


# Comparison of Mental Toughness Between Athletes in Individual and Team Sports of the CISM of the I.R.I.

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## ABSTRACT

**Objective:** The objective of this study was to compare the levels of mental toughness among athletes from different sports within the national military teams of the Islamic Republic of Iran, focusing on both individual and team sports.

**Methods and Materials:** This descriptive-applied study employed a causal-comparative (ex post facto) design. The sample consisted of 40 athletes from various sports, including volleyball, taekwondo, wrestling, pentathlon, and athletics. Participants were selected purposefully and completed the Sports Mental Toughness Questionnaire (SMTQ). Data were analyzed using one-way analysis of variance (ANOVA) to compare overall mental toughness and its subscales across different sports. Tukey's post-hoc test was employed to identify specific group differences where significant ANOVA results were found. The assumptions for ANOVA, including normality, homogeneity of variances, and independence, were checked and confirmed.

**Findings:** The one-way ANOVA revealed significant differences in overall mental toughness among the different sports ( $F(4, 39) = 27.02, p = 0.001$ ). Significant differences were also found in the subscales of confidence ( $F(4, 39) = 20.52, p = 0.000$ ), constancy ( $F(4, 39) = 17.54, p = 0.000$ ), and control ( $F(4, 39) = 6.43, p = 0.001$ ). Tukey's post-hoc test indicated that taekwondo and volleyball athletes exhibited significantly higher mental toughness scores compared to athletes from wrestling, athletics, and pentathlon.

**Conclusion:** The study concludes that the nature of the sport, particularly the level of physical and psychological demands, significantly influences mental toughness levels in athletes. Taekwondo and volleyball athletes displayed higher mental toughness, suggesting the need for sport-specific mental training programs. These findings highlight the importance of tailored psychological interventions to enhance mental toughness, particularly in competitive military sports environments.

**Keywords:** *Mental toughness, military athletes, sports psychology.*

## 1. Introduction

Several psychological factors have been identified, and their significance in sports has been highlighted due to the growth in the field of sports psychology. One important factor that may affect an athlete's performance and even their mental health is whether the sport involves individual or team performance. There are several fundamental differences between athletes in team and individual sports that should be clarified to provide appropriate support to athletes when necessary. Given the increasingly competitive nature of sports, certain characteristics such as motivation, confidence, coping strategies, self-esteem, and mental hardiness all play crucial roles in an athlete's success and the maintenance of their mental health (Schaal et al., 2011). Previous research results have shown that there is a significant difference in mental skills between individual and team athletes. Team sport athletes scored significantly higher in levels of mental skills. It is suggested that working in a team with other athletes may help individuals stay focused during competition and training (Maher, 2016). Burnout and stress are also factors that can affect athletes' self-esteem and sports identity. These factors can cause a major decrease in athletic performance and, in some cases, may lead an individual to quit competitive sports. Burnout and stress can result from overtraining, low self-esteem, and a lack of mental hardiness in the face of excessive stress and pressure in sports. Kobasa (2016) defines mental hardiness as a combination of beliefs about oneself and the world, consisting of three orientations: commitment, control, and challenge. She considers mental hardiness to be a belief that protects an individual from external and internal pressures (Kobasa, 2016). Mental hardiness is the ability to accurately perceive the world around oneself and make correct decisions about oneself. Mental hardiness is conceptualized as mental toughness in sports and can play a significant role in enhancing athletic performance (Jalili et al., 2011). Findings confirm the hypothesis that elite athletes have higher levels of mental toughness. In general, it should be noted that mentally tough individuals are more likely to evaluate stressful situations as opportunities for challenge rather than threats. Nafian et al. (2014) found that individual and team athletes differ in levels of stress and burnout, with team athletes reporting significantly higher levels than individual athletes. This could be due to the pressure from a coach, manager, or team members (Nafian et al., 2014). Mental toughness is an essential characteristic of a successful athlete. It is accepted as one of the fundamental

qualities underlying performance and excellence in a sports environment (Gucciardi et al., 2015). Mental toughness is the ability to endure adversity and challenging situations and the ability to strive at one's best and maintain focus and confidence after a loss. Although several studies have shown significant differences in levels of mental toughness between team and individual sports (Pintoa, 2015), the results of another study contradict these findings.

