The Research on the Relationship Between Psychological Capital of Chinese College Basketball Referees and Penalty Behavior

Liu Zi-ming and Xing Jin-ming
Krirk University, Thailand
Corresponding Author, E-mail: 772519002@qq.com

****

Abstract

The purpose of the research is to explore the relationship between college basketball referees and penalty behavior. The questionnaire is based on college students in Guangxi, China, and analyzed by means of mean number, standard deviation, t-test, one-way ANOVA, Pearson correlation and regression analysis. The results show that the psychological capital and penalty behavior of college basketball referees are above average; There are significant differences in different gender, basketball level, referee training experience, referee experience and referee level in psychological capital and penalty behavior; Psychological capital has a moderate positive correlation with penalty behavior; Psychological capital has a positive predictive power of 48.1% on penalty behavior.

Keywords： College Student Basketball Referee; Psychological Capital; Penalty Behavior

Introduction

Referee's psychological capital is a concept in Lucens' psychological capital theory, which refers to the positive psychological state shown by individuals in the face of challenges and pressures, including self-confidence, hope, optimism and resilience (Lunthans, 2007). Especially the psychological capital among referees (Fu Lijia, 2020), which shows a positive psychological state to improve self-confidence and complete different levels of tasks with a stable attitude when faced with challenges or stressful situations. With strong psychological capital, people can better cope with challenges and pressures, improve their work efficiency and happiness, and even perform differently in personal development and ability (Lunthans, 2007).

Basketball has been won great popularity among college students, and college basketball referees have become an important part of the referee team of college basketball games or public basketball games. (Xing Jinming, Cao Ping and Zheng Xiuli, 2011). College referees face all kinds of complicated situations and challenges in the competition, such as tense competition atmosphere, fans' interference, athletes' emotions and so on, so as to avoid making wrong decisions. When coping with the emergency of the competition, referees should confidently analyze and judge the events in the course of the game, make a quick decision, judge the game, consider multiple dimensions of the game, maintain order and resolve differences, which requires strong psychological capital (Fu Lijia, 2020). Inefficiency, carelessness, wrong decision and delayed response in these tasks may lead to ultimate stress and anxiety, leading to wrong penalty (Feltz, 2011).

* Received: December 28 2023; Revised: January 8 2024; Accepted: January 22 2024

In the field of sports psychology, research shows that psychological capital is very important to referees (Fu Lijia, 2020). JinSungLee (2005) pointed out that referees are regarded as an important group, and their psychological capital for referee performance is mostly ignored. Therefore, concepts and measurement models are needed to guide the research in this field. At present, there is little research on referees' psychological capital and penalty behavior, but the development of basketball referees' psychological capital and penalty behavior is very important for the success of competition. As the manager of basketball games, basketball referees shoulder the heavy responsibility of basketball development, and their penalty behavior is not only the key to the success or failure of basketball games, but also plays a decisive role in the development of basketball games (Luo Guocheng, 2014). Therefore, it is very important for the training process of referees and improving the performance of referees' penalty behavior to understand the relationship between psychological capital and basketball referees' penalty behavior and variables.

Research Objectives

1. What is the current situation of college basketball referees' psychological capital and penalty behavior
2. What are the differences between college basketball referees and penalty behaviors with different background variables
3. What is the correlation between psychological capital and penalty behavior of college basketball referees
4. What is the predictive power of psychological capital of college basketball referees on penalty behavior

Research Methodolog

1. Source of Data

All scales and questionnaires used in the study were distributed through the website Questionnaire star.

2. Population and Sampling

By stratified sampling, 1100 college basketball referees from 8 undergraduate colleges in Guangxi, China were surveyed by the questionnaire platform Wenjuanxing (https://www.wjx.cn/), covering basketball referees of national first-class, national second-class and national third-class. 1056 results were recovered, with a recovery rate of 96%. Eighty-one invalid samples were excluded, and 975 were valid, with an effective rate of 92.3%.

