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Studying the Varying Impact of Working Memory, Attention and Pressure on Sports Performance in Presence of Physical Fitness: An Empirical Study

Jingchao Hu[1], Li Wang[2]

Abstract

The main aim of this study is to critically evaluate the influence of pressure, working memory and attention on the overall sports performance in the context of the sports sector in China. To fulfill that aim, game or job pressure is studied as an independent variable, sports performance as a dependent variable, while working memory capacity, working memory control and attention act as mediators within this research study. Authentic and first-hand sources of data collection were used for the purposes of this study wherein different online surveys were conducted to study the performance of Chinese athletes. For this purpose, relevant respondents i.e. athletes, coaches, management and related experienced stakeholders were considered for accurate data collection. After this, the confirmatory factor analysis and the structural equation modeling based authentic statistical tests have been performed whose outcomes justified the proposed hypothesis of this research. According to the SEM-based authentic outcomes, the game/ job pressure caused a negative significant impact on working memory capacity, working memory control, attention, and the overall sports performance of Chinese athletes. While, the mediators i.e. working memory capacity, working memory control and attention caused a positive significant impact on the sports performance within the context of this study. Overall, it's an important source of information for the Chinese sports community, their coaches, trainers, decision-makers and other related ones to utilize its authentic data in their upcoming sports-related activities. Also, upcoming scholars can utilize this authentic data in their own research studies. This research also carries some contextual, theoretical, and methodological gaps that can be overcome by future researchers and scholars.

Keywords: game/ job pressure, working memory capacity, working memory control, attention; sports performance

Introduction

In the current era, only high-quality games can succeed in China with gamers expressing a preference over certain genres and types of games (Lin & Zhao, 2020; Songhe, 2018; W. Wang, Shang, & Li, 2019). Within the Chinese context, sports have been long associated with the Martial Arts, but now, there are a variety of competitive sports that have been played within China (i.e. mainland China, Macau and Hong Kong) (L. Ma & Zhang, 2020; Zhang, Li, Song, & Li, 2019). Being a sports person, there are many external pressures that cause a major negative impact on performance level, and game pressure is one of the major factors. Pressure is known as the burden of mental or physical distress especially from illness, grief or adversity; however, from a game point of view, such constant pressure caused a major impact on the confidence level of sportsman (Maher, Marchant, Morris, & Fazel, 2020; Metulini & Le Carre, 2020). For example, a situation in a soccer game where attacking players are moving forward and getting closer to scoring a goal, and the player from the opposing team is trying to stop them from scoring (Davis, Bransen, Decroos, Robberechts, & Van Haaren, 2019). According to Martin Armstrong, stress is the biggest threat to workplace health (Armstrong, 2016), as shown in Table 1 below;

Working memory is a cognitive system with a limited capacity that allows an athlete/ sportsman to temporarily hold a limited amount of data at his or her disposal for immediate mental use. Being a sportsman, such control on one's working memory played a major role in the reasoning and guidance of behavior and decision-making (Buszard & Masters, 2018). While

1 School of Physical Education, Henan Polytechnic University, Jiaozuo 454003, Henan, China
2 School of Surveying & Land Information Engineering, Henan Polytechnic University, Jiaozuo 454003, Henan, China.
Corresponding author: Li WANG, wangli29@yandex.edu.cn
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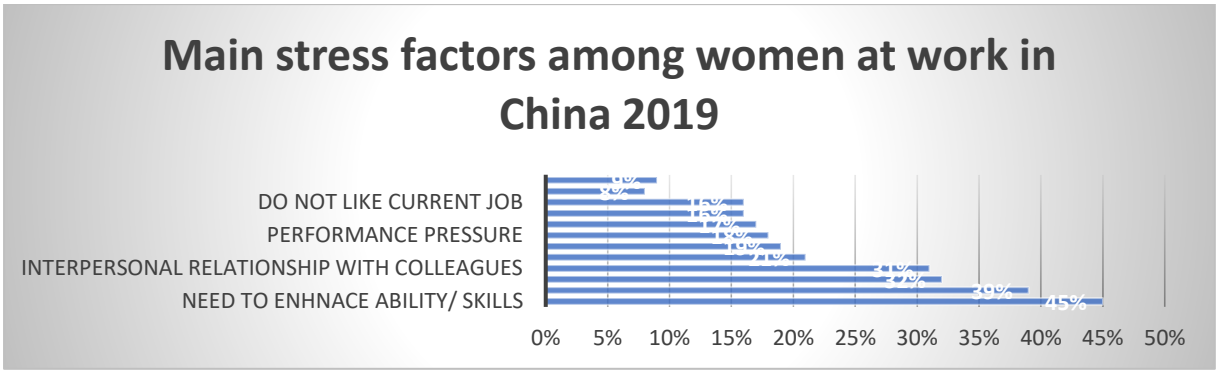
working memory capacity refers to the capacity to selectively maintain and manipulate goal-associated data without getting distracted by the data over short intervals. Such kind of capacity varies from person to person in game and job (Buszard & Masters, 2018; Ericsson, 2018; Felez-Nobrega, Hillman, Cirera, & Puig-Ribera, 2017). In this field , attention is also an essential feature to maintain the sportsman's focus on their game and make them more successful. In a literal sense, attention refers to the act of directing the human mind to use one's sense in order to learn something. It means, it is a psychological act of directing a mind to become more concentrated on a specific thing (Pan, Lyu, Liu, & Guo, 2018; Petilli et al., 2020). Physical and mental games also need proper attention and concentration of players to polish and upgrade their game level. Such a proper mindset of players to play game directly enhanced the overall performance of sports (Hongxin Li & Nauright, 2018). Within the People's Republic of China, a large number of sports activities are played i.e. badminton, basketball, football and table tennis. Athletics is one of the sports at the quadrennial National Games of China (Christophilopoulos, Bontoux, Lianaki-Dedouli, Ilieva, & Mantzanakis, 2019; Crossan, 2020; Hua Li, 2020).