Physical activity and fitness have been essential needs for military personnel in armed forces worldwide for years (Chenary et al., 2022; Yaghoubi et al., 2022). Despite advancements in technology and mechanical sciences in military tools, a high level of physical fitness remains a fundamental need for military personnel to perform their duties effectively and efficiently. The nature of military activity requires military personnel to maintain appropriate physical fitness during both peacetime and wartime, and in general, military skills training requires optimal combat and physical fitness (Cao et al., 2023; Fathi Ashtiani & Jafari Kandovan, 2022). Moreover, military personnel must cope with heavy and prolonged physical activity in areas with limited resources. Thus, considering all these factors, attention to the physical fitness of military personnel is an essential and unavoidable necessity. Given these explanations, it can be stated that the ability to align personal capacities with physical demands in performing duties can lead to improved job performance, job satisfaction, increased attention, reduced injuries, and decreased time wastage (Ahmadi & Siyahi, 2017; St. Cyr et al., 2014). Military and law enforcement personnel must recognize that high mental and physical fitness are interdependent and both are of high importance.

In the present study, given that there are few studies on mental toughness in the country and the existing research has primarily focused on general psychological approaches with less emphasis on sports-specific aspects, and since research on military athletes' mental toughness has never compared mental toughness across different skill levels and in individual contact and non-contact sports, it is evident that more research is needed to investigate variables such as skill level and type of sport. Additionally, contradictory results regarding the mental toughness of skilled, semi-skilled, and novice athletes have been found in various studies. Our goal is to examine the role of these variables on mental toughness across different skill levels of athletes to provide more comprehensive information and help resolve existing contradictions. The aim of this study is to answer the question of what differences exist in mental toughness

between athletes with different skill levels and types of sports (contact and non-contact), and what impact the interaction between skill level and type of sport has on individuals' mental toughness.

## 2. Methods and Materials

### 2.1. Study Design and Participants

This research is a descriptive-applied study of military sports and is of a causal-comparative (*ex post facto*) nature. The statistical population of this study consisted of players who were members of the national military teams of the Islamic Republic of Iran in the sports of volleyball, taekwondo, wrestling, pentathlon, hockey, and athletics. To obtain the required sample size, a preliminary study was conducted on the sports disciplines of the military athletes of the Islamic Republic of Iran who were preparing for competitions. After determining the sports disciplines present in the competitions, six sports were selected purposefully and conveniently. The sample consisted of 12 volleyball players, 8 taekwondo players, 5 pentathlon athletes, 7 wrestlers, and 8 track and field athletes, all of whom accurately completed the questionnaires; a total of 40 participants completed the questionnaires correctly and completely.

After prior coordination with the head of the Physical Education Department of the Armed Forces (Sardar Baran Cheshmeh) and correspondence with the relevant federations regarding the research topic and necessary cooperation with the researcher, initial guidance was provided to the athletes during their training and competitions. The athletes were then given instructions on how to complete the questionnaires, and they responded to the requested items under relatively uniform conditions.

### 2.2. Data Collection Tool

The instrument used for data collection was the Sports Mental Toughness Questionnaire (SMTQ) by Golby and Sheard (2010). The SMTQ, the only specific tool for measuring mental toughness in sports to date, identifies three key factors—confidence, constancy, and control—as the main components of mental toughness. The researchers claimed that these three factors are the primary characteristics of distinguished athletes and coaches who possess enduring and resilient minds, based on their experience working with them (Golby & Sheard, 2009). This questionnaire consists of 14 items, with 6 items measuring

