

# A STUDY ON THE PSYCHOLOGICAL CAPITAL AND STRESS COPING STRATEGY OF COMPETITION ON SPORTS PERFORMANCE FOR TABLE TENNIS PLAYER OF HIGH SCHOOL STUDENT

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## Summary

This study aims to explore the relationship among the psychological capital and stress coping strategy of competition on sports performance for table tennis player of high school student. The research object is high school table tennis players by Purposive Sampling with an online Google form. 108 questionnaires were distributed in the official questionnaire, 7 of which were incomplete and were deleted. 101 were effectively received with effective recovery of 93.52%. The results showed that the better the psychological capital of high school players, the better the ability to cope with the stress coping strategies of the competition, and the positive impact on sports performance. Stress coping strategies of competition do not directly affect sports performance, and there is no intervening relationship.

**Keywords:** Hope; Resilience; Problem-Focused; Emotion-Focused; Youth National Players.

## INTRODUCTION

Research background and motivations

The characteristics of table tennis, including its small ball size, fast ball speed, and varied spin, combined with differences in ball materials used by different players, require table tennis athletes to maintain high concentration and react instantaneously. Thus, even slight hesitations can affect players' performance on the court. Psychological factors influencing athletic performance have become a primary concern for researchers in sports psychology. In high-level competitions, the outcome often hinges not solely on technical differences but also on psychological aspects (Spence & Spence, 1966). As the level of technical skill increases in competition, psychological abilities become increasingly important. Athletes competing at intense levels not only expend a significant amount of physical energy but also deplete substantial mental resources.

In the development of sports psychology, the concept of psychological capital has garnered increasing attention from scholars, emphasizing the utilization of positive psychological attributes to achieve optimal athletic performance. Luthans et al. (2007) view psychological capital as a positive psychological

state exhibited by individuals in their growth and development. Luthans et al. (2004) propose four main components of psychological capital: optimism, confidence, hope, and resilience. These positive psychological traits can help athletes build confidence, adjust their mindset more quickly when facing training obstacles, and maintain stable performance levels under pressure during competitions.

Lazarus and Folkman (1984) introduced the stress and coping model, emphasizing that stress leads to negative psychological states in individuals. When individuals feel threatened psychologically, they adopt coping strategies to deal with stressors. Madden et al. (1989) modified the Ways of Coping Checklist (WOCC) to assess coping strategies in sports contexts, examining coping strategies for emotions and problem-solving. Domestic scholar Huang Qingru (2000) proposed a third aspect, avoidance coping, in his research. Psychological qualities influence athletes' selection of coping strategies in response to stress. Athletes with excellent psychological qualities have their own set of stress-relief adjustment methods to quickly return to their optimal state. Connor and Davidson (2003) regard resilience as the ability to cope with stress,

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while Bruininks et al. (2005) suggest that hope generates a combination of positive beliefs (agency) and beliefs in overcoming obstacles (pathways). Thus, athletes with high levels of hope are more proactive in overcoming adversity when facing stress. When stress is no longer perceived as a hindrance, timely stress can enhance athletes' arousal levels (Hanin, 2000).

From the above discussion, Good psychological capital traits can boost athletes' confidence and help them cope with stress positively. As high school table tennis players are still developing, understanding the impact of psychological capital and stress coping strategies can effectively support their growth and performance.

### **Research Objectives**

1. To understand the current status of psychological capital, competitive stress coping strategies, and athletic performance among high school table tennis athletes.

2. To analyze the relationships between psychological capital, competitive stress coping strategies, and athletic performance.

3. To examine whether psychological capital affects athletic performance through the mediating role of competitive stress coping strategies.

## **RESEARCH METHODS**

### **Participants**

This study focuses on high school table tennis players from the 2021 academic year, specifically those from the top 8 schools in the National High School Games. Using purposive sampling, 53 athletes were selected for a pilot test. Reliability and validity tests were conducted based on responses to three scales. The pilot data was analyzed using statistical software to determine Cronbach's  $\alpha$  coefficient. Based on the results, unsuitable items were eliminated, and the questionnaire was revised for the final survey.

