

The relationship between mental toughness and rumination in athletes

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Abstract

Background and Study Aim Rumination, defined as repetitive and persistent negative thinking, can negatively affect athletes' performance and psychological well-being. Mental toughness, the ability to adapt positively to stress and challenges, may help buffer against such effects. This study aimed to examine the relationship between mental toughness and rumination among university athletes in Turkey.

Material and Methods A total of 307 university athletes (153 female, 154 male) actively engaged in various sports participated in the study. The Sports Mental Toughness Inventory and the Sports Competition Rumination Scale were administered through an online survey. Data were analyzed using descriptive statistics, independent samples t-tests, one-way ANOVA, and Pearson correlation analysis. The significance level was set at $p < .05$.

Results Male athletes demonstrated higher levels of mental toughness than female athletes. Team-sport participants had higher persistence and confidence scores than those engaged in individual sports. Mental toughness tended to increase with athletic experience, while a small rise in rumination was also noted. A weak negative correlation was found between the control subdimension of mental toughness and rumination, indicating that athletes with stronger control abilities experienced fewer repetitive negative thoughts.

Conclusions The findings show that mental toughness, particularly its control aspect, plays an important role in reducing rumination among athletes. Strengthening psychological control and resilience through targeted training may help minimize maladaptive thought patterns and enhance mental performance in competitive environments.

Keywords: mental toughness, rumination, athletes, psychological control, sport performance

Introduction

The key element of success in athletes is achieving maximum performance, and transferring this performance to the competition environment is very important. However, it is not possible to say that training focused solely on developing motor skills is sufficient for athletes to achieve success. In the sporting environment, the mental and emotional state of the athlete is among the critical factors affecting performance [1, 2, 3]. Guskowska and Wojcik [4], who emphasized that mental toughness is an important element in the mental preparation of athletes, demonstrated that successful athletes performing at a high level exhibit greater mental toughness.

The concept of mental toughness was first defined by sports psychologist James Loehr [5] as an athlete's ability to demonstrate sporting skills and performance under various psychological

factors such as stress and pressure [6, 7]. Different definitions have also been proposed by researchers in the literature. Hardy et al. [8] define mental toughness as the ability to achieve predetermined goals in the face of pressure caused by various sources of stress. Goldberg [9] defines it as the ability of athletes to learn from failures, cope with adverse situations, and show psychological resistance to pressure and stress [6]. Jacelon [10] describes it as a factor that allows adaptation to situations or events by reducing stress from harmful situations. Another definition states that athletes need mental skills to use their physical and mental capacities in the best way possible and to be psychologically better than their competitors when needed [7]. The common point of many definitions is the ability to cope with stress and pressure, deal with difficulties, overcome situations where failure is encountered, and remain mentally strong despite all adverse conditions. This mental strength enables athletes to perform better than their teammates or competitors in training or competition environments [11].

The concept of rumination was first defined in the 1960s by Ingram and McAdam as “mental rumination” [12]. Later, it was examined by Nolen-Hoeksema [13] in relation to depression as a maladaptive response to psychological distress. It was defined as a tendency to focus persistently on certain thoughts and concerns and was associated with negative emotional experiences and depression [14]. Watkins [15] describes rumination as a person’s repetitive and prolonged thoughts about their own feelings, anxieties, and bad experiences. Martin and Tesser [16] define it as a person’s persistent focus on specific thoughts and feelings, dwelling on them, engaging in repetitive thinking about the subject, and being unable to move away from these thoughts. Getting stuck in negative thoughts and the mood created by them forms the basis of rumination. This negative psychological state can be associated with emotional difficulties such as failure, hopelessness, and helplessness, and can develop into psychological disorders [17]. Ruminative thoughts usually arise beyond the individual’s control and direct attention to unwanted and distressing situations. Therefore, it is stated that this condition affects many emotional and cognitive processes such as anger, empathy, depression, and anxiety [18]. It is also considered important for athletes to control and manage this process, as it can create a perception of failure and competition anxiety [19, 20]. Even if individuals with ruminative tendencies find solutions to problems, they only try to understand the problems and their causes by displaying a negative tendency. This situation causes them to be more affected by negative experiences, which leads to failure [21, 22].