Table 1: Basic information of basketball referees Source of the data: collected from the research.

(N=975)

Index	Category	Number of samples (n)	Percentage (%)
Gender	Male	587	60.20
	Female	388	39.80
Basketball level	Competition experience at department level	371	38.05
	Competition experience at school level	283	29.03
	Competition experience at or above county and municipal levels	321	32.92
Basketball referee training experience	No training experience	250	25.64
	Training experience at school level	354	36.31
	Training experience at municipal level	186	19.08
	Training experience at or above provincial level	185	18.97
Referee experience	Competitions at department level	326	33.43
	Competitions at school level	355	36.41
	Competitions at district and municipal levels	170	17.44
	Competitions at or above provincial level	124	12.72
Referee level	None	383	39.28
	National third-class	308	31.59
	National second-class	176	18.05
	National first-class	108	11.08

3. Research tools

(1) Psycap Questionnaire

The Positive Psycap Questionnaire (PPQ) developed by Zhang Kuo, Zhang Sai and Dong Yinghong (2010) is adopted, which is divided into four dimensions: self-efficacy, resilience, hope and optimism. Likert's five-point scoring method is adopted. The Cronbach'sα coefficient of the scale is 0.850, greater than 0.7, and the load of the four factors ranges from 0.58 to 0.87, all greater than 0.5.

(2) Penalty Behavior Scale

The penalty behavior scale developed by JinSungLee (2005) and the one translated into Chinese by Fu Lijia (2020) were adopted. The cover scale has a single-

dimensional structure with 14 questions, and is scored by Likert's five points. The Cronbach'sα of the scale is 0.975, greater than 0.7, and the factor load ranges from 0.719 to 0.896, both greater than 0.5, demonstrating the of the reliability and validity of the scale.

3.Data analysis

SPSS25.0 software was used to make statistics and analysis of the obtained data, including descriptive statistics, one-way ANOVA, multiple comparisons after Least Significant Difference, Pearson correlation analysis and regression analysis.

