Mental Training and Anxiety: Examining the Moderating Role of Gender in Athletes

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Abstract

This study aimed to examine how gender may influence the relationship between mental training practices and anxiety levels in both individual and team athletes. Using a quantitative approach, data was gathered through convenience sampling using electronically administered questionnaires. A grand total of 348 athletes from secondary school, high school, and university teams in individual and team sports across four Turkish provinces took part in the event. The Mental Training Scale developed by Behnke et al. (2019) was used to evaluate mental training practices, while the Sports Anxiety Scale-2, created by Smith et al. (2006) and Smith, Smoll and Schutz (1990), was used to gauge levels of anxiety. The data analysis included various statistical techniques such as descriptive statistics, Cronbach's alpha for assessing scale reliability, confirmatory factor analysis, correlation analysis to explore variable relationships, and bootstrap regression analysis to investigate the potential moderating effect of gender. The results showed that the predictor variables together explained about 9% of the variation in anxiety (R^2 = .084). There was a noteworthy correlation between mental training practices and anxiety, with mental training practices showing a beneficial impact (β = .30, $p < .05$). Additionally, gender was found to have a significant influence in a positive direction (β = 1.58, $p < .001$). In addition, a noteworthy moderating effect was found, suggesting that gender plays a role in the connection between mental training and anxiety (β = -.37, $p < .001$). It appears that female athletes on school teams are more inclined to incorporate mental training practices into their routines, leading to better anxiety management compared to male athletes who do not engage in such practices.

Keywords: Mental Training, Anxiety, Gender in Athletes.

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Introduction

Participating in regular sports practice has been shown to have a positive impact on the physical, mental, and psychological well-being of athletes in various levels and settings. In highly competitive settings, the conscious influence of psychological elements, such as focus, self-assurance, stress management, anxiety control, drive, flexibility, emotional control, mood stability, and interpersonal abilities, can have a profound effect on personal adaptation and overall happiness. This study explores the complex psychological factors that impact the health and well-being of athletes, which in turn can influence their dedication to their sport. Although engaging in sports and physical activities can bring about various advantages, they can also trigger feelings of self-doubt, unease, or pressure, which may result in avoiding such activities due to a fear of failing or feeling embarrassed. These adverse emotions can, in turn, impact an athlete's overall well-being, interpersonal connections, and commitment to their sport. Nevertheless, sports also play a crucial role in socialisation, impacting physical training, creating a fair athletic atmosphere, and encouraging perseverance in athletic pursuits. Thus, the overall health and happiness of athletes relies heavily on the social atmosphere in which they engage in sports, emphasising the significant impact of environmental elements on their overall experience.

Anxiety is a common psychological factor in sports, frequently mentioned as a significant contributor to performance fluctuations (Cox, 2007). Spielberger (1979) provides a definition of anxiety as "a subjective feeling of tension, worry, nervousness, and anxiety associated with the stimulation of the autonomic nervous system." Competitive situations in high stakes match often led to heightened anxiety and stress levels in athletes (Chun et al., 2022), which can have negative effects on their performance (Ekmekçi, 2022; Ford et al., 2017). Performance decrements can be attributed to cognitive anxiety, which includes negative self-talk, concentration difficulties, attention lapses, and performance concerns. Somatic anxiety, on the other hand, involves palmar sweating, increased heart rate, and elevated blood pressure. These factors have been identified as significant contributors to decreased performance (Martens, Vealey, & Burton, 1990; Parnabas, Mahamood, & Parnabas, 2013). Thus, it is essential to effectively manage anxiety states to improve athletic performance, which requires the use of mental training techniques (Barahona-Fuentes, Lagos, & Ojeda, 2019). Developing mental resilience involves actively preparing for and effectively managing external factors that could potentially affect an athlete's psychological well-being and performance. During this process, athletes develop the skill to manage and regulate their emotions in both training and competition (May, 2019).