Rumination is a multidimensional cognitive process affected by factors such as stress, anxiety, emotional disturbance, negative mood, perception of failure, and lack of motivation, which negatively affect an individual’s psychological well-being and functioning by constantly repeating negative thoughts in the mind. For athletes, this process can be a serious problem on the path to success by affecting mental skills [20, 23, 24]. Recent studies have shown that mental toughness and ruminative thinking are important factors affecting athlete performance. Studies have examined the relationship between the mental toughness levels of athletes and sports science students [25, 26, 27] and mental factors [28, 29] that may affect performance, such as passion for sport [30], exercise addiction [31], emotional intelligence [32], commitment to sport [33], self-efficacy [34], and emotional regulation [35, 36], as well as which variables are effective [37, 38, 39, 40] in different sports disciplines [34, 41, 42]. Studies on rumination and ruminative thinking have examined sleep behaviour attitudes [43], mental training [44], psychological toughness [45], emotion regulation [46], cognitive flexibility [47],

academic procrastination [48], and similar research [26, 49, 50, 51].

Analysis of research findings has shown that mental toughness and rumination are closely related to athletes’ emotional states and performance outcomes. Researchers emphasize that developing mental toughness helps reduce negative thought patterns and enhances the ability to cope with stress and pressure in competitive settings. At the same time, there remains a need for further exploration of the mechanisms through which mental toughness influences ruminative processes in athletes. This gap continues to limit the understanding of how psychological attributes determine effective adaptation to stressful situations in sports.

Nowadays, sporting success cannot be achieved solely by relying on physical abilities and skills. Success in sport is the result of a process influenced by mental, emotional, and many complex psychological factors. In this process, mental toughness, defined as the ability of athletes to cope with pressure and stress and perform at their best, and ruminative thinking, which means replaying negative thoughts in their minds based on past experiences, mistakes, or performance anxiety, are of critical importance. A review of the literature reveals that studies examining mental toughness and ruminative thinking together are quite limited. In light of the information obtained, achieving sporting success depends on many factors. Among these factors, the question arises as to what role mental toughness, which is said to be effective in achieving maximum performance, plays in ruminative thinking. A review of the literature reveals no studies examining both concepts together. Therefore, the aim of this study is to determine the relationship between these two concepts in the process of achieving success.

Materials and Methods

Participants

The study population consists of individuals who are actively involved in sports and are continuing their education in Turkey. The study sample includes a total of 307 participants, 153 female and 154 male, selected using simple random sampling. The demographic characteristics of the participants are presented in Table 1.

As shown in Table 1, the participants represented a balanced gender distribution and various educational levels. They were engaged in both individual and team sports and differed in their athletic experience and participation status. Most participants had taken part in competitions during the past year, while only a small number had previously received psychological support.

Research Design

This research utilized quantitative research

Table 1. Demographic Information About the Participants

Variable		N	%
Gender	Female	153	49.8
	Male	154	50.2
Educational Status	Secondary education	75	24.4
	Associate Degree	30	9.8
	Bachelor's degree	202	65.8
Sport Type	Individual Sports	133	43.3
	Team Sports	174	56.7
Level of athleticism	Amateur	172	56.0
	Professional	78	25.4
	National athlete	57	18.6
Competition	Yes	207	67.4
participation status in the last year	No	100	32.6
Status of receiving psychological support	Received	44	14.3
	Not Received	263	85.7

methods. It was conducted as a correlational survey model and is also descriptive. This model is used to determine the existence or degree of co-variation between two or more variables [52].

Data Collection Tools

The data collection tools used in the study were distributed to participants via Google Forms. In this context, a simple random sampling method was employed.

Personal Information Form. A personal information form consisting of six items was used to obtain detailed information about the participants. This form included questions about gender, educational status, type of sport, level of athleticism, participation in competitions within the last year, and receipt of psychological support.