Research Conceptual Framework

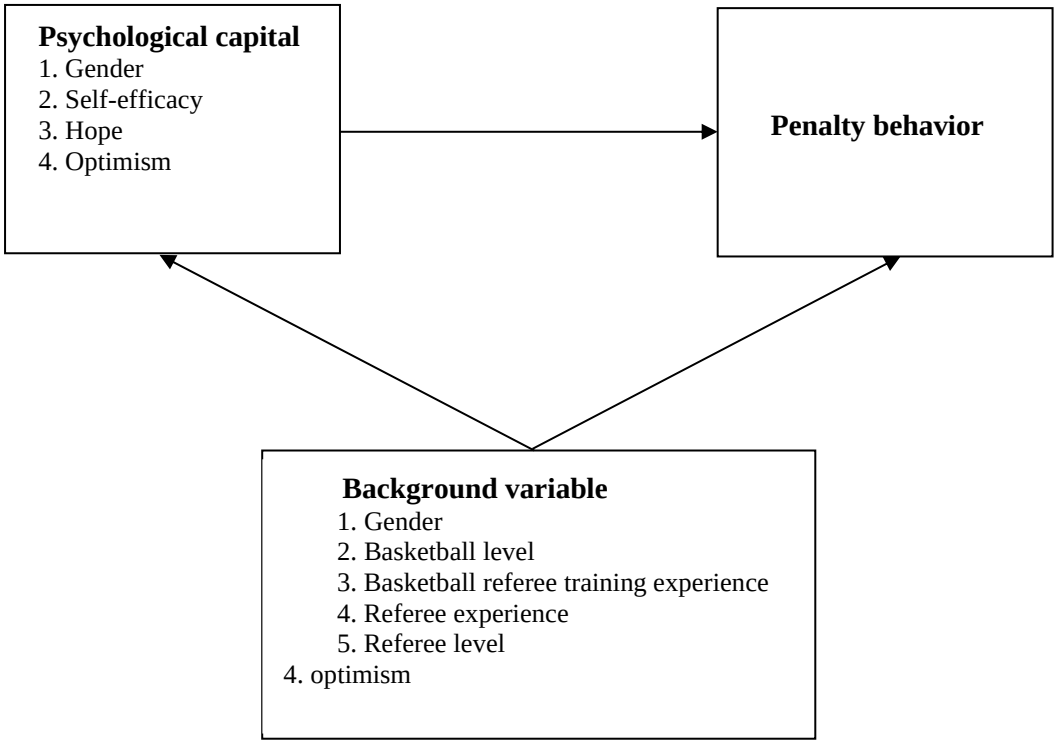

Figure 1 Research Conceptual Framework

Research Result

Because the measurement method of the research is questionnaire survey, in order to prevent the results from being biased, the common variance test is adopted first, and the results show that the maximum explanation of the factors with characteristic values greater than 1 is 37.68%, which is less than the critical standard of 40% (Podsoff, P.M., Mackenzie, Lee, & Podsoff, N.P., 2003), so there is no serious common method biases in the research.

1. Analysis of the Current Situation of Psychological Capital and Penalty Behavior

1.1 Analysis of the Current Situation of Psychological Capital

From Table 2, it can be seen that the average score of college basketball referees in psychological capital is M=3.462, which indicates that the psychological capital of the subjects is above average. Secondly, from all levels of psychological capital, the scores are: Hope (M=3.564), Optimism (M=3.489), Resilience (M=3.480) and Self-efficacy (M=3.369), which shows that the referee's self-efficacy is lower than the other three dimensions.

Table 2: Summary table of Mean Number and Standard Deviation of Each Dimension of Psychological Capital

Dimension	Number	Minimum	Maximum	Mean number	Standard deviation	Mean number ranking
Self-efficacy	975	1.00	5.00	3.369	.953	4
Resilience	975	1.00	5.00	3.480	.999	3
Hope	975	1.00	5.00	3.564	.997	1
Optimism	975	1.00	5.00	3.489	.952	2
Psychological capital	975	1.00	5.00	3.462	.914	

1.2 Analysis of the current situation of penalty behavior

As can be seen from Table 3, the analysis shows that the penalty behavior belongs to a single dimension, and the average score of college basketball referees in penalty behavior is M=3.524, indicating that the penalty behavior of college basketball referees reflects higher above average level.

Table 3: Summary Table of Mean Number and Standard Deviation of Penalty Behavior

Dimension	Number	Minimum	Maximum	Mean number	Standard deviation	Mean number ranking
Penalty behavior	975	1.00	5.00	3.524	.9.75	

2. Analysis of the differences between psychological capital and penalty behavior with different background variables

2.1 Gender

Independent sample T-test was used to analyze the relationship between psychological capital, penalty behavior and gender of college basketball referees. There were 587 valid male cases and 388 female cases, and the statistical analysis results are shown in Table 4.

(1) In terms of "psychological capital", college basketball referees of different genders (t=3.657, $p < 0.001$) show that there is a significant difference in psychological capital of college basketball referees of different genders, with males outweighing females.

(2) In the aspect of "penalty behavior", college basketball referees of different genders (t=5.116, $p < 0.001$) show that there is a significant difference in the penalty behavior of college basketball referees of different genders, with males outweighing females.

Table 4: Summary Table of T-test of Independent Samples of Psychological Capital and Penalty Behavior of College Basketball Referees of Different Genders

Detection variable	Gender	Number of people	Mean number	Standard deviation	t value	*p* value
Psychological capital	Male	587	3.54	.936	3.718***	.000
	Female	388	3.33	.836		
Penalty behavior	Male	587	3.65	.964	5.116***	.000
	Female	388	3.33	.960		

Note: *p＜0.05 **p＜0.01 ***p＜0.001.

2.2 Basketball level

The research analyzes the differences of psychological capital and penalty behavior of college basketball referees at different basketball levels, adopts one-way ANOVA, and makes multiple comparisons with LSD method afterwards, and verifies the differences of each group. The results are shown in Table 5.