Various theories, including symbolic learning and psychoneuromuscular theory, offer frameworks to comprehend the mechanisms that contribute to the effectiveness of mental training. Symbolic learning suggests that individuals can form internal mental representations, which can help them conduct specific behaviours. Similarly, the psychoneuromuscular theory suggests that mental imagery can activate the motor cortex, creating patterns of neuromuscular activation like those used during physical movement (Fortes et al., 2016). Research findings have shown that mental training can have a substantial impact on the autonomic nervous system of athletes, resulting in physiological changes (Altıntaş & Akalan, 2008). When there is a change in somatic anxiety, it can affect an athlete's performance. If the anxiety levels are within the optimal range, it can help them perform at their best.

However, if the anxiety levels go too high or too low, it can negatively impact their performance (Barahona-Fuentes et al., 2019). Studies indicate that mental training interventions have been found to have beneficial outcomes for both individual and team athletes. These outcomes include improved athletic performance, increased self-confidence, and decreased anxiety (Kahrović et al., 2014; Mamassis & Doganis, 2004). Providing athletes with proven techniques for managing anxiety can enhance their chances of success and improve their performance in their chosen sports (Khan et al., 2017). In a study conducted by Hut et al. (Hut et al., 2021), female student-athletes were found to benefit from mental training, which resulted in improved emotion regulation skills and a notable decrease in anxiety levels. Visualisation and deliberate practice are widely acknowledged as crucial elements in the development of athletic skills (Akandere, Aktaş, & Er, 2018).

Therefore, many athletes and coaches tend to prioritise physical skill training as the primary factor for enhancing performance. It is important to consider the significant impact of psychological skill training on enhancing performance outcomes for athletes, whether they are competing individually or as part of a team. Studies in sports psychology clearly emphasise the importance of coaches incorporating psychological skill training alongside physical training programmes. In addition, anxiety plays a significant role in affecting athletic performance from a psychological standpoint (Marwat &

Marwat, 2020). A wealth of research supports the favourable impact of mental training on different facets of athletic performance, such as improved physical performance (Blakeslee & Goff, 2007; Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004; Karaca & Gündüz, 2021; Mamassis & Doganis, 2004), heightened mental endurance (Akman, 2019; Dereli et al., 2020), and boosted self-confidence (Çankaya et al., 2020; Ciftci, Tolukan, & Yilmaz, 2021). There is a research gap in the current literature, as most studies primarily concentrate on using mental training to directly improve sports performance. There is a lack of research studying the impact of mental training practices on the anxiety levels of male and female athletes in both individual and team sports, especially when considering the analysis of regulatory effects.

We hypothesise that engaging in mental training practices can potentially enhance athletes' psychological well-being and overall satisfaction in life. Effective management of stress, anxiety, and depression can achieve this. This study seeks to investigate the potential of mental training as a valuable tool for managing psychophysiological changes induced by stress in athletes of all genders. We are confident that the results of this study will provide valuable insights for coaches and physical education teachers as they strive to promote the overall growth and well-being of athletes.

Mental Training

Enhancing cognitive abilities and performance is the goal of mental training, which involves the application of various techniques. In the past, mental training did not receive the same level of attention as physical training (Collard & Honoré, 2022). Since the 1960s, it has been recognised as a valuable tool in addressing psychological factors like stress, anxiety, and burnout that can arise from the challenges and pressures of athletics (Xiong, 2012). Developing mental skills through training can have a positive impact on various aspects of an individual's performance, including attention, focus, positive thinking, stress management, emotional control, and self-confidence. This type of training can also enhance psychological resilience, benefiting both individual athletes and teams (Hassan, 2023). Various disciplines outside of sports also incorporate mental training practices. For example, it is observed that musicians prepare mentally before going on stage, just as doctors do before performing surgery. Developing mental training practices is crucial for effective preparation (Collard & Honoré, 2022).