Table 1

Top Workplace Hazards

Top Workplace Hazards	Percentage
Stress	70%
Bullying/ harassment	48%
Overwork	40%
Back strain	32%
Long hours of work	30%
Slips, trips, fall (level)	28%
Repetitive strain injuries	26%
Violence & threats	24%
Display screen equipment	21%
Working alone	18%



Many leading reasons caused work-related anxiety among career women in China, as shown below (Y. Ma, 2020);

Table 2: Main stress factors among women at work in China 2019

The research objective of this study is to critically evaluate the influence of game/ job pressure on the overall performance of sports under the mediating role of working memory control, working meaning capacity, and attention of athletes in the Chinese state's perspective. This is an important source of information to critically conduct an empirical study to investigate the varying influence of attention, working memory, and pressure on Chinese sports performance in the presence of physical fitness. This statement significantly covers the gaps in previous researches and provides a new direction to upcoming researches. The major research objectives of this research study are as follows;

- Critically analyze the influence of game/ job pressure on sports performance in the Chinese state's perspective.
- Critically evaluate the mediating role of working memory control within the relationship of game/ job pressure and sports performance in the Chinese context.

- Critically examine the mediating role of working memory capacity within the relationship of game/ job pressure and sports performance in the Chinese context.
- Critically study the mediating role of attention within the relationship of game/ job pressure and sports performance in the Chinese context.

When the previous research studies are critically analyzed, then it becomes clear that there is a huge gap in the literature regarding the varying impact of working memory, attention, and pressure on the overall performance of sports/games, especially in the Chinese context. Like Marius Otting and others majorly worked on analyzing professional darts by focusing on performance under the pressure in skill tasks (Ötting et al., 2020); while Polly V Peers with others developed authentic research on evaluating the dissociable impacts of attentions vs working memory training on everyday functioning and cognitive performance of a person (Peers et al., 2020). In addition to these scholars, there have been researches evaluating the impact of Wii Sports resorts on the enhancement of processing speed, attention, and working memory in moderate stroke (Unibaso-Markaida, Iraurgi, Ortiz-Marqués, Amayra, & Martínez-Rodríguez, 2019); analyzing the game related to upgrade the working memory performance and the task-relevant cordial activity (Moisala et al., 2017); considering the game-based flexibility and the attention to enhance task-switch performance: far and near transfer of cognitive training in an EEG study (Olfers & Band, 2018); summarizing the benefits of working memory capacity on the efficient attentional control under pressure (Luo, Zhang, & Wang, 2017); and justifying the impact of high arousal on cognitive performance under the role of memory, attention and decision-making process in an extreme sport (Castellà, Boned, Méndez-Ulrich, & Sanz, 2019). However, all these researchers were unable to explore the influence of game pressure, working memory control, working memory capacity, and pressure on Chinese sports performance which is covered by this authentic research. As far as its significance is concerned, it becomes clear that this is an important source of information for Chinese athletes, coaches, decision-makers and related stakeholders in the sports sector to utilize its data in their employers' training session. Also, its authentic data of research can be utilized by upcoming scholars and academics\inspect the psychological influence on players' productivity. In addition to this, its reliable and valid outcomes can be utilized by sports and Olympics decision and policymakers or even the Chinese government in their upcoming projects.

Overall, this is an authentic research study which identifies a specific the problem statement, research objectives and research gaps. Following an introduction, a section for literature review has been added to critically review previous scholars' opinions and their theoretical understanding of related topics. After this, the third section will be based on research methodology which contains information regarding research design, sampling technique, measuring scale and related analytical outcomes. The fourth section will be based on results analysis which based on the interpretation of statistical outcomes. The lstly, section will present discussions and conclusions as well as a detailed understanding regarding this research's implications as well as limitation vis-a-visfuture researches.

Literature Review

Pascual-Leone's Theory of Constructive Operators

Pascual-Leone, a developmental neuropsychologist, introduced this neo-Piagetian approach for the cognitive development theory of constructive operators. Discussing mental attention and working memory in the context of developmental growth, this process-structural theory is based on evolving both explained and prediction about the temporal unfolding behavior. Its implication is considered to be the discrete motor task's demand and the prediction of minimum age to integrate the task and also the individual differences associated with efficient task integration. In previous research, a majority of scholars utilized its theoretical understanding in order to evaluate the mental processes and attention-based performance development. Like in 2019, Marie Arsalidou and others majorly utilized this theory of constructive operators to evaluate the developmental account of mental-attentional capacity (Arsalidou, Pascual-Leone, Johnson, & Kotova, 2019). While, other related scholars utilized its authentic data to understand how to establish a scientific consensus on the cognitive benefits of physical activity of a sportsman (Nazlieva, Mavilidi, Baars, & Paas, 2020), analyze a profile of scheme activation of students based on problem-solving reviewed from the high mathematical ability (Suroso, 2018), while (Sevinç, 2019) reviewing the neo-Piagetian theory of cognitive development along with discussing this theory majorly contributes to educational and developmental psychology.