### **Research Tools**

In this study, the pilot questionnaire's reliability and validity were analyzed using SPSS for Windows 20.0 statistical software. Descriptive statistics were also conducted on the

formal questionnaire. Furthermore, the results of the formal questionnaire were analyzed using Smart PLS 2.0, including confirmatory factor analysis and Structural Equation Modeling (SEM).

### **1. Descriptive Statistics**

This study analyzes the distribution of background variables of high school table tennis athletes, including proportions, means, and standard deviations, to understand the sample distribution and the current status of psychological capital, competition stress coping strategies, and athletic performance.

### **2. Confirmatory Factor Analysis (CFA)**

Confirmatory Factor Analysis is used to validate the relationships between latent variables and their associated factors within the complete framework. Before estimating the overall path model, CFA is conducted to test the reliability and validity of each construct, assessing the appropriateness and stability of each latent variable and its items.

### **3. Structural Equation Modeling (SEM)**

Structural Equation Modeling explores complex relationships among multiple variables through multiple regression and factor analysis. This study uses PLS-SEM to estimate the path relationships within the research model. After conducting CFA to measure the model's reliability and validity, path analysis is employed to understand the predictive power of the research model, including path coefficients, significance, and R-squared values.

## **RESEARCH METHODS**

In this section, statistical analysis of the high school table tennis players' sample based on the effective questionnaires collected is conducted according to frequency distribution and percentage. Based on the results, we can analyze the sample statistics of high school table tennis players under different background variables. The sample consists of 101 athletes, with a gender distribution of 55.45% male and 44.55% female. The grade distribution is 37.62% in the first grade, 30.69% in the second grade, and 31.68% in the third grade. The playing experience distribution is 3.96% with 1-3 years,

17.82% with 4-6 years, 75.25% with 6-12 years, and 2.97% with more than 13 years. Among them, 30.69% of the athletes have participated in overseas training, while 69.31% have not. In terms of competition level, 20.79% have not participated in any competition, 37.62% have achieved top 8 in the County Mayor's Cup, 29.70% have achieved top 8 in the National High School Games, and 11.88% are youth national team players.

#### Confirmatory Factor Analysis

This study used the Smart PLS 2.0 to analyze. Before conducting the path analysis, confirmatory factor analysis was used to test the reliability and validity of each dimension. This included evaluating the measurement model and examining discriminant validity. By testing the factor loadings of each variable, it was confirmed whether the items fell within the originally designated variables. According to the recommendations of Hair et al. (2006), this study used 0.5 as the threshold for item deletion. All items related to psychological capital, competition stress coping strategies, and sports performance met the standard of 0.5 or above, so no items needed to be deleted.

Post-dimension reduction, the factor loadings of psychological capital items ranged from .826 to .876, competition stress coping strategies items ranged from .943 to .949, and athletic performance items ranged from .745 to .811, indicating good validity for all items.

Furthermore, Hair et al. (2021) recommended that the composite reliability (CR) of constructs should exceed 0.7, indicating internal consistency. Calculation results revealed that CR ranged from .883 to .944 for each construct, demonstrating good internal consistency. The average variance extracted (AVE) measured the convergence and discriminant validity of each construct. According to Fornell and Larcker (1981), an AVE value above 0.5 is desirable. Each variable ranged from .602 to .895, all exceeding 0.5, indicating convergence validity for all constructs.

#### Structural Equation Modeling

In this section, the research was analyzed using Smart PLS 2.0 to examine the path

coefficients and direct and indirect relationships within the model. Based on the estimated causal relationships among the latent variables in the research framework. Psychological capital has a direct positive influence on competition stress coping strategies, with a coefficient of .794 ( $t=14.661$ ;  $S.E.=.051$ ). This finding is consistent with the results of Zhuang (2006) and Rabenu (2017). Psychological capital also has a direct positive impact on athletic performance, with a coefficient of .605 ( $t=6.411$ ;  $S.E.=.094$ ), aligning with the findings of Xu et al. (2018) and Lai et al. (2020). However, competition stress coping strategies do not have a direct impact on athletic performance, with a coefficient of .157 ( $t=1.298$ ;  $S.E.=.121$ ). Moreover, competition stress coping strategies do not mediate the relationship between psychological capital and athletic performance, with a coefficient value of .118 ( $t=1.266$ ;  $S.E.=.093$ ). From these results, we infer that possessing good psychological capital can help athletes choose better stress coping strategies and directly positively influence their athletic performance. However, psychological capital does not affect athletic performance through competition stress coping strategies.