Sports Mental Toughness Inventory. The Sports Mental Toughness Inventory was developed by Sheard et al. [53] and adapted into Turkish by Altıntaş [2]. The scale consists of three subscales: confidence, control, and persistence, with 14 items, using a 4-point Likert scale. The Cronbach's alpha values identified in the adaptation study were 0.84 for confidence, 0.79 for control, and 0.51 for persistence. In the current study, the Cronbach's alpha values were 0.74 for the trust subdimension, 0.73 for the control subdimension, 0.71 for the continuity subdimension, and 0.81 for the entire inventory.

Sports Competition Rumination Scale. The Sports Competition Rumination Scale, developed by Michel-Kröhler, Kryś, and Berti [54], was adapted to Turkish by Karafil and Pehlivan [50]. The scale consists of six items grouped into a single factor. It uses a 5-point Likert-type rating. The Cronbach's alpha value calculated for the scale was 0.87. The value obtained in the current study was also 0.87.

Statistical Analysis

The data obtained within the scope of the research were analyzed using the SPSS software package. The skewness and kurtosis values of the data were examined and found to be between -2 and +2. T-tests, ANOVA, and correlation analyses were applied to the normally distributed data

Results

The comparison of mean scores according to the gender variable is presented in Table 2.

When examining Table 2, according to the results of the t-test conducted on the gender variable, significant differences were found between the groups in the Mental Toughness Inventory, including the persistence, confidence, and control subdimensions, as well as in the overall mean scores ($p < .05$). The mean scores of male participants were higher in all of these comparisons. In contrast, no significant difference was observed between the groups in the Sports Competition Rumination Scale ($p > .05$).

The comparison of mean scores according to the sport branch variable is presented in Table 3.

Upon examining Table 3, according to the results of the t-test conducted on the sport branch variable, significant differences were found between the groups in the subdimensions of the Mental Toughness Inventory, specifically continuity and confidence in sports ($p < .05$). However, no significant difference was found between the groups in the control subdimension and the mean scores for the entire inventory ($p > .05$). It was observed that individuals participating in team sports had higher mean scores in the persistence and control subdimensions. When examining the Sports Competition Rumination

Table 2. t-Test Results Related to the Gender Variable

Gender		N	$\bar{x}$	Std. Deviation	Df	t	p
Trust	Female	158	2.80	.37582	317	-5.389	.000
	Male	161	3.04	.42686			
Control	Female	158	2.11	.46154	317	-4.808	.000
	Male	161	2.40	.60414			
Persistence	Female	158	3.07	.42033	317	-4.036	.000
	Male	161	3.27	.43874			
Sports Mental Toughness Inventory	Female	158	2.68	.30072	317	-6.413	.000
	Male	161	2.92	.37003			
Sports Competition Rumination Scale	Female	158	3.56	.73436	317	-.545	.586
	Male	161	3.61	.81591			

Table 3. t-Test Results Related to the Sports Branch Variable

Sport		N	$\bar{x}$	Std. Deviation	df	t	p
Trust	Individual Sports	134	2.86	.43571	317	-2.133	.034
	Team Sports	185	2.96	.40371			
Control	Individual Sports	134	2.26	.56498	317	.274	.785
	Team Sports	185	2.25	.55198			
Persistence	Individual Sports	134	3.11	.47445	317	-2.277	.023
	Team Sports	185	3.22	.40790			
Sports Mental Toughness Inventory	Individual Sports	134	2.76	.37427	317	-1.743	.082
	Team Sports	185	2.83	.34397			
Sports Competition Rumination Scale	Individual Sports	134	3.56	.82750	317	-.426	.670
	Team Sports	185	3.60	.73787			

Scale, no significant difference was observed between the groups ($p > .05$).

The comparison of mean scores according to the educational level variable is presented in Table 4.

When examining Table 4, according to the results of the one-way analysis of variance (ANOVA) conducted on educational status, no significant differences were observed between the groups in the Mental Toughness Inventory and its subdimensions in sports ($p > .05$). Similarly, no significant difference was found between the groups in the Sports Competition Rumination Scale ($p > .05$).