Game/ Job Pressure and Sports Performance

In 2017, Christian Swann and others considered the performance of sportsmen under pressure by exaggerating his psychological state underlying clutch productivity in sports. According to their clutch's outcomes, there are twelve major characteristics i.e. deliberate and heightened concentration, heightened awareness and intense efforts that distinguished the clutch's experience from optimal psychological states (Swann et al., 2017). While Merritt Schenk and Raymond Miltenberger assessed the numerous interventions' utility to upgrade athletic performance by using behavior measures. In their secondary source of data analyzing technique, they majorly review related research articles and concluded that there is a major influence of external behavior intervention on enhancing sports performance (Schenk & Miltenberger, 2019). In 2018, the other researchers critically evaluate the influence of emotional intelligence on overall performance in competitive sports. In their research, they conducted a systematic literature search and identified 21 studies on related topics, and concluded that there is a significant relationship between emotional intelligence and sports performance. While, the conceptualization of emotional intelligence (i.e. trait concept, ability concept or mixed-model concept), citation counts, type of publications and their data did not act as significant moderating variables, the study justified the role of emotional intelligence as a significant predictor in sports performance (Kopp & Jekauc, 2018). Sports psychology acknowledges the importance of referees in sports (Aguirre-Loaiza et al., 2020). According to these scholars, psychological characteristics were consistent towards experience and referee role, while significant differences were considered between education level and stress control. They also concluded that performance evaluation significantly caused a higher impact on postgraduate referees as compared to college one. Hence, the following hypothesis has been proposed;

H1: There is a significant relationship between Game/ Job Pressure and Sports Performance

Mediating Role of Working Memory Control between Game/ Job Pressure and Sports Performance

According to Troy A.W.Visser and others, overconfidence is mostly unrelated to working memory or attentional control. They conducted authentic research to better understand the overconfidence's origin in order to predict the individual differences in working memory, self-reported, and attentional control trait impulsivity. They concluded that there is no significant relationship between over-confidence and either attentional control or working memory, and also stated that enhanced impulsivity significantly predicted greater overconfidence (Visser et al., 2019). In 2020, Zhu Haiyan and Xu Yizhe majorly conducted research on sports performance prediction model based on the integrated learning algorithm and computing Hadoop platform. In their outcomes, a large number of simulations are performed on the Hadoop platform in order to verify the accuracy and characteristics of training skills. They concluded that spark framework directly developed a computational engine efficiency and enhanced the rain prediction models effectively by using big data and Hadoop learning (Zhu Haiyun & Xu Yizhe, 2020). The other relevant research has been conducted by Emmanuel Ducrocq and others to justify how the adaptive working memory training reduces the negative effect of anxiety on competitive motor performance. According to them, the optimum levels of attentional control are essential to prevent the athletes from experiencing any performance breakdown situation under immense pressure. They considered thirty tennis players and implemented an adaptive working memory training plan for them while measuring their working memory capacity as well as the performance and objective gauze indicators of attentional control in tennis volley task, and concluded that the significant benefits of training have been seen on working memory capacity, tennis performance and quiet eye offset in the high-pressure conditions (Ducrocq, Wilson, Smith, & Derakshan, 2017). After considering the previous scholars' point of view, the following hypothesis has been suggested;

H2: There is a significant mediating role of Working Memory Control between Game/ Job Pressure and Sports Performance

Mediating Role of Working Memory Capacity between Game/ Job Pressure and Sports Performance

According to Tahira Batool and others, there is a relationship existed between working memory capacity and the mathematical performance of the Pakistani students' sample. According to their SPSS software-based authentic outcomes, a notable difference has been seen in working memory capacity and mathematical performance due to gender, say, overall, the performance of male students of the Mathematics Performance Test was much better than the female

students' performance. While low performance in mathematics had been seen because of overloaded memory (Batool, 2019). In 2017, Tim Buszard with others majorly considered the generalizability of working-memory capacity especially in the sports domain where they stated that such capacity is directly associated with sport-related skills. They conducted a controlled experiment that sports experts possess a large working memory capacity. They worked on different kinds of players in sport and majorly focused on evaluating the causal relationship between tested variables. In the end, the study concluded that working memory capacity is directly associated with simple motor skills as compared to complex motor skills (Buszard, Masters, & Farrow, 2017). In the Journal of Experimental Child Psychology, Elisa Bisagno and Sergio Morra worked on considering the role of working memory capacity and the expertise in volleyball motor learning. They considered Pascual-Leone's theory of constructive operators (TCO) based framework to confirm that working memory capacity can be simultaneously activated through attentional resources. They assessed the practice's years and training sessions' number per week among 120 volleyball players and concluded that such capacity is the best predictor of correct motor performance, and the specific capacity threshold existed for considering each athletic gesture while experience played a significant role in the authentic gestures' precision (Bisagno & Morra, 2018). Therefore, the following hypothesis has been proposed;

H3: There is a significant mediating role of Working Memory Capacity between Game/ Job Pressure and Sports Performance