Gaining a solid grasp of the fundamental aspects of mental training, particularly in the realm of sports, plays a crucial role in enhancing athletes' performance and ensuring their psychological preparedness (Behnke et al., 2019). Regarding this matter, mental training involves various techniques for developing psychological skills such as imagery, inner speech, autogenic training, progressive muscle relaxation, and attention and concentration exercises. These techniques help athletes effectively manage their psychological characteristics in order to achieve their goals (Cece, Guillet-Descas, & Martinent, 2020). The psychological skills training approach primarily relies on cognitive behavioural therapy. Psychological skills training techniques can assist athletes in achieving peak performance and maintaining a balanced mental state, particularly in situations involving stress or excessive anxiety (Röthlin & Birrer, 2020). In recent years, various techniques such as biofeedback (Blumenstein & Hung, 2016), neurofeedback (di Fronso et al., 2020; Ros et al., 2020), and wearable technology (di Fronso et al., 2020; Kiely et al., 2019) have been used to study the psychophysiological and behavioural aspects linked to optimal performance. The use of innovative technologies (Ye et al., 2020), such as mobile applications and video systems (Seshadri et al., 2019), in the field of sports psychology is becoming increasingly prevalent. With the help of these technological tools, athletes can enhance their performance by sharing real-time analysis data with their team (coach, physical education, or mentor) (Siekańska et al., 2021).

Anxiety and Sports

Research in sport psychology continues to focus on anxiety, with ongoing efforts to develop models that incorporate various approaches such as arousal-based, multidimensional, and assessment-oriented frameworks (Cheng & Hardy, 2016). The Yerkes-Dodson model (Yerkes & Dodson, 1908) illustrates this relationship as an inverted U-curve, where performance initially increases with anxiety until reaching a peak before declining. This highlights the negative effects of heightened anxiety. Various theories shed light on the impact of anxiety on performance, considering factors such as learning, cognition, motivation, and stress-coping mechanisms (Rowland & van Lankveld, 2019). Competitors, especially those involved in individual or team sports, encounter distinct pressures that can affect their performance. Competitive individuals experience heightened anxieties compared to non-competitive individuals (Khan et al., 2017). Elevated levels of cognitive anxiety, specifically a particular type, significantly impede performance.

Effective coping strategies are crucial for optimal athletic performance, extending beyond anxiety levels (Masten, Tušak, & Faganel, 2006). The increasing levels of anxiety have a detrimental impact on various aspects of athletes' well-being, including their cognitive function, mental

health, and emotional state. Stress, anxiety, and depression can negatively impact focus, decision-making, and performance during preparation or competition (Aksoy, 2019; Ning, Hao, & Huang, 2022). Interventions aimed at reducing stress and anxiety are regarded as valuable means of improving athletic performance (Mehrsafar et al., 2019). The Emotion Thermometers can provide health professionals with a straightforward method to detect potential anxiety, anger, and depression-related disorders (Silva et al., 2023).

Gender and Sports

Research indicates that female athletes may experience elevated levels of stress, anxiety, and depression in comparison to male athletes, which can have detrimental effects on their overall well-being (Guntoro & Putra, 2022). The disparity in mental and psychological well-being of female athletes is influenced by gender inequality, specific health concerns, and increased vulnerability to harassment and violence (Pascoe et al., 2022). Furthermore, female athletes in their adolescence and young adulthood are more prone to psychological distress, such as stress, anxiety, and depression, compared to their male counterparts. Several factors, including overtraining, social appearance anxiety caused by the portrayal of women in social media, early recovery from injury, and the unplanned end of an athletic career, can adversely affect anxiety, depression, and psychological well-being (Herrero, Jejurikar, & Carter, 2021). Social and family support have been found to have a significant impact on reducing symptoms of stress, anxiety, and depression and increasing life satisfaction among female athletes (Brajković, Milat-Panža, & Kopilaš, 2023). Identifying the psychological and social challenges individuals face in their daily lives is essential (Almeida et al., 2023). Providing support and strategies to address and overcome these negative experiences is crucial (Watanabe et al., 2023).