(1) In terms of "psychological capital", college basketball referees with different basketball levels (F=3.240, $p< 0.05$) perform rather differently in the psychological capital. After multiple comparisons, it is found that the psychological capital of college basketball referees is the highest among those who have competed in competitions at county and municipal levels, and they perform significantly higher than those who have the experience at merely school level and department level competitions.

(2) In the aspect of "penalty behavior", there is no significant difference among college basketball referees at different basketball levels (F=2.887, p>0.05).

Table 5: Analysis Table of the Difference of Psychological Capital and Penalty Behavior among College Basketball Referees with Different Basketball Levels

Detection variable	Competition experience at department level (n=371)	Competition experience at school level (n=283)	Competition experience at or above county and municipal levels (n=321)	*F*	*p*	*LSD*
	Mean value (standard deviation)					
Psychological capital	3.375 (0.862)	2.952 (0.956)	3.556 (0.928)	3.420*	0.033	3>1 3>2
Penalty behavior	3.445 (0.976)	3.515 (0.992)	3.623 (0.953)	2.887	0.056	

Note1: *p＜0.05 **p＜0.01 ***p＜0.001.
Note2: Basketball level classification: “1” = competition experience at department level; “2” = competition experience at school level; “3” = competition experience at or above county and municipal levels

2.3 Basketball referee training experience

The research analyzes the differences in psychological capital and penalty behavior of college basketball referees with different basketball referee training experiences, adopts one-way ANOVA and LSD method to make multiple comparisons afterwards, so as to verify the differences in mean number among each group. The results are shown in Table 6.

(1) In terms of “psychological capital”, college basketball referees with different training experiences (F=13.507, $p < 0.001$) show that the current situation of “psychological capital” of college basketball referees will be significantly different due to different training experiences. After multiple comparisons, it is found that college basketball referees with “training experience at or above provincial level” perform the highest in psychological capital, and the psychological capital of those who have “training experience at or above provincial level” is obviously higher than that of those with “training experience at municipal level”, “training experience at school level” and those who didn’t get any training experience.

(2) In the aspect of “penalty behavior”, college basketball referees with different training experiences (F=9.836, $P < 0.001$) shows that the current situation of “penalty behavior” of college basketball referees will be significantly different due to different training experiences. After multiple comparisons, it is found that college basketball referees with “training experience at or above the provincial level” perform the highest in the penalty behavior, and their penalty behavior is clearly higher than the one of those with “training experience at municipal level” and “school level”, as well as those with “no training experience”.

Table 6: Analysis Table of Psychological Capital and Penalty Behavior of College Basketball Trainers with Different Basketball Referee Training Experiences

Detection variable	No training experience (n=250)	Training experience at school level (n=354)	Training experience at municipal level (n=186)	Training experience at or above provincial level (n=185)	*F*	*p*	*LSD*
	Mean value (standard deviation)						
Psychological capital	3.182(0.873)	3.503(0.875)	3.522(0.906)	3.702(0.960)	13.507***	0.000	4>1 4>2 4>3
Penalty behavior	3.271(0.998)	3.603(0.925)	3.494(1.007)	3.744(0.934)	9.836***	0.000	4>1 4>2 4>3

Note1: *p＜0.05 **p＜0.01 ***p＜0.001.

Note 2: Classification of basketball training experience: “1” = no training experience; “2” = training experience at school level; “3” = training experience at municipal level; “4” = training experience at or above provincial level.

2.4 Referee experience

The research analyzes the differences in psychological capital and penalty behavior of college basketball referees with different referee experiences, uses one-way ANOVA and adopts LSD method to make multiple comparisons afterwards to verify the differences in mean number among each group. The results are shown in Table 7.

