

## Research Paper

## Investigating the Predictive Role of Mental Toughness in Resilience and Distress Tolerance of Paralympic Athletes



Mehdi Fakhri<sup>1</sup> , Anahita Khodabakhshi-Koolae<sup>2\*</sup> , Mohammad Reza Falsafinejad<sup>3</sup> 

1. Department of Counseling, Faculty of Humanities and Social Sciences, Science and Research Branch, Islamic Azad University, Tehran, Iran.

2. Department of Psychology & Educational Sciences, Faculty of Humanities, Khatam University, Tehran, Iran.

3. Department of Assessment and Measurement, Faculty of Psychology & Educational Sciences, Allameh Tabataba'i University, Tehran, Iran.



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**ABSTRACT**

**Objectives:** The outstanding performance of Paralympic athletes improves their quality of life and resilience. The present study explores the role of mental toughness in predicting resilience and distress tolerance in Paralympic athletes.

**Methods:** This descriptive and correlational study was conducted on Paralympic athletes who were members of the Iran Sports Federation for the Disabled (IRISFD) and were invited to attend the Paralympic games. The participants were 128 Paralympic athletes (n=60 women and n=68 men) who were selected via the simple random sampling method. The data were collected using the mental toughness questionnaire-48 (MTQ48), the Connor-Davidson resilience scale (CD-RISC) and the distress tolerance scale (DTS). The collected data were analyzed using the multiple regression analysis by the SPSS software, version 26.

**Results:** The results showed that mental toughness can predict resilience and distress tolerance in Paralympic athletes. Moreover, mental toughness accounted for 47.8% of the variances in resilience and 28.6% of the variance in distress tolerance. In addition, the analysis of the standard beta coefficients showed that mental toughness can positively and significantly predict resilience and distress tolerance in Paralympic athletes, with  $\beta$  coefficients equal to 0.69 and 0.53, respectively.

**Discussion:** Mental toughness is a psychological construct that affects the performance and success of Paralympic athletes and increases their resilience and distress tolerance. Thus, a part of the preparation process, namely training and skill development programs for Paralympic games should focus on the mental toughness of athletes.

**Keywords:**

Mental toughness, Resilience, Distress tolerance, Athletes, Disability, Paralympics

## \* Corresponding Author:

Anahita Khodabakhshi-Koolae, Associate Professor.

Address: Department of Psychology and Educational Sciences, Faculty of Humanities, Khatam University, Tehran, Iran.

Tel: +98 (21) 89174000

E-mail: [a.khodabakhshid@khatam.ac.ir](mailto:a.khodabakhshid@khatam.ac.ir)



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## Highlights

- Mental toughness is a key psychological construct that affects a Paralympic athlete's perseverance and success in competitive sports.
- Paralympic athletes with high mental toughness overcome many obstacles, such as inflexibility, dependence and ineffective cognitive strategies in major international sports events.
- The present study revealed that Paralympic athletes with higher resilience and distress tolerance had higher levels of mental toughness.

## Plain Language Summary

In addition to physical preparations and proper nutrition and training, Paralympic athletes need some psychological characteristics that help them achieve championships in individual or group sports in national and world competitions events. One of these characteristics is mental toughness. This study showed that Paralympic athletes with higher resilience and distress tolerance had higher levels of mental toughness.

## Introduction

**D**isability refers to a physical or mental condition that makes it difficult for the affected person to perform certain activities and interact with the surrounding world. About 1.3 billion people worldwide suffer from disabilities, which account for 16% of the world's population [1, 2].

Disability means the loss or limitation of opportunities to take part in the life of the community on an equal level with others and compared to normal people, people with disabilities experience some restrictions both in individual performance and communication with others [3]. Disability makes a person face problems during life and doing a job, and it is not just a health-related problem, but a complex phenomenon that reflects the interaction between the characteristics of a person's body and the characteristics of the community in which the person lives [4].