the confidence subscale, 4 items measuring the constancy subscale, and 4 items measuring the control subscale. Each item has five response options based on the Likert scale (from completely incorrect to completely correct). The validity and reliability of this questionnaire have been fully confirmed by Golby and Sheard (2010). The Cronbach's alpha coefficients for the confidence, constancy, and control subscales were reported as 0.80, 0.74, and 0.71, respectively. The validity of the questionnaire was also confirmed through confirmatory and exploratory factor analyses. In Iran, in Kashani's research, the reliability of this questionnaire was examined by determining the Pearson correlation coefficient in the test-retest method (response stability) and by determining Cronbach's alpha coefficient to assess internal consistency (internal stability) of the items, in the preliminary distribution of the questionnaire, and it was confirmed. Kashani reported a Pearson correlation coefficient of 0.72 in the test-retest method with a two-week interval, and Cronbach's alpha coefficient for all three subscales was above 0.70. For content validity, Kashani used Lawshe's (1975) content validity ratio (CVR) and Lynn's (1986) content validity index (CVI). Accordingly, the 14-item mental toughness questionnaire in Iran has standard validity and reliability and was used in this study (Jafarpoor et al., 2023; Seyed Ali Tabar & Zadhasn, 2023).

### 2.3. Data Analysis

For data analysis, statistical methods were used at both descriptive and inferential levels. The descriptive analysis involved using measures of central tendency and standard deviation to assess the participants' descriptive and structural characteristics. For hypothesis testing, inferential statistical method, one-way analysis of variance (ANOVA) test was utilized. The significance level for all hypotheses was set at  $\alpha = 0.05$ .

## 3. Findings and Results

The demographic characteristics of the study participants are as follows: The taekwondo athletes had an average age of 22.62 years, with 7 years of sports experience and 11 hours of training per week, comprising 8 participants. The wrestlers had an average age of 21.29 years, with 8 years of sports experience and 14 hours of training per week, comprising 7 participants. The track and field athletes had an average age of 22.25 years, with 6 years of sports experience and 10 hours of training per week, comprising 8 participants. The volleyball players had an average age of

21.42 years, with 7 years of sports experience and 16 hours of training per week, comprising 12 participants. Finally, the pentathlon athletes had an average age of 21.40 years, with

6 years of sports experience and 14 hours of training per week, comprising 5 participants.

**Table 1**

*Means, Standard Deviations, and Sample Sizes by Sport and Subscales*

Sport	Subscale	Mean	SD	SEM	N
Taekwondo	Confidence	21.50	2.07	0.07	8
	Constancy	16.00	1.30	0.46	
	Control	14.00	2.00	0.70	
Wrestling	Confidence	16.14	1.34	0.50	7
	Constancy	11.14	2.11	0.80	
	Control	10.71	2.49	0.94	
Athletics	Confidence	17.12	2.51	0.91	8
	Constancy	11.50	1.41	0.50	
	Control	10.38	1.99	0.70	
Volleyball	Confidence	25.33	3.77	1.08	12
	Constancy	15.92	1.97	0.57	
	Control	14.14	3.01	0.87	
Pentathlon	Confidence	16.66	1.14	0.51	5
	Constancy	10.10	2.73	1.22	
	Control	9.40	1.14	0.51	

Before conducting the one-way ANOVA, the assumptions of normality, homogeneity of variances, and independence were checked and confirmed. The normality of the data was assessed using the Shapiro-Wilk test, with p-values ranging from 0.112 to 0.340 across all groups, indicating that the data were normally distributed. Homogeneity of variances was evaluated using Levene's test, which yielded a non-significant result ( $F(4, 35) = 1.21, p = 0.319$ ), confirming that the variances were equal across

the groups. Independence of observations was ensured by the study design, as each participant's data were collected independently without influence from other participants. Given that all assumptions were met, the one-way ANOVA was deemed appropriate for analyzing the data.

In Table 2, the results of the one-way analysis of variance (ANOVA) to examine the differences in mental toughness and its components among athletes in team and individual sports are reported.

