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Original Research

Investigation of the Relationship between Mental Endurance and Psychological Well-Being of Male Chess Players

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Abstract

Background: The aim of this study is to examine the relationship between mental endurance and psychological well-being of male chess players. **Methods**: 87 male active licensed chess players participated in the study. Ethics committee approval was obtained for the research. Mental endurance scale, psychological well-being scale and personal information form were used to collect the research data. Confirmatory factor analysis (CFA) was performed for the research scales. In addition to descriptive statistics, correlation and regression analyzes are included in the relational model. **Results**: Considering the average values obtained from the research scales, it was found that the mental endurance and psychological well-being levels of chess players were high, and there was a positive and high level relationship between mental endurance and psychological well-being within the scope of the relational model ($r = 0.742$; $p < 0.001$), and it has been found that mental endurance has a significantly high and positive contribution on psychological well-being in sports ($\beta = 0.745$; $p < 0.001$). **Conclusions**: It can be said that as the mental endurance of chess players improves, their psychological health will also be positively affected. It can also be stated that, especially by directing the young generation to chess, their mental endurance and psychological health will be improved in a positive way.

Keywords: mental endurance; psychological well-being; chess players; men

1. Introduction

The concept of mental toughness has become a common research topic in the field of exercise and sports psychology in recent years. Since the beginning of the current century, many studies have been conducted examining the effect of mental toughness on athletic success. Despite these intensive studies, there is not enough consensus on the measurement and conceptualization of mental toughness [1].

Middleton *et al.* [2] conducted a study that included Olympic gold medalist or world champion elite athletes to reveal the basic components of mental endurance, and they stated that the concept of mental endurance consisted of multidimensional and various components (self-efficacy, potential, mental self-concept, task familiarity, value, personal bests, goal commitment, perseverance, task focus, positivity, minimizing stress and positive comparisons). According to researchers, mental endurance is walking towards a goal with unwavering determination and conviction, despite pressure or difficulties. Jones *et al.* [3], on the other hand, as a result of the research they conducted with the participation of Olympic or world champion athletes, coaches and sports psychologists, expressed the qualities required to be mentally tough as a process in the form of attitude/mentality, education, competition and post-competition. Kuan and Roy [4] specifically stated that mental endurance includes the following features: (a) self-confidence (belief that one can perform well and be successful), (b) negative energy control in achieving success (coping with negative emotions such as fear, frustration, and anger), (c) attentional control (focus and performing well), (d) visualization and imagery control (positive mental image formation), (e) motivation level (energy and desire to persevere), (f) positive energy control (fun, joy, and satisfaction), (g) attitude control (thought and perseverance, obedience habits).

Jones and Moorhouse [5] reported that mental endurance is one of the characteristics we all recognize, and upon closer examination, it is a difficult concept to define; however, they reported that we can all think of the persevering athlete. Mental endurance is a reflection of the psychological characteristics central to optimal performance [6]. According to Madrigal *et al.* [7], mental resilience refers to an internal focus and commitment to overcome these difficulties when faced with difficulties. At the same time, they stated that mental endurance is one of the most important psychological characteristics in determining success in sports.

Crust [8], Crust and Clough [9] argued that in order to measure and develop mental endurance, young athletes should be exposed to these situations gradually, instead of being protected from difficult situations in training and

competition in order to learn how to cope with challenging runs in the sportive life process. Also, as athletes mature more emotionally, they must be more and more involved in decision-making regarding their own development. Athletes should be encouraged and supported to reflect on setbacks and failures that occur as a natural part of the development process. According to them, negative experiences and the confidence-building results of achieving goals provide opportunities for personal growth and allow important lessons to be learned.

Some researchers conceptualize psychological well-being through certain components or specific processes such as the emotional process [10]. Psychological skills and psychological well-being are overlapping and interrelated concepts [11]. Ryff interprets psychological well-being as individuals' struggle to realize their potential real abilities. This model was developed and created by combining various theories of personal development and adaptive functions [10]. Ryff and Singer [12] stated that because of the biological connections of psychological well-being, living a meaningful life provides possible health benefits for those who consider their psychological health.

According to Dikkhat [13], well-being is a condition of physical, mental, passionate and social prosperity. Great wellbeing engages individuals to appreciate life and to have the chance to accomplish the objectives they have set for themselves. According to Huppert [14], psychological well-being is related to the well-being of lives. It is a combination of feeling good and functioning effectively. Sustainable well-being does not require individuals to feel good all the time; The experience of painful emotions (e.g., disappointment, failure) is a normal part of life, and being able to manage these negative or painful emotions is essential for long-term well-being. However, psychological well-being is compromised when negative emotions last excessively or for too long and interfere with a person's ability to function in their daily life. It is widely accepted that psychological characteristics have very important contributions to success in sportive performance [15]. Athletes, coaches and sports psychologists also emphasized that mental endurance is an important feature for success in sports [6].