Mediating Role of Attention between Game/ Job Pressure and Sports Performance

Rim Buszard along with others conducted authentic research in which they measured the attention and working memory capacity of children in order to examine their motor learning during multiple instructions. They conducted a shooting of basketball practice for 240 trials, administered their retention test after one week of post-test, and then children were provided with five explicit instructions that were specifically associated with basketball shooting. In the end, they concluded that working memory capacity with proper attention displayed consecutive improvements from pre and post-test along with retention test, while opposite outcomes generated in the low working memory capacity group (Buszard, Farrow, et al., 2017). In 2018, E. Nicole McCluney and others evaluated the number of factors (stressors) that triggered basketball coaches in their game-related decision-making process by pressurizing (strain) them. According to their descriptive statistics, stressors caused an intense, low and moderate pressure on coaches' in-game decision-makers based on their years of experience, gender, educational level, coaching position and level of athletes coaching. They concluded that intense pressure of stressors were expectation of self, quality of preparation and importance of eventual outcomes, and the low pressure had been seen on other expectations, physical well-being and venue. While the most intense pressure occurred due to coaching position, year of experience, gender of coach and gender of athletes coaching (McCluney, McCullick, & Schempp, 2018). In the same year, Gulsum Bastug specifically investigated the attention, mental toughness and concentration characteristics of table tennis, tennis and badminton athletes by implementing the concentration endurance test to evaluate the level of attention of athletes. According to their statistical outcomes, the concentration performance was significantly diverse between the groups in which the tennis athletes were more successful in their concentration performance as compared to table tennis and badminton athletes (Bastug, 2018). Hence, the following hypothesis has been proposed;

H4: There is a significant mediating role of Attention between Game/ Job Pressure and Sports Performance.

Methodology

Research Design

In this research study, a quantitative research design was used in this research project. There are different types of quantitative research i.e. correlation, experiment and quasi-experiment, case studies and interviews (Apuke, 2017; Bloomfield & Fisher, 2019; Crane, Henriques, Husted, & Matten, 2017; Leavy, 2017). However, in this research study, the correlations research study was majorly utilized that followed a survey methodology where large samples of respondents answer a set of closed and standardized questions.

Data Collection and Sample of Study

Within this kind of quantitative research design, different kinds of data collection sources have been utilized; however, in the current research study, an online survey based research study was used (Gundry & Deterding, 2019; Morgan, 2017; Rahi, 2017). In its data collection campaign, a random sampling

technique was employed where close-ended questions were randomly distributed to selected participants of this research study who belonged to Chinese athletes, sports management and decision makers in order to gain their experience based outcomes on analyzing the influence of game/ job pressure, working memory capacity, working memory control, attention on their sports performance even within or outside the given context. Before being randomly distributed, confirmation was gained from the research supervisor and related experts on relevant variables and their measuring indicators, as included in the questionnaire. For this research survey, only 387 out of 400 gave their valid outcomes on the tested variables.

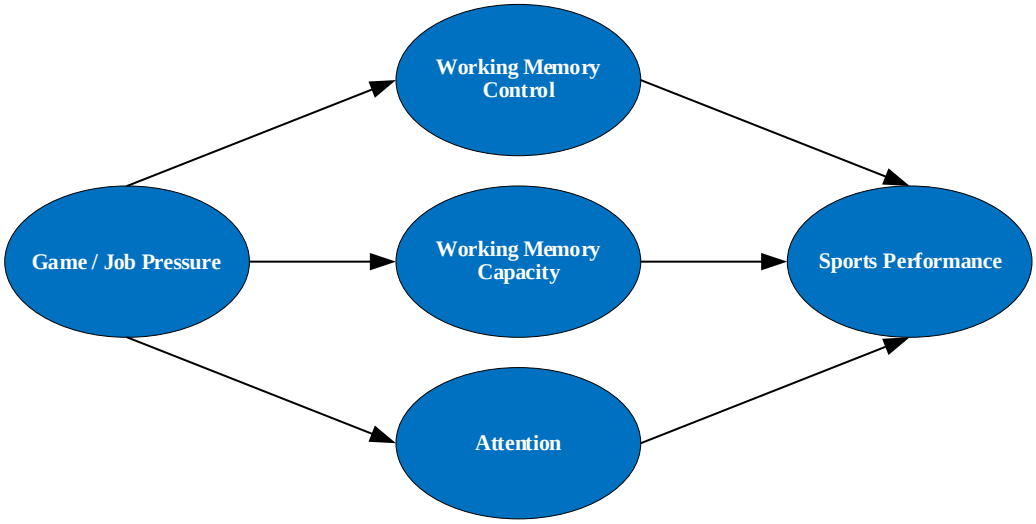


Figure 1: Underpinned Theory-based Framework

Table 3

Summarizing Table of Literature

Author and Year	Main Contribution	Gap
(Swann et al., 2017)	Deliberate and heightened concentration, heightened awareness and intense efforts distinguished the clutch's experience from optimal psychological states	Unable to generalize their findings beyond the current population of athletes Fails to explore all potentially important information related to clutch states
(Kopp & Jekauc, 2018)	Emotional intelligence acts as a significant predictor in sports performance	Lack of longitudinal designs based study and lack of advanced analyses, such as multilevel analysis to promote heterogeneity in emotional intelligence factors
(Aguirre-Loaiza et al., 2020)	Performance evaluation has a significantly higher influence on postgraduate referees than college referees	Deficiency of social factor and psychological characteristics associated to refereeing performance along with different types of referees role
(Visser et al., 2019)	No significant relationship existed between overconfidence and either attentional control or working memory	Does not yield strong conclusions about possible causal relationships between impulsivity and overconfidence