The Relationship Between Mental Training, Anxiety and Gender

Elite athletes operate in a stressful environment as they continuously aim to outperform their competitors in the pursuit of excellence. Chronic stress exposure has negative effects on both the body and mind, resulting in psychological challenges including post-traumatic stress disorders, burnout, and various forms of anxiety and depression. The high occurrence of negative moods and physical fatigue among elite athletes highlights the emotional and mental challenges they face (Henriksen, Diment, & Kuettel, 2023). Female athletes exhibited greater levels of depressive symptoms compared to male athletes (Nixdorf, Frank, & Beckmann, 2016; Weber et al., 2018; Wolanin et al., 2016). The psychological well-being of young professional football players was examined in a study, revealing that 5% of participants reported burnout and 26% displayed symptoms of anxiety or depression (Gouttebarge, Frings-Dresen, & Sluiter, 2015). Studies have shown a high occurrence of anxiety among college student athletes, with estimates suggesting a prevalence of around 37%. This raises concern as high anxiety levels in young athletes are linked to an increased risk of developing depression (Weber et al., 2018). It is highly recommended to implement mental training practices to enhance psychological skills, considering the potential negative impacts on mental health and sports performance (Ning et al., 2022). The type of sport can impact the psychological symptoms experienced by athletes. Research has indicated that individual athletes exhibit higher levels of anxiety and depression in comparison to team athletes (Nixdorf et al., 2016; Salles et al., 2022). Studies have found that individual sport athletes have higher rates of depression (13%) compared to team sport athletes (7%) (Pluhar et al., 2019), providing further evidence for this trend.

The issue of athlete mental health extends beyond university settings. The prevalence of depression among German elite athletes is a cause for concern, as indicated by a recent report. Symptoms of depression were observed in 28.6% of athletes, and there was a general decline in their overall mental well-being (Geiger et al., 2023). A study found that both male and female Australian football players reported high rates of psychological symptoms, with 63% of women and 52% of men experiencing these symptoms (Kilic et al., 2021). The gender disparity in anxiety disorder prevalence is emphasised in a cross-sectional study of semi-elite Australian footballers. The study reveals that female players have a threefold higher prevalence (28.6%) compared to their male counterparts (8.5%). Depression symptoms were significantly more prevalent in females (57%) compared to males (20%) (Henderson et al., 2023). The implementation of mental training programmes is increasingly crucial due to the concerning prevalence of psychological symptoms and the potential for sport-specific variations. Studies indicate that these practices can effectively reduce anxiety and depression while promoting the acquisition of important psychological skills (Lu & Xu, 2023; Röthlin & Birrer, 2020; Yuan et al., 2021).

Method

Research Model

The model designed for our study is presented in Figure 1.

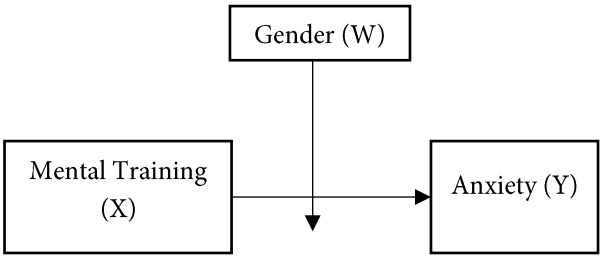

Figure 1. Research Model.

Population and Sampling

The study included athletes who were actively involved in both individual and team sports. A total of 348 athletes, comprising an equal number of males (n=176) and females (n=172), were recruited from secondary school, high school, and university teams in four Turkish provinces: Antalya, Istanbul, Izmir, and Mugla. The age range of the participants varied from 18 to over 25 years. Convenience sampling was used to select participants from the target population.