Known for its tactical requirements, chess is one of the oldest and most popular board games with a centuries-old history [16]. In modern chess, which is seen as an intellectually challenging sport discipline that requires high logical/abstract thinking capacities [17], players experience pressure during competition or training, in some cases, adaptation of physiological and psychological functions and difficulty in energy supply, and experience a severe mental illness that may trigger some syndromes. As far as we know, the physiological and psychological lesions that occur cannot be easily described [16].

There is a positive relationship between the level of mental activity and the level of cognitive functionality [18]. It has also been proven that chess helps to improve and enhance mental functions [19]. It is an undeniable fact that chess players have mental abilities. However, having mental ability does not mean mental toughness. Mental endurance is a psychological aspect of sport that must be developed and sustained in order to be successful [20,21]. In the studies in the literature in which football, cricket, rowing, swimming athletes and Olympic champions participated, it was stated that mental performance and psychological processes are factors that affect each other and help each other's development [22–25]. Mental process is an important factor that can affect the performance of chess players. However, the effects of fatigue that may occur in mental processes on the performance of chess players are rarely investigated [26].

Chess players remain in focus for potentially very long periods of time; this could mean that mental fatigue could potentially occur. For this reason, it can be thought that the mental endurance levels of chess players are an important indicator for their psychological performance and psychological state. It is thought that the psychological state and mental performance have important consequences in or outside the sport. Based on this idea, this study aimed to examine the relationship between the mental endurance of chess players and their psychological well-being. The results of the research are thought to be a guide to chess coaches and athletes, especially families, as well as individuals who are not participants in chess sports.

2. Materials and Methods

2.1. Research Model

Relational screening models are research models that aim to determine the existence or degree of change between two or more variables [27]. Relational screening model was used in this study. The conceptual model of the study (mental endurance/psychological well-being) and the hypotheses created are presented in Fig. 1 below.

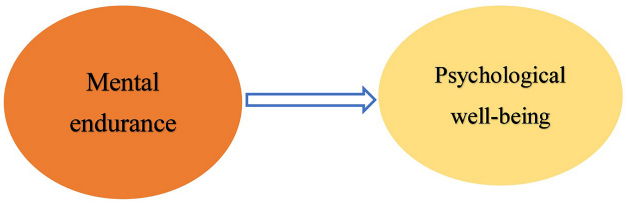

Fig. 1. Conceptual model of research. H_1: Mental endurance significantly affects psychological well-being in a positive way. H_2: Mental endurance significantly affects psychological well-being in a negative way.

2.2 Research Group

The population of the research consists of male individuals who play chess. The sample group consists of 87 male active licensed chess players who voluntarily accepted to participate in the research.

2.3 Analysis of Data

Confirmatory factor analysis (CFA) was performed for the scales used in the study. Missing values and outliers were examined. Analysis was carried out with the participation of 87 players. In addition to descriptive statistics, Pearson correlation and multiple regression analysis methods were used to test the relationships between the scales within the context of the relational model.

2.4 Data Collection Tools

Mental Endurance Scale: Madrigal *et al.* [7] stated that only elite athletes were used as samples while developing some other mental toughness scales developed in the literature, and they criticized that elite athletes were limited in representing the universe in this case. Based on this idea, they developed the mental resilience scale. The scale developed to determine the level of mental endurance in the sports environment is in the 5-point likert type. The scale consists of one dimension and 11 items.The scale was adapted to Turkish by Erdogan [28].

Psychological Well-Being Scale: It identifies important elements of human function, from positive relationships to feelings of competence to having a meaningful and purposeful life. Scale Diener *et al.* [29] developed by. The Turkish adaptation study was done by Telef [30]. The scale is 7-point likert type and consists of one dimension and 8 items.

3. Results

3.1 Confirmatory Factor Analysis (DFA)

As a result of the Confirmatory Factor Analysis (DFA) for the Mental Endurance Scale, the compliance criteria were examined and CMIN/DF (x^2/df) was found to be: 1.466, CFI was found to be: 0.967, GFI was found to be: 0.925, IFI was found to be: 0.967, AGFI was found to be: 0.880, TLI was found to be: 0.955, RMSEA was found to be: 0.062. In addition, the Cronbach's Alpha (α) value of the scale was calculated as: 0.893.