The comparison of mean scores according to the level of athleticism is presented in Table 5.

When examining Table 5, according to the results of the one-way analysis of variance (ANOVA) conducted on the level of athleticism, significant differences were observed between the groups ($p < .05$) in the Mental Toughness Inventory, specifically in the consistency and confidence subdimensions, as well as in the overall inventory scores. According to the LSD test results conducted after the ANOVA, amateur athletes had lower mean scores than professional and national athletes in the persistence subdimension and in the overall inventory. National athletes had higher mean scores than amateur

athletes in the confidence subdimension. When examining the Sports Competition Rumination Scale, no significant difference was found between the groups ($p > .05$).

The correlation results related to the athletic level variable are presented in Table 6.

As shown in Table 6, there was a low but statistically significant positive correlation between athletic level and the Sports Mental Toughness Inventory, including all of its subscales ($p < .05$). This indicates that as athletic level increases, participants' mental toughness scores also increase. A significant relationship was also found between the Sports Competition Rumination Scale and athletic level ($p < .05$). It was observed that rumination levels tended to rise with greater athletic experience.

The correlation results among the main study variables are presented in Table 7.

As shown in Table 7, significant correlations were found among several key variables. A positive relationship was observed between the subdimensions of the Mental Toughness Inventory, while a negative correlation was found between mental toughness and rumination levels ($p < .05$). This suggests that higher mental toughness is associated with lower ruminative thinking among athletes.

Table 4. ANOVA Results Related to Educational Level

Educational Status		N	$\bar{x}$	SS	Source of Variance	SS	sd	MS	F	p
Trust	Primary Education	79	2.87	.42656	Between Groups	.330	2	.165	.937	.393
	Associate Degree	30	2.98	.46513	Within Groups	55.700	316	.176		
	Bachelor's Degree	210	2.93	.41059						
Control	Primary Education	79	2.16	.57183	Between Groups	1.225	2	.612	1.989	.139
	Associate Degree	30	2.20	.52557	Within Groups	97.314	316	.308		
	Bachelor's Degree	210	2.30	.55250						
Persistence	Primary Education	79	3.20	.42191	Between Groups	.086	2	.043	.221	.802
	Associate Degree	30	3.18	.49101	Within Groups	61.458	316	.194		
	Bachelor's Degree	210	3.16	.44065						
Sports Mental Toughness Inventory	Primary Education	79	2.76	.35460	Between Groups	.176	2	.088	.686	.505
	Associate Degree	30	2.82	.38931	Within Groups	40.613	316	.129		
	Bachelor's Degree	210	2.81	.35547						
Sports Competition Rumination Scale	Primary Education	79	3.48	.86222	Between Groups	2.334	2	1.167	1.951	.144
	Associate Degree	30	3.43	.65578	Within Groups	189.027	316	.598		
	Bachelor's Degree	210	3.65	.75320						

Table 5. ANOVA Results Related to Athleticism Level

Level of Athleticism		N	$\bar{x}$	SS	Source of Variance	SS	sd	MS	F	p
Trust	Amateur	183	2.88	.41441	Between Groups	1.250	2	.625	3.604	.028
	Professional	81	2.93	.39137	Within Groups	54.781	316	.173		
	National Athlete	55	3.05	.45686						
Control	Amateur	183	2.25	.55340	Between Groups	.487	2	.244	.785	.457
	Professional	81	2.20	.55826	Within Groups	98.052	316	.310		
	National Athlete	55	2.33	.56735						
Persistence	Amateur	183	3.10	.44117	Between Groups	2.051	2	1.026	5.447	.005
	Professional	81	3.27	.36998	Within Groups	59.493	316	.188		
	National Athlete	55	3.25	.49292						
Sports Mental Toughness Inventory	Amateur	183	2.76	.35960	Between Groups	.845	2	.422	3.341	.037
	Professional	81	2.82	.30347	Within Groups	39.944	316	.126		
	National Athlete	55	2.90	.40919						
Sports Competition Rumination Scale	Amateur	183	3.59	.82332	Between Groups	.064	2	.032	.053	.949
	Professional	81	3.57	.69771	Within Groups	191.297	316	.605		
	National Athlete	55	3.61	.73260						