(1) On the whole, the psychological capital of college basketball referees with different referee experience (F=24.674, $p < 0.001$) shows a significant difference, indicating that the current situation of college basketball referees’ psychological capital will be significantly different due to distinct referee experience. After multiple comparisons afterwards, it is found that the psychological capital of college basketball referees who gain “the referee experience in competitions above the provincial level” is the highest, while the psychological capital of those with “referee experience in competitions at district and municipal levels” is significantly higher than that of college basketball referees who have merely “referee experience in competitions at school level” and “department level”.

(2) On the whole, the penalty behavior of college basketball referees with different referee experiences (F=19.467, $p < 0.001$) shows significant differences, indicating that the current situation of the penalty behaviors of college basketball referees will be significantly different due to different referee experiences. After multiple comparisons afterwards, it is found that college basketball referees who gain “the referee experience in competitions above the provincial level” have the highest penalty behavior, while the penalty behavior of those who have “referee experience in competitions at district and municipal levels” is significantly higher than those who have merely “referee experience in competitions at school level” and “department level”.

Table 7: Analysis Table of Psychological Capital and Penalty Behavior of College Basketball Referees with Different Referee Experience

Detection variable	Competitions at department level (*n*=326)	Competitions at school level (*n*=355)	Competitions at district and municipal levels(*n*=170)	Competitions at or above provincial level (*n*=124)	*F*	*p*	*LSD*
	Mean value (standard deviation)						
Psychological capital	3.169(0.855)	3.472 (0.919)	3.726(0.821)	3.841 (0.925)	24.674***	0.000	4>1 4>2 4>3
Penalty behavior	3.238(0.973)	3.546(0.994)	3.768(0.870)	3.879(0.844)	19.467***	0.000	4>1 4>2 4>3

Note:1 *p＜0.05 **p＜0.01 ***p＜0.001.

Note 2: Classification of referee experience: “1” = competitions at department level; “2” = competitions at school level; “3” = competitions at district and municipal; “4” = competitions at or above provincial level

2.5 Referee level

The research analyzes the differences in psychological capital and penalty behavior of college basketball referees with different referee levels, and uses one-way ANOVA and LSD method to make multiple comparisons afterwards to verify the differences in mean number among the groups. The results are shown in Table 8.

(1) In the aspect of “psychological capital”, the psychological capital of college basketball referees with different referee grades is significantly different ($f = 39.050$, $p < 0.001$), indicating that the overall situation of “psychological capital” of college basketball referees will be significantly different due to different referee levels. After multiple comparisons afterwards, it is found that the psychological capital of college basketball referees who have the “national first-class” certificate is the highest, while those who have the “national second-class” certificate perform significantly higher in psychological capital than those who have “national third-class” certificate or those who don’t even get one.

(2) In the aspect of “penalty behavior”, there is a significant difference in the penalty behavior of college basketball referees with different referee levels ($F=35.626$, $p < 0.001$), indicating that the overall situation of “penalty behavior” of college basketball referees will be significantly different due to different referee levels. After multiple comparisons afterwards, it is found that the college basketball referees who have the “national first-class” certificate have the highest penalty behavior, while those who have the “national second-class” certificate perform significantly higher in psychological capital than those who have “national third-class” certificate or those who don’t even get one.

Table 8: Analysis Table of Psychological Capital and Penalty Behavior of College Basketball Referees with Different Referee Levels

Detection variable	None (*n*=383)	National third-class (*n*=308)	National second-class (*n*=176)	National first-class (*n*=108)	*F*	*p*	*LSD*
	Mean value (standard deviation)						
Psychological capital	3.128(0.904)	3.534(0.877)	3.744(0.809)	3.982 (0.767)	39.050***	0.000	4>1 4>2 4>3
Penalty behavior	3.212(0.999)	3.523(0.994)	3.851(0.847)	4.099(0.714)	35.626***	0.000	4>1 4>2 4>3

Note1: *p＜0.05 **p＜0.01 ***p＜0.001.
Note 2: Classification of referee levels: “1” = none; “2” = national third-class; “3” = national second-class; “4” = national first-class

3. Correlation analysis between psychological capital and penalty behavior

Pearson correlation analysis is used to test the correlation between “psychological capital” and “penalty behavior” of college basketball referees, as shown in Table 9.