Data Collection Tools

Mental Training Scale: The mental training scale, developed by Behnke et al. (2019), assesses mental training practices specifically in a sport setting and targets athletes. The adaptation of the Turkish culture was conducted by Yarayan and İlhan (2018). The study employed a scale comprising 20 items, which assessed various subdimensions including mental foundations skills, mental performance skills, interpersonal skills, self-talk, and mental imagery. The scale has a 5-point likert-type structure and is scored as (1) " I totally disagree " and (5) " I totally agree ". The fit index values of the confirmatory factor analysis of the scale were determined as x^2/sd (x^2=303.69, sd=164) =1.85, GFI=0.91, CFI=0.95, NFI=0.91, AGFI=0.88, RMSEA=0.53, SRMR=0.48, RMR=0.34. The internal consistency coefficients of the scale ranged between 0.82 and 0.91. When the internal consistency coefficients of the sub-dimensions of the scale were examined, it was determined that mental foundations skills (4 items) α=.60, mental performance skills (6 items) α=.78, interpersonal skills (4 items) α=.72, self-talk (3 items) α=.85, and mental imagery (3 items) α=.70. Based on these results, it can be suggested that the Turkish version of the "Mental Training in Sport Scale" is a valid and reliable measurement tool for athletes (Yarayan & İlhan, 2018).

Anxiety Scale in Sports-2: The Anxiety in Sport Scale-2 (AIS-2) was employed to assess the anxiety levels and status of the athletes. Smith initially developed the (Smith et al., 1990) and subsequently revised by Smith et al. (2006). The Turkish adaptation of the Anxiety in Sport Scale was conducted by Akyol, Sezer and Aşçı (2015) and Akyol et al. (2016). The scale comprises fifteen items and is divided into three subscales: somatic anxiety, worry, and concentration disruption. The scale is a 4-point likert structure and consists of "Not at all (1), A little (2), A lot (3), and Very much (4)" statements. The confirmatory factor analysis results of the scale were found to be between X^2 =214.42, X^2 /sd=2.52, IFI=0.93, TLI=0.91, CFI=0.93, and RMSEA=0.07 goodness of fit index values. In our study, the Turkish version of the Sport Anxiety Scale-2 exhibited robust psychometric properties. The factor loadings for the sub-dimensions of worry (0.63-0.84), somatic anxiety (0.49-0.61), and concentration disruption (0.51-0.70) demonstrate strong internal consistency and discriminant validity. These findings support the appropriateness of using this measure to assess anxiety levels in athletes.

Data Analysis

The analysis used a comprehensive approach to evaluate the relationships in the proposed model. Descriptive statistics were calculated for the categorical variables of the participating athletes. Cronbach's alpha coefficients were calculated to assess the internal consistency of the study's instruments. Confirmatory factor analysis was used to establish the construct validity of the scales. Correlation analysis was performed to examine the relationships between categorical and continuous variables. The proposed model was evaluated using bootstrap-based regression analysis. The model analysis used the Process Macro developed by Hayes (2018). A bootstrap resampling option of 5,000 was implemented to account for the sensitivity of mediation and moderation analyses to sample size. When interpreting mediation and moderation analyses using the bootstrap method, it is important to consider the 95% confidence interval (CI) values. To validate the research hypotheses, it is important that the confidence interval (CI) values do not include the zero (0) value.

Research Ethic Information.

The study received ethical approval from the Inonu University Social and Humanities Scientific Research and Publication Ethics Committee on May 4, 2023 (protocol number 3/4).

Findings

Male athletes (50.6%) were slightly more represented than females among the study participants. The age distribution reached its highest point among individuals aged 19-21, accounting for 33.6% of the population. Most athletes (63.2%) were enrolled as undergraduate students, with individual sports (52.8%) being slightly more common than team sports. Regarding experience, 32.8% of participants had engaged in competition for 1-2 years,

while most participants (42.0%) reported training 3-4 days per week. Most participants (35.9%) participated in daily training sessions lasting 60-90 minutes, while a small minority (10.6%) were national athletes. The study excluded athletes with less than one year of experience (Table 1).