(Ducrocq et al., 2017)	Significant benefits of training have been seen on working memory capacity, tennis performance, and quiet eye offset in the high-pressure conditions	Level of difficulty did not increase during training If a pretraining pressure test has been imposed, then a stronger benefits of WM training to performance under pressure could
(Batool, 2019)	A significant relationship existed between working memory capacity and their mathematical performance of males and English medium students	Relationship of working memory capacity of a diverse population with the mathematical performance Why the school mathematics in Urdu medium participants is creating problems? Impact of working memory capacity of an elementary school on any subject's performance by utilizing experimental research design
(Buszard, Masters, et al., 2017)	Working memory capacity is directly associated with simple motor skills as compared to complex motor skills	Lack of understanding regarding how larger working-memory capacity facilitates the attainment of sport expertise.
(Bisagno & Morra, 2018)	Working memory capacity is the best predictor of correct motor performance and athletic gesture	Improper sample size Lack of role of memory capacity and expertise in other sports with different characteristics Need to implement executive functions, emotion regulation, and attentional style-based sports performance predictors.
(McCluney et al., 2018)	Expectations of Self, Quality of Preparation, and Importance of Eventual Outcome imposed intense pressure on basketball coach. Physical Well-Being, Venue and Others' Expectations imposed lesser pressure.	Lack of exclusion of coaches in other sports
(Buszard, Farrow, et al., 2017)	Working memory capacity with proper attention displayed consecutive improvements from pre and post-test along with retention test	Need to research on individual differences in cognitive variables i.e. working memory capacity and attention, during practical assessment of motor skill acquisition
(Bastug, 2018)	Tennis athletes have higher concentration performance as compared to table tennis and badminton athletes	Need to focus on different variables i.e. nutrition, sleep and fatigue.

Measures

In order to measure the significant performance of the tested variables, the authentic subscale and related

indicators were utilized in informative and relevant questionnaire development. Within this research study, Game/ Job Pressure acted as an independent variable, Sports Performance was considered as a major dependent variable, while Working Memory Control, Working Memory Capacity and Attention have participated as mediators. The five points Likert scale was used in order to significantly measure the tested variables' outcome.

Game/ Job Pressure

The game/ job performance was measured through four types of work-related pressures with four per subscale (16 items) that was initially utilized by (Pelletier, Séguin-Lévesque, & Legault, 2002; Taylor, Ntoumanis, & Standage, 2008). The first subscale measured the perceived time constraints associated with physical education lessons. The second and third subscales measured the pressures stemming from authorities and colleagues, and the final subscale assessed the amount of pressure trainer felt based on the athletes' performance.

Sports Performance

Sport performance was measured on the basis of testing indicators of (Verner-Filion, Vallerand, Amiot, & Mocanu, 2017), such as, evaluating the performance of Chinese athletes on a scale ranging from 0 (very poor performance) to 100 (outstanding performance). Such similar performance scale based measuring indicators were initially utilized by (Vallerand et al., 2008).

Working Memory Control

Working memory control-based mediating variable was assessed through a working memory questionnaire developed by (Vallat-Azouvi, Pradat-Diehl, & Azouvi, 2012) by focusing its last ten questions (21-30). (For example, if a character in a test is designated in diverse way, do you have difficulty in understanding the game strategy? tc).

Working Memory Capacity

(Vallat-Azouvi et al., 2012) based measuring indicators of working memory capacity was also utilized for this mediating variable. For that aim, question 1-question 10 of working memory questionnaire of this authentic were used. (For example, do you feel that you tire quickly during the day practice? etc).

Attention

Attention-based mediating variable was measured using the working memory attention-oriented measuring indicators of (Vallat-Azouvi et al., 2012) from their questions from 11 to 20. (For example. do you need to re-read the trainer instructions many times to understand simple information? etc).

Demographic Statistics

	N	Min	Max	Mean	SD	Skewness
GamePres	387	1.00	5.00	2.9057	1.24980	.399
WMCont	387	1.00	5.00	3.3274	.93083	-.511
WMCapc	387	1.00	5.00	3.5421	1.14707	-.600
Atten	387	1.00	5.00	3.4491	1.13880	-.554
SportPerf	387	1.00	5.00	3.5573	1.14435	-.403

After conducting an authentic research survey from the Chinese athletes, management, coaches and related bodies, it becomes clear that majority of them belonged to the male gender as compared to the female. The frequency of males was 214 (55.3%) and only 173 were females (45%). As far as their age-based demographic analysis is concerned, it becomes clear that the overall percentage of respondents who were less than 25 years old was 32%, while 40% individuals were from 25 to 35 years old, 24% were from 35 to 45 years old and only 4% individuals were more than 45 years old. Lastly, the experience-based demographic analysis depicted that 14% of participants had less than two years of experience on the related game field, while 43% had 2 to 5 years' experience, 34% had 5 to 8 years' experience and only 10% of them had more than 8 years' experience. This demographic analysis depicted that majority of active respondents were young adults with 2-7 years' experienced male in this field.

Data Analysis

In order to justify the relationship between the independent, mediator and dependent variable, the PLS-based confirmatory factor analysis and structural equation modeling based authentic statistical tests were implemented, whose related outcomes are clearly interpreted in the following section. Within this testing model, the other related tests were also
implemented like KMO and Bartlett's Test, Rotated Component Matrix, Total Variance and Convergent and Discriminant Validity, to evaluate whether either tested variables were within their threshold range or

not (Baistaman, Awang, Afthanorhan, & Rahim, 2020; Savalei & Bentler, 2010; Thompson, 1997).