Table 9: Summary table of correlation analysis between psychological capital and penalty behavior

Variable	Psychological capital	Penalty behavior
Psychological capital	1	
Penalty behavior	.679**	1

Note：**p<0.01

From Table 9, it can be seen that the psychological capital of college basketball referees is positively correlated with the penalty behavior (r=.679, P <0.01), which is to say, the higher the psychological capital is, the more stable the psychological factors are and the higher the penalty behavior would be.

4. Regression Analysis of Psychological Capital and Penalty Behavior

Psychological capital can significantly positively affect the penalty behavior (β=0.626, p<0.001), and the variation of the explanation for the penalty behavior is 48.1%, which indicates that the higher the level of psychological capital of college students is, the higher the level of their penalty behavior would be. On the contrary, the lower the level of psychological capital is, the lower the level of their penalty behavior would be. Apparently, it can be seen that the psychological capital of college basketball referees has a significant influence on the penalty behavior.

Table 10: Regression analysis table of psychological capital's dimensions and penalty behavior

Variable	Penalty behavior		VIF
	β	*t*	
Gender	-0.081	-3.482**	1.019
Basketball level	0.010	0.444	1.047
Basketball referee training experience	-0.132	-3.393**	2.854
Referee experience	0.043	1.051	3.186
Referee level	0.170	4.407***	2.705
Psychological capital	0.626	25.349***	1.146
R^2	0.484		
After adjustment R^2	0.481		
F value	151.509***		

Note1: *p＜0.05 **p＜0.01 ***p＜0.001.

Discussion

1. Discussion on the Current Situation and Differences of Psychological Capital and Penalty Behavior of College Basketball Referees

The psychological capital and penalty behavior of college basketball referees are, higher than the median value of 3, which turns out to be higher above average level.

In addition, the differences of psychological capital and penalty behavior of college basketball referees are analyzed through different background variables (gender, basketball level, basketball referee training experience, referee experience and referee level).

In terms of gender, the psychological capital and penalty behavior of male college basketball referees are significantly higher than those of women, which is consistent with the conclusion of Fu lijia (2019) and Shan Zifei (2022).

In terms of basketball level, the research found no difference in penalty behavior, which is inconsistent with the research results of Li Chao (2020). However, there are differences in psychological capital. The higher the basketball level of college basketball referees, the higher their psychological capital, which is consistent with the research of Vicente Romo-Perez (2023).

In terms of basketball referee training experience, the research found that the higher the level of basketball referee training, the higher the psychological capital and penalty behavior, which is consistent with the research of Ju Fujin (2008), Wang Tianyang (2020) and Shan Zifei (2022).

In terms of referee experience, the research found that the higher the level of competitions which college basketball students refereed, the higher their psychological capital and penalty behavior. The result is consistent with that of Fu Lijia (2019) and Shan Zifei (2022).

In terms of referee level, the research found that the higher the referee level of college basketball referees, the higher their psychological capital and penalty behavior, which is consistent with that of Fu Lijia (2019), Wang Qiulin (2021) and Shan Zifei (2022).

2. Discussion on the influence of psychological capital of college basketball referees on penalty behavior

The research found that the psychological capital of college basketball referees has a positive influence on the penalty behavior, that is, the higher the psychological capital of basketball referees, the higher their penalty behavior level, which is consistent with the previous research results of Fu Lijia (2016), Shan Zifei (2022), Aydin Karacam (2023) and Eran Sabag (2023).