**Table 2**

*One-Way Analysis of Variance (ANOVA) for Mental Toughness*

Source	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	289.72	4	72.43	27.02	0.001
Within Groups	93.80	35	2.68		
Total	383.53	39			

Based on the results, there is a significant difference in mental toughness among athletes from different sports ( $P = 0.001, F(4, 39) = 27.02$ ). Tukey's post-hoc test was used to compare differences between groups. The results showed significant differences in mental toughness scores between taekwondo and wrestling ( $P = 0.001$ ), taekwondo and athletics ( $P = 0.001$ ), and taekwondo and pentathlon ( $P =$

0.001). Additionally, significant differences were found between wrestling and volleyball ( $P = 0.001$ ), athletics and volleyball ( $P = 0.001$ ), and volleyball and pentathlon ( $P = 0.001$ ).

In Table 3, the results of the one-way analysis of variance (ANOVA) to examine the mental toughness subscales among different sports are reported.

**Table 3**

*One-Way Analysis of Variance (ANOVA) for Mental Toughness Subscales*

Subscale	Source	Sum of Squares	Df	Mean Square	F	Sig.
Confidence	Between Groups	585.37	4	146.34	20.52	0.000
	Within Groups	249.59	35	7.13		
	Total	834.97	39			
Constancy	Between Groups	252.20	4	63.05	17.54	0.000
	Within Groups	125.77	35	3.59		
	Total	377.97	39			
Control	Between Groups	145.87	4	36.46	6.43	0.001
	Within Groups	198.50	35	5.67		
	Total	344.37	39			

The one-way ANOVA indicated significant differences among the sports in the mental toughness subscales ( $P < 0.05$ ). Tukey’s test results showed significant differences in the confidence subscale between taekwondo and wrestling ( $P = 0.004$ ), taekwondo and athletics ( $P = 0.019$ ), taekwondo and volleyball ( $P = 0.026$ ), and taekwondo and pentathlon ( $P = 0.022$ ). Additionally, significant differences were observed between wrestling and volleyball ( $P = 0.026$ ) and athletics and volleyball ( $P = 0.001$ ).

In the constancy subscale, significant differences were found between taekwondo and wrestling ( $P = 0.001$ ), taekwondo and athletics ( $P = 0.001$ ), and taekwondo and pentathlon ( $P = 0.001$ ). Wrestling also showed significant differences with volleyball ( $P = 0.001$ ), and there were significant differences between athletics and volleyball ( $P = 0.001$ ). The volleyball sport also had significant differences with the pentathlon ( $P = 0.001$ ).

In the control subscale, significant differences were shown between taekwondo and athletics ( $P = 0.034$ ) and taekwondo and pentathlon ( $P = 0.014$ ). Additionally, wrestling with volleyball ( $P = 0.047$ ) and athletics with volleyball ( $P = 0.016$ ) were also significant. There was a significant difference between volleyball and pentathlon ( $P = 0.008$ ).

**4. Discussion and Conclusion**

Overall, the purpose of the present study was to examine the mental toughness of national military athletes in the I.R.I. The results showed that there are differences in mental toughness scores among athletes from different sports, indicating that taekwondo and volleyball athletes exhibit higher levels of mental toughness compared to athletes from other sports. This difference may be attributed to the combative nature of taekwondo compared to athletics and even military pentathlon.