Results and Analysis

Table 4: Descriptive Statistics and Normality

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.950
Bartlett's Test of Sphericity	Approx. Chi-Square	18662.637
	df	666
	Sig.	.000

In this table of descriptive statistics, the values of minimum and maximum statistics confirm that there are no outliers in the data as they lie within 1 and 5 ranges of the 5 type Likert. The standard deviation values depicted that WMCont value has least deviated from its mean position which shows its immense impact on the dependent variable SportPerf which is 1.144 times deviated from mean position. While, the GamePres value has highly deviated from its mean, showing its insignificant impact on the dependent variable. KMO and Bartlett's Test majorly worked on exploring the suitability of the statistical for efficient structure detection. Its Kaiser-Meyer-Olkin measures of sampling adequacy are used to indicate the proportion of variance in variables that might be caused by underlying factors (Center, 2018; Napitupulu, Kadar, & Jati, 2017). Its outcomes are mentioned below;

Table 5: KMO and Bartlett's Test

The results for KMO and Bartlett's Test are given in the above table. The purpose of which is to confirm that the sample size of data is accurate and the value lies between the threshold range of 0.8 and 1. The result of KMO testing shows a value of .950, which is adequate. The rotated component matrix is referred to as loading of the key output of the principle components analysis that also helped to understand the correlation between each variable (Deutsch & He, 2017; G. Wang, Wang, Fan, & Pan, 2017). Its outcomes are mentioned below;

Table 6: Rotated Component Matrix

	Component				
	1	**2**	**3**	**4**	**5**
GP1				.851	
GP2				.840	
GP3				.842	
GP4				.841	
CO1			.785		
CO2			.714		
CO3			.734		
CO4			.828		
CO5			.733		
CO6			.747		
CO7			.789		
CO8			.832		
CO9			.858		
CO10			.856		
CA1	.846				
CA2	.786				
CA3	.804				
CA4	.837				
CA5	.828				
CA6	.809				
CA7	.855				
CA8	.858				
CA9	.868				

	Component				
	1	2	3	4	5
CA10	.870				
AT1		.708			
AT2		.743			
AT3		.726			
AT4		.780			
AT5		.866			
AT6		.885			
AT7		.901			
AT8		.883			
AT9		.883			
AT10		.884			
SP1					.796
SP2					.795
SP3					.785

The above table depicts the results for the rooted component matrix, which is a part of CFA. All the components carry factor loading greater than 0.7 showing that there is no issue of cross-loading and each variable is effectively loaded.

Table 7: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	18.238	49.292	49.292	18.238	49.292	49.292
2	4.198	11.347	60.639			
3	3.340	9.027	69.666			
4	2.258	6.104	75.769			
5	1.464	3.958	79.727			

According to the total variance explained in Table 7 above, the percentage of variance and cumulative percentage of game/job pressure is 49.3%. While, in Work Memory Control, the percentage of variance is 11.3% and the cumulative percentage is 60.6%. In Work Memory Capacity, the percentage of variance is 9.0% and the cumulative percentage is 69.6%. While in Attention, the percentage of variance is 6.1% and 75.7% cumulative percentage, and in Sports Performance, the percentage of variance is only 3.9% and a cumulative percentage is 79.7%. This shows that the overall game/job pressure values show a moderate variance percentage.

Table 8: Convergent and Discriminant Validity

	CR	AVE	MSV	GP	CO	CA	AT	SP
GP	0.938	0.792	0.246	0.890				
CO	0.950	0.659	0.305	-0.412	0.812			
CA	0.929	0.821	0.353	-0.496	0.494	0.906		
AT	0.914	0.789	0.353	-0.474	0.466	0.594	0.888	
SP	0.893	0.737	0.305	-0.444	0.552	0.530	0.449	0.858

In Table 8, convergent and discriminant validity. CR, AVE, and MSV are indicators for convergent validity and they are all within their thresholds i.e., CR and AVE are above 0.7 and 0.5, respectively, and the values of MSV are lesser than AVE. Results, therefore, show that there is no convergent validity issue and no discriminant validity issue has been seen in the data.

Table 9: Model Fit Indices

Fit Index	Recommended Score	Observed Score	Interpretation
CMIN/DF	≤ 3.0; 5.0	2.703	Excellent
GFI	≥ 0.80	0.811	Excellent
IFI	≥0.90	0.945	Excellent
TLI	≥ 0.90	0.940	Excellent
CFI	≥ 0.90	0.946	Excellent
RMSEA	≤ 0.08	0.066	Excellent

CFA (confirmatory factory analysis) is a unique type of examination used to calculate how well the uniform elements show the number of contrives (Eaton & Willoughby, 2018; Marsh, Guo, Dicke, Parker, & Craven, 2020; Mohammadfam, Soltanzadeh, Moghimbeigi, & Akbarzadeh, 2017; Shau, 2017). In Table 9 of model fit indices, the value of CMIN/ DF is 2.703, lower than standard 3, while, on the other side, GFI value is greater than 0.80 with 0.811 value outcomes. Well, both values of IFI and CFI show the same outcomes 0.945 which is more than 0.90 value. Also, its RMSEA value is 0.066, lower than 0.08, which depicted that all these indicators lie within their defined thresholds, proving that the selected research model is a good fit. The figure below shows the contribution of each factor in the model.