Memon and Rahman (2013) pointed out that the purpose of model fit is to assess whether the framework adequately explains the data obtained from the actual investigation. The Smart PLS statistical software measures model fit using the Goodness of Fit (GOF) index, where the values for interpretation are GOF small = .10, GOF medium = .25, and GOF large = .36 (Akter et al., 2011). This software cannot produce this value, so researchers need to compute it themselves using the formula  $=\sqrt{(\text{average of AVE} * \text{average R}^2)}$ . A good fit indicates a high substantive value of the model, making the estimated values more representative. From Table 2, it can be observed that the fit value of this model is .638, which is considered high, indicating that the use of this model for measuring the impact of psychological capital, competitive stress coping strategies, and athletic performance among high school table tennis players is appropriate.

**Table 1. Direct and Indirect Effects Between Dimensions**

	Competition stress coping strategies	Athletic performance		Total Effect	VAF
	Direct	Direct	Indirect		
Psychological capital	.749*	.605*	0.118	0.723	16.18%
	(t =14.661; S.E.=.05)	(t =6.411; S.E.=.094)	(t =1.266; S.E.=.093)		
Competition stress coping strategies		0.157		0.157	
		(t =1.298; S.E.=.121)			

**Table 2. Overall Model Fit**

Construct	AVE	Composite Reliability	R <sup>2</sup>	Cronbach's Alpha	Communality	GOF
Psychological capital	0.734	0.917		0.88	0.889	0.638
Competition stress coping strategies	0.895	0.944	0.561	0.882	0.885	
Athletic performance	0.602	0.883	0.533	0.834	0.835	

**CONCLUSION**

For high school table tennis players, psychological capital has a direct positive impact on both competitive stress coping strategies and athletic performance. Competitive stress coping strategies do not have a direct effect on athletic performance nor do they serve as a mediator. When the psychological capital of high school table tennis players is higher, their competitive stress coping strategies and athletic performance also tend to be higher.

**Suggestion**

**Practical Application Recommendations**

Based on the findings of this study, it is evident that psychological capital not only influences athletic performance but is also closely related to competitive stress coping strategies. Therefore, how to enhance athletes' psychological capital becomes increasingly important. Based on this study, the following recommendations are proposed:

1. Foster positive thinking, communication, and resilience in athletes:

The current situation analysis revealed that the resilience aspect of psychological capital had the lowest average score. Therefore, it is recommended that coaches simulate high-pressure competition scenarios in future training sessions, allowing athletes to think and devise their own strategies. Coaches can also maintain effective communication to help athletes stay calm and balanced in their physical, mental, and technical states.

2. Invite successful athletes to share their competition and training experiences:

The analysis reveals that among the highest achievers, youth national players have higher levels of hope compared to non-ranked players. In high-intensity competitions, psychological capital is an essential quality for top athletes. Therefore, it is recommended to invite high-achieving athletes to share their experiences on how they adjust their mindset and overcome difficulties when facing competition pressure, and how they handle mental slumps when encountering technical bottlenecks. This can help other athletes maintain high motivation and achieve their competition goals.

Recommendations for Future Research

It is recommended to gain a more comprehensive understanding of the current status of psychological capital, competition stress coping strategies, and athletic performance among different types of high school table tennis athletes to enhance the depth and breadth of the research. Future studies should consider qualitative research involving athletes or coaches, such as conducting in-depth interviews with representative subjects, to address the limitations of quantitative research and provide a more thorough understanding of how psychological capital and competition stress coping strategies impact the athletic performance of high school table tennis players

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