Table 1

Demographic Characteristics

Variables		f	%	$\bar{x}$	sd
Gender	Male	176	50.6	1.49	.501
	Female	172	49.4		
	Total	348	100.0		
Age	18 years and under	108	31.0	2.18	1.027
	19-21 years	117	33.6		
	22-24 years	74	21.3		
	25 years and above	49	14.1		
	Total	348	100.0		
Education	Secondary school	39	11.2	2.62	.748
	High school	72	20.7		
	Undergraduate	220	63.2		
	Postgraduate education	17	4.9		
	Total	348	100.0		
Sport Branch	Individual Sports	163	52.8	8.86	5.903
	Team Sports	146	47.2		
	Total	309	100.0		
Total Sports Resume	1-2 years	114	32.8	2.62	1.494
	3-4 years	76	21.8		
	5-6 years	48	13.8		
	7-8 years	49	14.1		
	9 years and above	61	17.5		
	Total	348	100.0		
Weekly Training Frequency (Days)	1-2 days	97	27.9	2.02	.763
	3-4 days	146	42.0		
	5-6 days	105	30.2		
	Total	348	100.0		
Daily Training Time	30 min and less	42	12.1	2.97	1.162
	30-60 min	74	21.3		
	60-90 min	125	35.9		
	90-120 min	67	19.3		
	120 min and above	40	11.5		
	Total	348	100.0		
Are you a National Athlete?	Yes	37	10.6	1.89	.309
	No.	311	89.4		
	Total	348	100.0		

Validity and Reliability Analysis

Confirmatory factor analysis was conducted to assess the construct validity of the scales used in this study, as their validity had been previously established. Additionally, reliability coefficients were examined. The study determined that both scales demonstrated satisfactory fit values (Meydan & Şeşen, 2011). Additionally, the examination of reliability coefficients indicated that both scales exhibited high levels of reliability (Bursal, 2017; Büyüköztürk, 2023) (Table 2).

Table 2

Validity And Reliability Results of The Scales

Variables	X^2	df	CMIN/DF ≤5	GFI ≥.85	AGFI ≥.80	CFI ≥.90	NFI ≥.90	RMSEA ≤.10	Cronbach Alpha
Mental Training	325.543	159	2.047	.917	.890	.947	.902	.055	.921
Anxiety	204.262	83	2.461	.928	.896	.955	.927	.065	.924

Note: Goodness of fit value ranges are organized according to "acceptable standards" Meydan and Şeşen (2011)

Correlation Analysis

Significant associations were found in the correlation analysis involving the mental training variable. The study revealed a significant negative correlation between anxiety and mental training engagement ($r = -0.244$; $p < 0.01$), suggesting that increased engagement in mental training is linked to lower levels of anxiety. The results indicate a weak, negative correlation ($r = -0.158$; $p < 0.01$) between gender and mental training, suggesting a slight preference for higher engagement among male participants. Conversely, positive correlations were observed between mental training and age ($r = 0.130$; $p < 0.05$), total sports resume ($r = 0.188$; $p < 0.01$), and daily training time ($r = 0.176$; $p < 0.01$). These findings indicate that older athletes, individuals with greater sporting experience, and those who engage in more frequent training are more likely to actively participate in mental training practices.

Regarding demographic characteristics, it was found that mental training did not have a significant association with educational status or sport type. A notable demographic correlation for anxiety was found in relation to gender, indicating that female participants in the study reported higher levels of anxiety compared to male participants ($r=-0.141$, $p<0.05$) (Table 3).