Although these findings do not hold true for wrestling, which despite being a highly energetic sport, showed lower mental toughness scores compared to taekwondo and volleyball athletes in this study. It is possible that in taekwondo, factors such as high concentration power, visualization ability, and practice play a more significant role in the success of taekwondo athletes during competition. Considering that taekwondo is a two-person competition, a successful taekwondo athlete must score points against their opponent and prevent them from scoring. Thus, precision, focus on the opponent’s movements, timely reactions, and maintaining concentration when points are lost and need to be regained play a crucial role in executing strikes against the opponent. The findings of the present study also align with prior studies (Jalili et al., 2011; Pintoa, 2015). However, these results are inconsistent with some findings (Nicholls et al., 2009) that used a 48-item Mental Hardiness Questionnaire (MHQ48) and compared the differences between sports types, finding no significant difference in mental hardiness between athletes in team contact sports and individual non-contact sports. Possible reasons for differences in findings could be due to the different questionnaires used; Nicholls used a 48-item questionnaire, whereas the present study used the 14-item SMTQ. Nicholls and colleagues also suggested that mental hardiness is a stable personality trait, and therefore, not influenced by different situations and conditions (Nicholls et al., 2009).

Another finding of this study was that taekwondo athletes showed significant differences in mental toughness scores compared to wrestling, athletics, and pentathlon, but not with volleyball. The theory of personal construct suggests that each individual perceives and interprets reality through their mental constructs, which are formed based on personal experiences and observations (Ashton & Lee, 2001). According to the researchers, self-confidence, motivation, overcoming pressure and anxiety, task-related focus,

lifestyle-related focus, regaining psychological control, and coping with physical pain are some of the most important characteristics of mentally tough individuals.

Additionally, the results of the mental toughness subscales (confidence, constancy, and control) across different sports showed significant differences among these subscales. Specifically, in the confidence subscale, significant differences were observed between taekwondo and wrestling, athletics, volleyball, and pentathlon, as well as between wrestling and volleyball, and athletics and volleyball. Differences between volleyball and pentathlon were also noted.

Higher mental toughness in team sport players compared to individual sport players can be attributed to the team setting, where players consistently receive support from other team members (Pintoa, 2015). Zeng et al. (2003) reported significantly higher levels of confidence among team athletes compared to individual athletes. This gives us reason to believe that mental toughness levels in team athletes will also be higher (Zeng, 2003). This might be because team athletes are generally more aggressive, competitive, and prideful than individual athletes, possibly due to the team environment where teammates regularly compete with each other, necessitating greater mental toughness. Additionally, athletes participating in team sports are significantly influenced by "team resilience." In a team, individuals pool their resources to positively cope with adversities and challenges, responding and coping effectively (Wright & Masten, 2015). Previous studies also indicate that team athletes are more competitive than individual athletes. Moreover, motivation plays a crucial role in sports competitions, which is more clearly observed in the performance of team athletes (Jalili et al., 2011).

Uncertainty about their skills is the main problem for athletes who cannot "replicate in competition" what they easily do every day in practice. Several mental barriers can interfere with this: fear of failure, perfectionism, high expectations, focusing on results rather than the process, and the pressure of performing in a major competition. To perform at their best, athletes must universally apply the concept of confidence, from youth athletes to professionals, and trust in what they have learned in practice. Given the points mentioned, it is possible that wrestling, athletics, and pentathlon athletes scored lower in the confidence subscale due to fear of failure, high expectations, and even psychological pressure during competition. By implementing strategies to avoid these conditions,

confidence can be maximized in athletes, enabling them to perform at their best when facing challenges and difficulties.

In the constancy subscale, significant differences were found between taekwondo and wrestling, athletics, and pentathlon, as well as between wrestling and volleyball, and athletics and volleyball. Additionally, volleyball showed significant differences with pentathlon. Overall, it can be stated that mental toughness is a critical psychological factor in both individual and team sports. Skilled athletes in individual sports require high levels of mental toughness, particularly in contact sports such as taekwondo and wrestling, which, due to their unique nature and higher physical and psychological pressures compared to non-contact sports (athletics and pentathlon), require athletes with higher levels of mental toughness for success. However, it is important to note that the nature of combat sports such as taekwondo creates conditions in which athletes are more diligent and competitive, while the philosophy of combat sports compels athletes to persist through physical and psychological pressures during competition and training, pursuing their goals with greater competitiveness compared to other individual sports. Finally, in the control subscale of mental toughness, significant differences were found between taekwondo and athletics, and between taekwondo and pentathlon. Additionally, significant differences were found between wrestling and volleyball, and between athletics and volleyball. There were also significant differences between volleyball and pentathlon. These findings indicate that in the control subscale, there are significant differences among non-contact sports, but no significant differences among contact sports (taekwondo and wrestling). Another point that can be derived from this finding is that athletes in pentathlon and athletics, due to the nature of their sports (which involve no direct competition or contact with an opponent) and possibly due to different personality traits compared to taekwondo athletes, wrestlers, and volleyball players, may have some emotional disturbances or problems. However, further and more comprehensive scientific research is needed to confirm this hypothesis.