Table 6. Correlation Results Related to Athletic Level

Variable		Sports Mental Toughness Inventory	Sports Competition Rumination Scale	Trust	Control	Persistence
Athletic Experience	r	.223**	.165**	.203**	.152**	.152**
	p	.000	.003	.000	.007	.007

Note. **p < .01.

Table 7. Correlation Results Among Main Study Variables

Variable		Sports Mental Toughness Inventory	Trust	Control	Persistence
Sports Competition Rumination Scale	r	-.033	.100	-.291**	.131*
	p	.561	.074	.000	.019

Note. *p < .05, **p < .01.

Discussion

The aim of this study was to examine the relationship between mental toughness and rumination among university athletes in Turkey. The results showed that male athletes demonstrated higher levels of mental toughness compared with females, and team-sport athletes scored higher in the persistence and confidence subdimensions than individual-sport athletes. Mental toughness was also found to increase with athletic experience, while rumination levels showed a slight rise. A weak negative correlation was observed between the control subdimension of mental toughness and rumination, indicating that athletes with stronger self-control tend to experience fewer ruminative thoughts.

According to the analysis of the gender variable, significant differences were found in all subscales of the Sports Mental Toughness Inventory and in the total scores, with male athletes scoring higher than females. Factors such as type of sport, training duration, intensity, and socio-economic background may contribute to these differences. Studies with similar findings are reported in the literature [55, 56, 57], while some studies also indicate gender-based differences [58, 59, 60]. However, other research has reported results that differ from the present study [29, 41].

According to the analysis results conducted on the gender variable of the athletes participating in the study, no significant difference was found between the groups on the Sports Competition Rumination Scale ($p > .05$). In today's sports education, athletes undergo similar training processes regardless of gender. Furthermore, variables such as personality traits, rather than the gender variable, may be decisive in sports competition rumination. A review of the literature reveals that the results of the present study are similar to those of other studies [27, 44, 61]. However, it is also seen that there are studies in the literature that differ from the current research results [20, 43].

According to the analysis results regarding the sport branch variable of the athletes participating in the study, a significant difference was found in the persistence and confidence subdimensions of the Sports Mental Toughness Inventory ($p < .05$). It was observed that individuals whose branch was team sports had higher average scores. Studies in the literature have also reported differences in favour of team sports [62]. When the mean scores for the control subdimension and the entire inventory were examined, no significant differences were found between the groups. A review of the literature reveals studies that found no significant difference between team sports and individual sports [63]. İnceoğlu-Ayaz and İlgar-Doğan [64] found a difference in favour of team sports only in the trust

subdimension, while no significant difference was found in the other subdimensions and in the total score.

According to the analysis results regarding the sport branch variable of the athletes participating in the study, no significant difference was found between the groups on the Sports Competition Rumination Scale ($p > .05$). It is thought that factors such as individual differences, experiences, and motivations of the participants may have influenced this result [47]. Studies similar to the findings of the present research have also been reported in the literature [44, 47]. However, there are also studies that found significant differences [20].

According to the analysis results regarding the educational status variable of the athletes participating in the study, no significant difference was found between the groups in the subdimensions of the Sports Mental Toughness Inventory and in the mean scores for the entire inventory. The fact that the majority of the current research sample had undergraduate and graduate educational status may have contributed to this result. A review of the literature reveals studies showing similar results to the current research findings [57, 65, 66]. However, there are also studies that have identified significant differences in the Sports Mental Toughness Inventory in relation to the educational status variable [67, 68]. In the study conducted by Bacak and Yıldız [69], a significant difference was found only in the confidence subdimension.

