of Competitive Motivation between High and Low Groups of Problem-Solving Pondering

### 2.3 Analysis of the Correlation between Sports Training Work Rumination and Competitive Motivation of Athletes

The analysis of the correlation coefficient combined with the analysis of the data of the particular extreme groups showed a high degree of consistency between the results of the figures. The analysis of the correlation coefficients revealed a significant correlation between sports training rumination and competitive motivation. The higher the sports work-related rumination in training, the higher their competitive motivation will be. Rumination was used for all negative scoring, and the lower the rumination score, the more effective the rumination. The affective dimension of training rumination was significantly correlated with the social approval dimension with a significant negative correlation with perceptual experience. A large number of studies have concluded that affective rumination is a cognitive state and that affective rumination is characterized by the presence of intrusive, pervasive, and recurrent thoughts, with attention directed primarily to work-related feelings, and is negative in affective terms, a negative effect. Higher affective rumination tends to be accompanied by higher social approval motivation, meaning that high social approval is susceptible to affective influence. A higher total work rumination score would indicate the person is more positive, the affective rumination thinking is more likely to be negative and problem-solving rumination is more conducive to positivity. It means that a low affective rumination would favor motivation levels, while a high problem-solving rumination would likewise favor motivation levels. The more positive rumination, the more conducive to the performance of competitive motivation. The level of competitive motivation will also promote their positive correlation. External motivation is easy to induce affective rumination and bring negative effects. The level of internal motivation is more likely to lead to improved rumination of problem-solving.

The problem-solving dimension of training rumination is significantly correlated with the improvement dimension of competitive level, effort orientation dimension and the total score value of competitive motivation. Sports training work-related rumination is more subject to the impact of problem-solving on competitive motivation. The impact of problem-solving on competitive motivation is mainly reflected in social motivation, level improvement and effort orientation. Social affirmation, praise and encouragement of individual behavior are called social recognition. The improvement of level is greatly influenced by problem-solving rumination. Low affective rumination is associated with higher motivational level, while high problem-solving rumination is also associated with higher motivational level. The more positive rumination, the more conducive to the performance of competitive motivation. The level of competitive motivation will also promote their positive correlation, external motivation is easy to induce emotional rumination and bring negative effects. The level of internal motivation is more likely to lead to problem-solving

rumination improvement. Positive problem-solving rumination is positive and beneficial, and can help athletes solve training problems. Athletes with a high score of effort orientation are more likely to actively solve problems, while athletes with a low score of effort orientation may pay more attention to training itself and show less enthusiasm towards goals and results.

### **3. Conclusion and Prospect**

#### **3.1 Conclusion**

This study explored the relationship between sports training work-related rumination subjected to rumination content (affective rumination, problem-solving pondering rumination) and competitive motivation content (social recognition, level improvement, perceptual experience, effort orientation) by questionnaire method, and the following conclusions were drawn.

(1) In competitive motivation content (social recognition, leveling up, perceptual experience, effort orientation), motivation intensity (strong, weak) and motivation direction (positive, negative) have an impact on sports training work-related rumination. Social recognition and perceptual experience directly affect affective rumination. Leveling up and effort orientation have a positive impact on problem-solving.

(2) There is an internal correlation between sports training work-related rumination and competitive motivation. A significant negative correlation between affective rumination and social identity and perceptual experience motivation dimensions. A significant positive correlation between problem-solving pondering rumination and level improvement and effort orientation. The affective rumination of sports training work-related rumination plays more negative role and affects athletes' social identity and perceptual experience motivation. The problem-solving pondering rumination of sports training work plays more positive role and affects athletes' motivation to improve their level and effort orientation motivation. Social recognition and perceptual experience directly influence affection rumination. Increased level and effort orientation positively influence problem-solving.

#### **3.2 Prospect**

(1) Limited by the current research tool scale, the sports training rumination scale adopted a two-dimension unidirectional design. The scale defined affective rumination as negative, and only negative affective rumination was measured. The dimension of problem-solving pondering was defined as positive, and only the dimension of positive problem-solving pondering was measured. In this study, only training work-related rumination, negative direction of affective ruminant dimension and competitive motivation, and positive direction of problem-solving pondering dimension and competitive motivation were studied, and two-dimensional unidirectional results were obtained. The study found that the future of training can be done in the direction of individual factors of ruminant positive and negative two-way research, will be an in-depth analysis of the training work-related rumination dimensions and directions of sports meetings.

(2) Under the influence of the testers, 235 athletes from Jiangxi Provincial sports teams were selected as the research objects, including 27 national elite athletes, 51 national level-1 athletes and 157 national level-2 and below athletes. In this study, national level-2 athletes and those below take up 67% of the total samples. In the future, more samples of national elite athletes or even world-class athletes can be selected to study the relationship between rumination and competitive motivation in their sports training.

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