Overall, considering the research variables and reviewing the hypotheses, the general conclusion is that in the mental toughness scale, both in the main factors and subscales, there are significant differences between two sports and the others. These two sports are taekwondo and the popular sport of volleyball, both of which showed significant differences with other sports in the three dimensions of confidence, constancy, and control. It is important to note that various

factors such as timing, sports experience, age, level of activity, the nature of the sport, as well as individual differences, play a significant role in the development of desirable psychological skills. Research shows that mentally tough athletes are better able to maintain a favorable mindset during competition, manage criticism, setbacks, and poor performance, overcome defeats or recover from them, take personal responsibility for performance, and remain calm and composed under pressure. Moreover, the components of mental toughness, including confidence, anxiety management, and focus, are all positively associated with athletic performance (Pintoa, 2015).

Given that mental toughness is a crucial psychological factor in athletes' ability to recover during competition and regain lost points or maintain an acceptable level of performance, coaches are advised to select athletes with higher levels of psychological skills (mentally tougher individuals) for competitions. Additionally, experience is a very important factor in mental toughness. Coaches and officials are encouraged to provide more competitive and high-pressure environments for athletes. Athletes should be exposed to competitions with more professional and technically and tactically superior opponents, so that if they fall behind in points, coaches can use more effective psychological techniques to bring them back into the game.

Mental toughness is one of the psychological skills that significantly influences athletic success and is largely developable and growable. Coaches and officials need experienced psychologists to help develop mental skills alongside physical fitness in training camps, which will increase athletes' chances of success in sports competitions, including world championships in military sports.

## 5. Suggestions and Limitations

One of the primary limitations of this study is the relatively small sample size, which may limit the generalizability of the findings to the broader population of military athletes. Additionally, the study's cross-sectional design prevents the establishment of causal relationships between mental toughness and its influencing factors. The reliance on self-reported measures, such as the Sports Mental Toughness Questionnaire (SMTQ), may also introduce response bias, as athletes might have provided socially desirable answers. Furthermore, the study did not account for potential confounding variables such as the athletes' training environment, coaching style, or prior

psychological interventions, which could influence the results.

Future research should consider expanding the sample size and including a more diverse range of sports to enhance the generalizability of the findings. Longitudinal studies are recommended to explore the causal relationships between mental toughness and other psychological or environmental factors over time. Additionally, it would be valuable to examine the role of specific psychological interventions or mental skills training programs in enhancing mental toughness among military athletes. Researchers should also consider using mixed methods, combining quantitative and qualitative approaches, to gain a deeper understanding of the underlying mechanisms and personal experiences that contribute to mental toughness in different sports contexts.

The findings of this study suggest that mental toughness is a critical factor in athletic performance, particularly in high-stakes environments such as military sports. Coaches and sports psychologists working with military athletes should focus on developing targeted interventions to enhance mental toughness, including mental skills training and resilience-building programs. It is also important to consider individual differences in mental toughness when designing training regimens and to provide personalized support based on the specific needs of each athlete. Furthermore, incorporating psychological assessments into regular training routines could help identify athletes who may benefit from additional psychological support, ultimately contributing to improved performance and well-being in competitive settings.

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## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations, such as informed consent and confidentiality, were observed in conducting this study.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

## Authors' Contributions

Not applicable.

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