As a result of the DFA for the Psychological Well-Being Scale, the compliance criteria were examined and CMIN/DF (x^2/df) was found to be: 1.707, CFI was found to be: 0.962, GFI was found to be: 0.940, IFI was found to be: 0.963, AGFI was found to be: 0.880, TLI was found to be: 0.941, RMSEA was found to be: 0.077. In addition, the Cronbach's Alpha (α) value of the scale was calculated as: 0.855. As a result of confirmatory factor analysis, it can be said that the goodness-of-fit values obtained for both scales used in the research are within the range deemed appropriate [31–35].

3.2 Findings on Demographic Characteristics of Chess Players

The findings regarding the demographic characteristics of the chess players participating in the research are presented in Table 1 above. 87 male (100%) chess players participated in the study. Age distributions were grouped as 32 players aged 7–10 (36.8%), 34 players aged 11–14 (39.1%), and 21 players aged 15 and over (24.1%). Athletic duration groups were grouped as 46 players (52.9%) for 1–3 years, 21 players for 4–6 years (24.1), 20 players for 7 years and above (23%).

Table 1. Findings on demographic characteristics of chess players.

		N	%
Gender	Male	87	100
Age group	7–10	32	36.8
	11–14	34	39.1
	15 and older	21	24.1
Duration of being athlete	1–3 years	46	52.9
	4–6 years	21	24.1
	7 years and more	20	23.0
Total		87	100

3.3 Correlation Analysis Results

With the correlation analysis between the mental endurance scale and the psychological well-being scales, the direction of change and the relationships of these variables were examined. According to the results of the correlation analysis; A significant, positive and strong relationship ($r = 0.742$; $p < 0.001$) was found between mental endurance and psychological well-being (Table 2).

Table 2. Correlation analysis results.

N = 87	M	SD	1	2
(1) Mental endurance	4.27	0.581	-	
(2) Psychological well-being	6.13	0.779	0.742**	-

**$p < 0.001$.

3.4 Regression Analysis Results

Regression is used to predict the score of one variable from the score of other variable [36]. Table 3 shows the regression analysis between the independent variable, mental endurance, and the dependent variable, psychological well-being. Finding Durbin-Watson (D-W) values between 1.5 and 2.5 confirms that there is no multicollinearity problem between the variables. The created multiple regression model is statistically significant ($F_{(1\text{-}85)} = 106.120$;

Table 3. Regression analysis results.

Model	B	Std. Error	Beta (β)	t	p	VIF
(Constant)	1.862	0.418		4.451	0.000	
Mental endurance	0.999	0.097	0.745	10.301	0.000	1.000
R = 0.745	R^2 = 0.555	Adj. R^2 = 0.550				
$F_{(1\text{-}85)}$ = 106.120	p = 0.000	D-W = 1.758				

Dependent variable: Psychological well-being. Independent variable: Mental endurance.

$p < 0.001$). R^2 value of the model was found to be 0.555. This finding shows that the independent variable of mental endurance explains 55% of the changes in the psychological well-being dependent variable dimension. Considering the power of the independent variable in this relationship to affect the dependent variable, based on the beta indicator, there is a significant effect ($\beta = 0.745$; $p < 0.001$) has been observed. It can be said that mental endurance has a significant positive contribution to psychological well-being in sports; and a unit increase in mental endurance will increase psychological well-being by 0.74. In summary; It can be said that as the mental endurance of the players improves, their psychological state will be positively affected (Table 3) and so h_1 is supported.

4. Discussion

The aim of this research is to examine the relationship between the mental endurance of chess players and their psychological well-being. 87 male active licensed chess players participated in the study.