Table 3

Correlation Analysis

	Variables	1	2	3	4	5	6	7	8	9
1	Gender	1								
2	Age	-.211**	1							
3	Education	-.195**	.680**	1						
4	Sport Branch	-.051	.219**	.392**	1					
5	Total Sports Resume	-.159**	.369**	.228**	.063	1				
6	Weekly Training Frequency (Days)	-.012	-.234**	-.374**	-.187**	.166**	1			
7	Daily Training Time	-.018	-.212**	-.300**	-.071	.359**	.466**	1		
8	Are you a National Athlete?	.015	-.058	.047	.173**	-.337**	-.116*	-.178**	1	
9	Mental training	-.158**	.130*	.011	-.027	.188**	.100	.176**	-.062	1
10	Anxiety	.141*	-.011	.039	-.090	-.020	-.007	-.033	-.046	-.244**

*p<.05. **p<.01

Regression Analysis Based on Regulatory Effect

Regression analysis was conducted on the Process Macro programme to examine the moderating influence of gender on the relationship between mental training practices and anxiety in individual and team athletes (Table 4).

The regression analysis indicated that the predictor variables accounted for approximately 9% ($R2 = .084$) of the variance in anxiety levels. Two significant predictors were identified: mental training and gender. The study found that engaging in mental training practices had a significant negative impact on anxiety ($b = .30$, $p < .05$), suggesting that higher levels of mental training are associated with lower levels of anxiety. The study found a significant positive effect of gender on anxiety ($b = 1.58$, $p < .001$). Specifically, female athletes reported higher anxiety levels compared to male athletes. The analysis indicated a significant interaction effect between mental training and gender on anxiety ($b = -.37$, $p < .001$). The findings suggest that gender moderates the impact of mental training on anxiety levels. The analysis found a significant and negative effect of mental training on anxiety in female athletes ($b= -.4120$, 95% CI [-.5787, -.2452] $t=4.8592$, $p<0.001$). However, the impact of mental training on anxiety was not found to be significant for male

athletes (b= -.0513, 95% CI [-.1700, .0674] t= -.8496, p>0.05). The slope graph can offer additional visual insights into this moderating effect (Figure 2).

Table 4

Regression Analysis

	b	SH	t	p	LLCI	ULCI
Dependent Variable: Anxiety						
Constant	.4189	.5948	.7043	.4817	-.7510	1.5887
Mental Training (X)	.3094	.1475	2.0973	.0367	.0192	.5996
Gender (W)	1.5848	.4176	3.7949	.0002	.7634	2.4062
X.W	-.3607	.1041	-3.4656	.0006	-.5654	-.1560
Conditional Effect = Gender						
Male (1)	-.0513	.0604	-.8496	.3961	-.1700	.0674
Female (2)	-.4120	.0848	-4.8592	.0000	-.5787	-.2452

R= .290; R^2= .084; n= 348, LLCI: Lowest confidence interval, ULCI: Highest confidence interval, Unstandardized beta coefficients reported

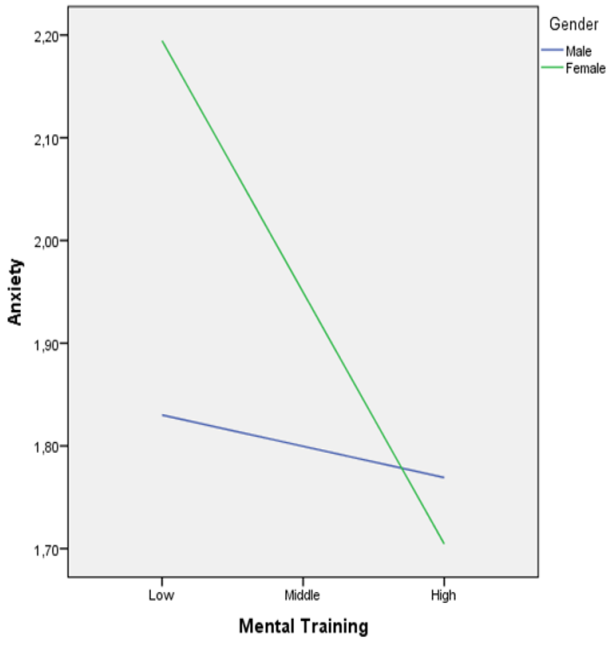

Figure 2. Graphical Representation of Regulatory Variable Effects.