Research Conclusion

The research draws the following conclusions: the psychological capital and penalty behavior of college basketball referees are above average. Among the significant differences , (1) males referees perform higher than females in terms of different genders; (2) referees with competition experience at or above county and municipal level possess higher significance in terms of different levels of basketball; (3) referees with training experience at or above provincial level, too, display higher significance in terms of different referee training experiences; (4) those who have referee experience in competitions at or above provincial level show higher significance in terms of different refereeing experiences; (5) and those who acquire a national first-class certificate show a higher level of significance in terms of different referee levels. There is a significant positive correlation between the psychological capital of college basketball referees and the penalty behavior. Thus, it can be concluded that the psychological capital of college basketball referees can significantly predict their penalty behavior, and the psychological capital has a positive predictive power of 48.1% on penalty behavior.

Research Suggestions

According to the results of this study, we put forward two suggestions.

(1) The research discussed the relationship between the psychological capital of college basketball referees and their penalty behavior, and it carried out a study on the different variables that would affect the psychological capital of basketball referees. It would be helpful to the related research on this field.

(2) In the process of training college basketball referees, training their psychological capital is helpful to improve the accuracy of their decisions.

References

Baron,R.M.,&Kenny,D.A.(1986).The moderator–mediator variable distinction in social psychological research: *conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology*. 51 (6), 1173-1182.

Barratt,J.M.&Duran,F.(2021).Does psychological capital and social support impact engagement and burnout in online distance learning students. *The Internet and Higher Education.* 51 (3), 100821.

Cohen, L. H., Towbes, L. C., & Flocco, R. (1988). Effects of induced mood on self-reported life events and perceived and received social support. *J Pers Soc Psychol*. 55 (4), 669-674.

Comrey, A. (1973). *A First Course on Factor Analysis*. London: Academic Press.

Eberhart, S. W., & Keith, T. Z. (1989). Self-concept and locus of control: Are they causally related in secondary students. *Journal of Psychoeducational Assessment*. 7 (1), 14-30.

Ellis, B. J., Boyce, W. T., Belsky, J., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2011). Differential susceptibility to the environment: *An evolutionary neurodevelopmental theory. Development and Psychopathology*. 23 (1), 7-28.

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Kellogg Graduate School of Management, Northwestern University*. 18 (3), 382-388.

From, L., Olesen, M. H., & Thomsen, D. K. (2020). Elite athletes are higher on Grit than a comparison sample of non-athletes. *Scandinavian Journal of Sport and Exercise Psychology*. 2 (1), 2-7.

Fu Lijia (2019). *The Influence of Psychological Capital of Football Referees in China on Penalty Behavior*. Northeast Electric Power University.

Ju Fujin (2008). Teaching practice of the cultivation of basketball referee ability for university Student. *Shandong Sports Science Technology*,03, 82-83

Lei,F.,Chung,E.,&Eng, L.S.(2022).Factors Affecting Mental Health Among Chinese College Students: A Preliminary Review of Literature. *Journal of Cognitive Sciences and Human Development*. 8 (1), 175-185.

Luthans,F.,& Youssef, C. M. . (2007). Human, social, and now positive psychological capital management. *Organizational Dynamics*. 33 (2), 143-160.

Shan Zifei (2022). *Research on the Ability Training of Basketball Referees of College Students Majoring in Physical Education in Jiangsu Provinc*. China University of Mining and Technology

Sports Competition Referee Practice to Enhance Physical Accomplishment———Taking Beijing Polytechnic College as an Example.*Journal of beijing polytechnic college*. (04)59-62.

Vicente Romo-Perez (2023). Adapting the Emotion Regulation Scale for Athletes for Use with Referees and Examining Its Psychometric Properties. *Akdeniz Spor Bilimleri Dergisi*. 6 (4),1167-1177

Wang Hao (2021). *Research on the Role Conflict and Adjustment of Basketball Referees on the Spot*.Hunan University Of Technology.

Wang Tianyang (2020). An Empirical Study on Multi-target Visual Tracking of Different Levels of Basketball Referees. *Journal of Tianjin University of Spor*. (06), 703-707.

Xing Jinming, Cao Ping and Zheng Xiuli (2011). Analysis and Countermeasures of the Training to College Students Basketball Referees . *Journal of Jilin Institute of Physical Education*. 27 (001),121-122.