Many people in the community were born disabled for various reasons, or they will become disabled based on multiple acquired factors caused by injuries during sports activities, traffic accidents, war, occupational accidents, illness and other cases [3]. Research shows that participation in sports and social activities reduces the psychological and physical consequences of disability [3]. Individual or group sports, especially championship sports activities, can greatly help to increase the hope and quality of life of people with disabilities. Athletes are more psychologically resistant to life problems and

the resulting pressures [5]. Resiliency is a personality trait that enables the athlete to respond to obstacles and failures in competitive sports [6].

One of the psychological constructs that have been considered in studies related to athletes with disabilities is resilience as a personality trait. To this end, the training and promotion of resilience in athletes are considered a goal in sports teams and clubs and it helps the autonomy and independence of athletes with disabilities [5, 6]. Resilience is defined as an adaptive and positive characteristic during and after a traumatic event [7]. Sports psychologists suggest resilience as a solution-based and necessary approach to adapting to difficult life events [8].

Moreover, resilient people have good tolerance and patience for distress and troubles ahead. A person's ability to manage an emotional event without feeling discomfort, stress and dizziness is called distress tolerance [9]. Tolerating distress and difficult feelings and emotions can help a person return to a state of balance faster with the appearance of stressful symptoms [10]. Distress tolerance is considered an effective skill in dealing with psycho-social pressures and tensions [11]. Shapiro and Malone (2016) concluded that sports and sports activities give people with disabilities the opportunity for social participation and autonomy, improve their quality of life and reduce their stress and psychological distress [12]. Furthermore, mental toughness as a personality trait can lead to an increase in resilience and distress tolerance and a decrease in mental exhaustion in athletes with disabilities [13, 14].

Mental toughness is a key psychological construct that affects a person's perseverance and success in the functional domain. A study examined the concept of mental toughness in Paralympic athletes and the results showed that mental toughness from the perspective of Paralympic athletes means determination, pragmatism, optimism, flexibility, self-belief, independence and autonomy, and having cognitive strategies, such as logical thinking, goal setting, and pain management and control. Athletes with a high level of mental toughness can win by overcoming very difficult situations [15]. The lives of athletes, especially athletes with disabilities, do not always go according to predetermined conditions and expectations, and they need to interact with challenges with mental toughness. Thus, features, such as resilience and distress tolerance are critical for athletes with disabilities [16].

Engaging in sports activities and having a sportsmanship spirit contribute to improving physical and mental health. By relying on athletes with disabilities and sports and Paralympic federations, Iranian officials help athletes with disabilities display their abilities and capacities at international competitions. However, to help athletes with disabilities achieve accomplishments in sports competitions and appreciate their efforts, it is essential to provide training, raise their awareness, and enhance personality traits, such as resilience, distress tolerance, and mental toughness. Following a review of the literature, no study has yet addressed the predictive role of mental toughness in resilience and distress tolerance in Paralympic athletes. Thus, it is essential to examine psychological abilities and discover positive psychological traits of athletes with disabilities. Competitions between athletes for medals, problems with sports teams, challenges in holding national and international competitions, budget and economic constraints, and even family problems of athletes lead to psychological distress them. Thus, focusing on athletes' psychological characteristics can improve their positive personalities. Accordingly, the present study investigates the role of mental toughness in predicting resilience and distress tolerance in Paralympic athletes.

## Materials and Methods

### Research design

This descriptive and correlational study was conducted on athletes with disabilities from various sports endorsed by the [Iran Sports Federation for the Disabled \(IRISFD\)](#) in 2022.

### Study participants

The criteria for enrollment in the study were as follows: 1) Informed consent to participate in the study, 2) Having a high school diploma to understand the items in the questionnaires and complete them independently, 3) Having one of the physical-motor disabilities, and 4) Not suffering from mental disorders as diagnosed by the psychiatrist of the [Federation](#). Meanwhile, the exclusion criteria were not completing the items in the questionnaires and having mental disabilities.

The sample size was estimated based on the predictor variable. Following multivariable regression analysis and using the [Equation 1](#):

$$1. N \geq 50 + 8m$$

128 athletes with disabilities (60 women and 68 men) were selected as the participants through simple random sampling using a list of names with even and odd scores. Subsequently, the questionnaires were distributed, completed, and collected from June 2022 to September 2022. The participants were selected from basketball, shooting, goalball, volleyball, badminton, boccia, tennis, archery, judo, cycling, fencing, swimming, soccer, sailing and weight-lifting athletes.