Discussion and Conclusion

While there is existing research on mental training and its relationship to varied factors, limited studies have examined the impact of gender on its effectiveness in anxiety management among athletes. The purpose of our study is to investigate the relationship between mental training practices, gender, and anxiety levels in the field of sports psychology, aiming to fill a knowledge gap in this area. The analysis of data from individual and team athletes indicated that mental training practices explained around 9% of the variation in anxiety. The role of gender as a significant moderator in the relationship between mental training and anxiety reduction has been identified. The results of our study indicate that mental training had a significant impact on reducing anxiety levels in female athletes but did not have a statistically significant effect on male athletes. Thus, women exhibit greater emotional sensitivity and possess superior imagination abilities compared to men (Kozak, Zorba, & Bayrakdar, 2021). The findings align with previous research. Several studies (Kaplan & Andre, 2021; Kozak et al., 2021; Yüksel & Orhan, 2021) have emphasised the common use of specific mental training techniques, including self-talk and mental visualisation, among female athletes. The studies, including our own, emphasise the significance of considering gender as a potential factor in the effectiveness of mental training practices for reducing anxiety in athletes.

Studies consistently emphasise the advantages of mental training practices for athletes. Research has shown that both individual and team athletes can benefit from these practices, which have been found to effectively reduce cognitive and somatic anxiety, increase self-confidence, and improve performance (Fekih et al., 2021; Kulak, Kerkez, & Aktaş, 2011; Mamassis & Doganis, 2004; Varzaneh et al., 2011). It is recommended that athletes prioritise the inclusion of mental training alongside physical training to effectively manage pre-competition anxiety and enhance performance.

Athletes who participate in mental training experience benefits that go beyond immediate competition-related concerns. The mentioned practices provide valuable tools for developing crucial psychological skills, including anxiety and stress management, improved attention and concentration, and enhanced mental resiliency (Kolayiş, Sarı, & Köle, 2015). The integration of mental training alongside physical training can be a powerful motivator, enabling athletes to maximise their potential.

The cultivation of sport-specific skills tailored to an athlete's chosen discipline should begin early in their career, emphasising the importance of mental training development (Akandere et al., 2018). Athletes can achieve significant performance improvements by effectively regulating anxiety and building self-confidence through mental training programmes (Ciftci et al., 2021; Mamassis & Doganis, 2004). It is important for athletes to establish

strong mental training habits from an early age (Yüksel & Orhan, 2021). It is important to consider individual differences and developmental levels when providing training to athletes. This ensures that the training is tailored to their specific needs and takes into consideration their readiness for abstract thinking (Karaca & Gündüz, 2021).

Conclusion

Our study concludes that female athletes on school teams exhibit a higher propensity for utilising mental training practices in comparison to their male counterparts. Furthermore, female athletes who participate in mental training exhibit superior anxiety management compared to those who do not. These observations merit additional investigation, specifically through experimental studies that concentrate on elite athletes. Integrating qualitative data from athletes after the intervention in mixed-method designs could enhance the findings. The integration of wearable technology and mental training applications in future research could enhance the accuracy and objectivity of data collection, particularly in relation to measuring anxiety levels. This would enable a more thorough evaluation of the efficacy of mental training practices throughout the course of competition.

Coaches should prioritise actively supporting athletes by integrating mental training practices. This can facilitate the development and long-term utilisation of valuable psychological skills. Nevertheless, it is imperative to recognise the constraints of the present study. The sample was limited to athletes who participated in individual and team sports within school teams during the 2023-2024 academic year. The analysis did not include information about the specific sports and schools involved. In addition, the study utilised a survey design instead of an experimental approach, thereby restricting the ability to establish causal relationships between variables.

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