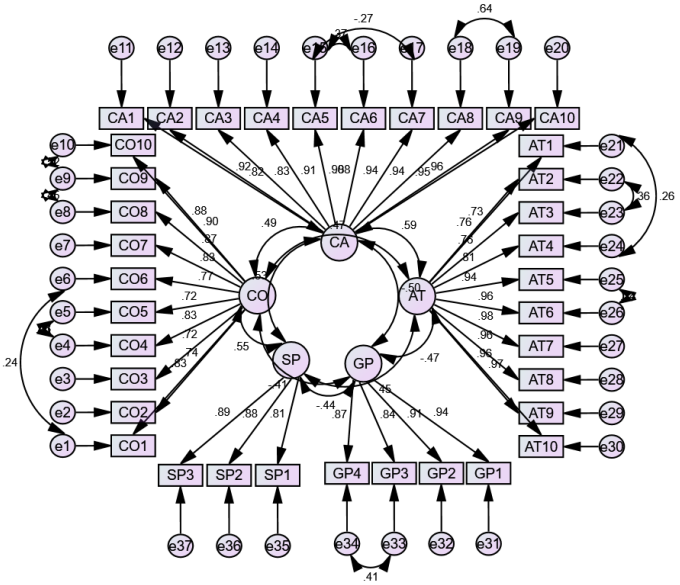


Figure 2: CFA

Figure 2 above shows that all the variables are equally uploaded in this model. Now we used the structural equation modeling for the theoretical analysis. The structural equation modeling is to examine the structural associations of the measured elements and inactive form (Hayes, Montoya, & Rockwood, 2017; Mueller & Hancock, 2018; Ringle, Sarstedt, Mitchell, & Gudergan, 2020; Sarstedt, Ringle, & Hair, 2017). A tabular representation of these values is provided below;

Table 10: Structural Equation Modeling

	Path		Estimate	S.E.	C.R.	P
WMCont	<---	GamePres	-.385	.035	-8.191	***
WMCapc	<---	GamePres	-.486	.041	-10.927	***
Atten	<---	GamePres	-.467	.041	-10.364	***
SportPerf	<---	GamePres	-.154	.049	-2.779	.005
SportPerf	<---	WMCont	.318	.054	7.008	***
SportPerf	<---	WMCapc	.236	.046	4.921	***
SportPerf	<---	Atten	.095	.046	2.009	.045
Indirect Effect			-.281	0.053	-	0.010

According to the above structural equation modeling based statistical outcomes, it becomes clear that there is a direct relationship among the tested independent, mediating, and independent variables. The effect of Game/ Job Pressure on the mediating variables (i.e. Work Memory Control, Work Memory Capacity and Attention) shows the significant negative outcome like one percent change in game/ job pressure negatively caused 39% change in WMCont, 49% change in WMCapc, and 47% change in Atten. Also, the effect of Game/ Job Pressure on Sports Performance shows the .005 significant value with -15.4% influence. After this, the dependent variable, SportPerf, shows 24% deviation because of WMCont, 24% change due to WMCapac, and only 9.5% due to Atten. These results have been graphically represented in the following figure;

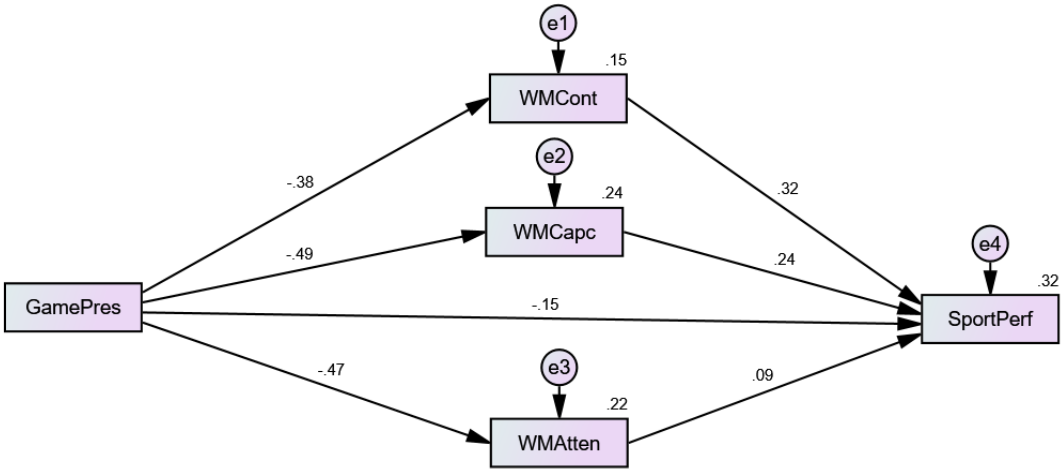


Figure 3: SEM

Discussion and Conclusion

Discussion

According to these statistical outcomes, it becomes clear that there is a negative significant influence of Games/Job Pressure on the Working Memory Control, Attention & Working Memory Capacity and Sports Performance. This shows that if higher pressure is imposed from outside sources then overall psychological performance and productivity of sportsmen and athletes was affected. In the Chinese context, the game/job pressure directly affects the sport's performance in any field of sports. This argument has already been justified by Haiyun and Yizhe in their research journal that in the Hadoop cloud computing platform, the significant relationship based outcomes existed between games/job pressure and sports performance in a piece learning program that is a model of cloud-based data accumulation. By Hadoop cloud computing platform, this model is acceptable for cloud computing with many data types though which, many inferences were taken under various other scenarios to justify that imposed external game pressure caused a negative impact on the overall performance of a person (Z Haiyun & X Yizhe, 2020).