According to the results of the correlation analysis of the research; A significant, positive and strong relationship was found between mental endurance and psychological well-being (Table 2). According to the regression analysis finding of the study, mental endurance has a significant positive contribution to psychological well-being in sports; It was determined that a one-unit increase in mental endurance would increase psychological well-being by 0.74 (Table 3). It can be said that the figure reached is at a very good level. Considering the research results in the relevant literature, Stamp *et al.* [37] found that mental endurance components were a strong predictor of psychological well-being in their study conducted by undergraduate students from nine UK universities. Nicholls *et al.* [38] found that high mental endurance level was associated with coping strategies (mental imagery, effort, thought control, and logical analysis) to cope with more problems or approaches. Crust and Clough [39] reported that there were significant relationships between mental endurance and physical endurance. In another study in which individual and team athletes formed the sample group, it was confirmed that there were positive relationships between mental endurance and emotional intelligence [40]. It was concluded that there is a moderate and positive relationship between the mental endurance of the athletes and their self-efficacy levels [41]. It has been determined that the psychological skills of athletes have an important role in determining their mental resilience [42]. Significant relationships were found between the mental endurance levels and emotional intelligence levels of university students who do sports [43]. It has been determined that the emotional self-efficacy of the athletes is a determinant of their mental endurance [44]. It has been observed that there is a positive and significant relationship between mental endurance and courage in sports [45]. It has been found that athletes with high mental endurance may experience burnout less [46]. It has been found that mental endurance and imagination predict each other [47]. It was concluded that as the mental endurance of the athletes increased, their loneliness level decreased [48]. A positive and significant relationship was found between the emotional intelligence and mental endurance of coaches and coaches working in professional football leagues [49]. It has been observed that the mental skills used by the archers have an increasing effect on the arrow shooting scores [50]. Connaughton *et al.* [51] stated that positive and negative critical events were perceived by the participants as a catalyst in initiating or developing certain components of mental endurance. It has been found that exposure to mental fatigue negatively affects the pattern recall performance of expert chess players [26].

Pourranjbar *et al.* [52] found a positive correlation between participation in sports and psychological well-being, as a result of the research they conducted with the participation of medical faculty students. Edwards *et al.* [53] achieved participation of 60 university hockey players, 27 health club members and 111 non-sports students in the related study in which they investigated psychological well-being, sports and physical self-esteem. As a result of the research, they revealed that both hockey players and health club members are generally better psychologically and have more positive physical self-perceptions than students who do not exercise. Woods *et al.* [54] observed a trend towards the positive impact of sports-based interventions on the psychological well-being of prisoners. Malebo *et al.* [55] stated that students who actively participate in sports have significantly lower levels of negative affect, physical negative symptoms, depression symptoms and pessimistic life orientations. In the research of Campbell and Jones [56], wheelchair sports participants exhibited lower depression, anger and confusion, and higher psychological well-being and a positive well-being profile than the non-sporting group. Resilience was positively associated with

sport achievement and psychological well-being [57]. It has been determined that chess training applied to children under the protection of the state prone to crime has a positive effect on their performance and psychological well-being [58].

Weinberg *et al*. [59] regarding mental resilience characteristics, psychological skills, motivation to succeed and resilience, state that a challenging physical practice environment, creating a positive mental environment and providing learning opportunities for the development of mental toughness are the emerging themes as strategies that coaches use to train mentally tough athletes. On the other hand Edwards and Steyn [11] concluded that psychological skills training supports improvement in psychological skills, psychological well-being and sportive performance. Sports and its participants are a part of society, and the problems of sports are also thought to be a problem in society. It is thought that the studies to be carried out for the development of the mental endurance and psychological well-being of the athletes are important not only for the psychological health of the athletes, but also because of the contributions they will provide to the psychological health of the society.

5. Conclusions

As a result of the research; When the average values obtained from the research scales are examined, it has been determined that the mental endurance and psychological well-being levels of male chess players are at a high level, and there is a positive and high-level relationship between mental toughness and psychological well-being. It can be said that as the mental endurance of the athletes improves, their psychological well-being will also be positively affected. At the same time, it is thought that the research has both theoretical and practical contributions. First of all, the main theoretical contribution of the research is that mental resilience has a positive effect on psychological well-being in line with the opinions of individuals who are actively interested in chess as of today. Its practical contribution is that if chess is allowed to become widespread, the psychological health of individuals engaged in this sport will be positively affected. In other words, a high level of mental resilience predicts a high level of psychological well-being. No research has been found in the available resources that examines the relationship between the mental stamina of chess players and their psychological well-being. Therefore, it is thought that the relevant results of this research will contribute to the athletes who engage in intense mental activities.

Finally, the fact that the research was carried out only with the contribution of male chess players can be considered as a limitation of the research. It is also a fact that studies with larger population and sample groups will contribute to the relevant literature.

Author Contributions

Study conception and design—AO, SP and AG. Data acquisition—AO. Analysis and interpretation of data—AO, SP and AG. Drafting the article—AO.

Ethics Approval and Consent to Participate

For the research, ethics committee approval was obtained from Osmaniye Korkut Ata University's Science Scientific Research and Publication Ethics Committee with the decision number of 2022/1/22.

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Conflict of Interest

The authors declare no conflict of interest.

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