According to the analysis results regarding the educational status variable of the athletes participating in the study, no significant difference was found between the groups on the Sports Competition Rumination Scale ($p > .05$). Since ruminative thinking may be more related to individual psychological characteristics and sporting experiences, the level of education may not have a sufficient effect on these situations. Consequently, no significant difference emerged in relation to educational level. When examining the differences between departments in the study conducted by Cevahircioğlu, Karakuş, and Şenel [44], no significant difference was found between the groups. It is observed that studies conducted on this subject in the literature are quite limited.

A low positive correlation was observed between the sporting experience of the athletes participating in the study and their average scores on the subscales of the Sports Mental Toughness Inventory and on the inventory as a whole. It is expected that the mental toughness of athletes increases as their experience increases. As athletes gain more experience, they encounter greater difficulties, stress, and competition anxiety, but they also develop stronger psychosocial parameters such as training, support, and motivation to cope with these challenges. A review of the literature reveals studies

that show similarities with the current research findings [40, 70, 71]. However, there are also studies that have not identified a significant relationship or difference between mental toughness and athletic experience [39, 72].

A low positive and significant correlation was also observed between the athletic experience of the athletes and the Sports Competition Rumination Scale. This finding may be related to factors such as an increasing number of competitions, past failures, performance pressures, and mistakes associated with athletic experience. A review of the literature reveals that studies have identified a significant relationship or difference between athletic level and rumination [20, 61].

There was no significant relationship between the mean scores of the Sports Competition Rumination Scale and the overall scores of the Sports Mental Toughness Inventory among the athletes participating in the study. However, a negative relationship was found with the persistence subscale and a positive relationship with the control subscale. The athletes' higher perception of control may indicate that they are able to move away from negative thoughts more quickly. At the same time, the positive relationship observed in the persistence subscale can be explained by the tendency to reflect more on events experienced after competition. A review of the literature reveals that studies on the relationship between rumination and mental toughness are quite limited. However, the existing studies have identified relationships between mental toughness and concepts such as negative thinking, dwelling on distress, and ruminative thinking [61, 73].

The results discussed in this section highlight the multifaceted relationship between mental toughness and rumination among university athletes. They show that gender, type of sport, educational level, and athletic experience influence certain aspects of mental toughness, while rumination seems to be more related to individual psychological traits and experiences. Although some associations were found between specific subscales of mental toughness and rumination, the overall relationship between these constructs remains complex. The reviewed literature also indicates both similarities and differences across studies, suggesting that future research should examine this relationship within broader psychological, social, and situational contexts.

Limitations of the Study

This study has several limitations that should be acknowledged. The research sample was limited to university athletes in Turkey, which may restrict the generalizability of the findings to athletes from other age groups or cultural contexts. The study relied on self-report questionnaires, which may be subject to response bias or inaccuracies in participants' self-assessment. In addition, the cross-sectional design prevents establishing causal relationships between mental toughness and rumination.

Future studies should include larger and more diverse samples from different sports and cultural backgrounds to improve the generalizability of the findings. Longitudinal and experimental designs could help clarify the causal relationships between mental toughness and ruminative thinking. Including qualitative approaches or mixed methods may also provide deeper insight into the psychological mechanisms that link these constructs and support the development of more effective psychological training programs for athletes.

Conclusions

This study revealed that the relationship between mental toughness and rumination in athletes is meaningful but complex. The study examined mental toughness and rumination in relation to demographic variables. The results indicate that gender is an important factor, with male athletes showing higher levels of mental toughness. The finding that team-sport athletes scored higher on the persistence and confidence subdimensions also suggests that the type of sport can influence mental toughness. The positive and significant relationship between sporting experience, mental toughness, and rumination may be explained by the fact that experienced athletes tend to reflect more on past failures, performance pressures, and anxiety, while also developing better strategies to cope with these difficulties.

This research highlights that achieving high performance in athletes requires preparation not only in the physical but also in the mental domain. Based on the findings, control skills related to mental toughness may play a key role in reducing rumination.

Conflict of Interest

The authors declare no conflict of interest.

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