To reduce the games/job pressure and enhance brain function and sports performance, many exercises have been taken, in particular, the confirmed trail developed by other researchers to explain the difference between machine-based and free-weight training with consideration to their performance to severely increase cognitive performance. This examination shows that there is an effective reflection of games/job pressure on sports performance as well as with working memory control, capacity, and attention (Stricker, Usedly, & Wilke, 2020). Also, Alesandra Gruszka and Edward Necka explored the limitations of working memory capacity and controlling with the perspective of cognitive psychology and the natural limitations of human cognition. According to them, such an efficient working memory of a person negatively affected by the massive external pressure and complex cognitive activities on it (Gruszka & Nęcka, 2017). According to Benjamin Siart along with others, the overall performance of the athlete was majorly affected by external stress factors. They stated that performance was negatively correlated with the rise in testosterone concentration and less affected by the status (Siart, Nimmerichter, Vidotto, & Wallner, 2017).

According to its statistical outcomes, the majority of Chinese athletes confirmed that their working memory control, attention and working memory capacity caused a significant positive influence on overall their sports performance because these factors directly increased their confidence. This statement was also confirmed by previous researcher's in their research study on how physical activity and working memory caused a positive influence on the enhancement of cognitive performance based motor skills among preschool children (Zeng et al., 2017). In this situation, the attention factor played a major role to sustain the efficient performance of a person. A similar research conducted by Nash Unsworth and Matthew K. Robison in the same year to examine the relationship between working memory capacity and attention control and provide evidence of linking moment-to-moment fluctuation in arousal to the individual difference in attention control and working memory capacity (Unsworth & Robison, 2017). According to Rabecca Lewthwaite and Gabriele Wulf, positive outcomes have been generated on the overall performance and learning of motor due to efficient motivation and attention. They studied the conditions needed to support performer autonomy benefits motor learning and performance in which the attentional focus and motivation directly contributed to the goal-action coupling and connectivity (Lewthwaite & Wulf, 2017). Also, the arousal reappraisal from the authority towards employees performance promoted the adaptive stress responses, their self-confidence and perceptions of resources (Sammy et al., 2017).

Conclusion

Thus, after critically evaluating the confirmatory factor analysis and structural equation modeling based statistical outcomes, it becomes clear that the game/job pressure caused a significant negative impact on the dependent variable (i.e. sports performance) and mediators (i.e. as working memory control, working memory capacity, and attention), while, working memory control, working capacity and attention caused a positive significant influence on the sports performance. In its methodology portion, an online survey-based quantitative research was considered to collect the authentic and related data from the Chinese athletes and related bodies. After executing an authentic research design, the major hypotheses of this research study has been confirmed that there is a significant negative relationship existed between game/ job pressure and sports performance, while there is a significant mediating role of working memory control, working memory capacity, and attention within the relationship of game/ job pressure and sports performance. These hypotheses based arguments have already been justified by previous scholars in their research journals that further enhanced the authenticity of its outcomes. In the Chinese context, it becomes clear that a significant impact of working memory, attention, and pressure on sports performance has been seen in the presence of physical fitness. Research Implications

In terms of its research implications, it is clear that there are practical, theoretical and policy-oriented implications of this research study. Practically, its online survey quantitative data can be utilized by Chinese games' authority, decision-makers, management and related employees to understand the importance of physical and mental power with some productive and innovation strategies. They can utilize its favorable outcomes to enhance the productivity and performance of the employee with co-curricular activities. In addition to this, it can also be informative for every industry and their management to consider the influence of games/jobs pressure, sports performance, working memory capacity, working memory control, and attention on their overall performance. As far as theoretical implications are concerned, it becomes clear that these authentic research outcomes give a new direction to upcoming scholars to utilize its data in their future topic selections and hypotheses development. Also, they can utilize its related information in their literature review and discussion portion to enhance the authenticity of their outcomes. This authentic data can also be utilized by policymakers of Chinese games to make a constructive and long-lasting decision-making process. This research paper is also useful for many game institutions and their management authorities to train their players and employees to work under pressure while maintaining performance.

Limitations and Future Researches

Like most researches in this area of study, this paper also carried some limitations that future researchers can seek to overcome in their upcoming researches. In addition to its implications, some weaknesses/ deficiencies of this paper might impact the authenticity of its analysis, such as a lack of interviews or mixed methods of research to generate versatile research. If the psychological understanding of the participants was considered, then there would be more chances of

authentic and reliable research outcomes. The other limitation of this research study is based on its contextual gap as it only focuses on the Chinese Game industry and its related sportsmen's psychological behavior under a stressful environment. However, if the other Asian countries along with their game industry's productivity were considered, then there would be more chances to develop versatile and generalisable outcomes on the tested variables and their inter-relationships. There is also a lack of emotional and health affected factors' influence on the sports performance factors in a complicated environment. However, if the emotional and health-related influencing variables were in fact considered as moderators within the context of this study, potentially more authentic and valid outcomes would be generated. This lack of diversity in its methodological and analytical approach might affect its acceptability factor. Therefore, after critically evaluating its limitations, it becomes clear that there is a major opportunity for future scholars and researchers to cover its methodological and contextual gap, and derive productive and informative research analytical outcomes in their future researches.

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