### Study measurements

The questionnaires were completed by the participants after obtaining informed consent from them in person. The data were collected using the mental toughness questionnaire-48 (MTQ48), the Connor-Davidson resilience scale (CD-RISC) and the distress tolerance scale (DTS).

MTQ48 was developed by Clough et al. [17]. It is a 48-item instrument with four subscales of challenge, commitment, control, and trust. The trust subscale measures two factors, namely self-trust and interpersonal trust [17]. The items in the questionnaire are scored based on a 5-point Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree). The reliability coefficient for the questionnaire was estimated at 0.90 using the test-retest method [18]. In this study, the reliability of the questionnaire was confirmed using the Cronbach  $\alpha=0.85$ .

CD-RISC (2003) was used to measure the participants' resilience levels. This 25-item instrument measures five factors as follows: 1) High standards, tenacity and competence; 2) Handling negative emotions, trusting one's instincts, and perceived benefits of stress; 3) Having a positive attitude to change and secure relationships; 4) Perceived control;

5) Spirituality. The instrument has 25 items that are rated based on a 5-point Likert scale ranging from 0 (“not true at all”) to 5 (“true all the time”) [19]. In the present study, the overall score of the instrument was used as a measure of the participants’ resilience. The reliability coefficient of the scale was reported to be 0.87.

DTS was developed by Simons and Gaher [10]. This scale is a self-rated tool and the items in this scale measure distress tolerance based on the individual’s capabilities for distress tolerance, subjective assessment of distress, and the level of attention to negative emotions if they occur, and regulatory measures for distress tolerance. This scale contains 15 items and four subscales as follows: 1) The ability to tolerate emotions (tolerance); 2) Assessment of the emotional situation as acceptable (appraisal); 3) The level of attention absorbed by the negative emotion and relevant interference with functioning (absorption); and 4) Ability to regulate efforts to reduce distress (regulation). The items in this scale are scored based on a 5-point Likert scale from 5 (strongly agree) to 1 (strongly disagree), with higher scores on this scale indicating higher distress tolerance [10]. The present study used the total score to evaluate the participants’ distress tolerance. In this study, the reliability of the scale was confirmed with the Cronbach  $\alpha$  method at 0.78.

### Statistical analysis

The collected data were summarized using descriptive statistics, including frequency, Mean $\pm$ SD and percentage. In addition, the research hypotheses were tested using the Pearson correlation test and multiple regression analysis using the SPSS software, version 26.

### Result

Table 1 shows the participants’ demographic characteristics; Table 2 demonstrates the descriptive statistics for the research variables; Table 3 presents the correlations between resilience and mental toughness and its subscales.

The Pearson correlation coefficients indicate challenge, commitment, and trust have positive and significant relationships with resilience. Thus, promoting mental toughness in Paralympic athletes can enhance their resilience. Table 4 shows the correlation coefficients between distress tolerance and mental toughness and its subscales.

The Pearson correlation coefficients in the table above indicate challenge, commitment, and trust have positive and significant relationships with distress tolerance confirming that promoting mental toughness in Paralympic athletes can enhance their distress tolerance.

The results of the multiple regression analysis in Table 5 show that mental toughness can predict resilience and explain 47.8% of the variances of resilience in Paralympic athletes. In addition, mental toughness can also predict distress tolerance and explains 28.6% of the variances in distress tolerance in Paralympic athletes.

The analysis of the standard regression coefficients in Table 5 shows that mental toughness was a significant predictor of resilience in Paralympic athletes. Accordingly, mental toughness can positively and significantly predict resilience in Paralympic athletes ( $P=0.01$ ,  $\beta=0.69$ ). The data also show that mental toughness was a significant predictor of distress tolerance in Paralympic athletes, and it can positively and significantly predict distress tolerance in athletes ( $P=0.01$ ,  $\beta=0.53$ ).

### Discussion

The findings of the present study revealed that mental toughness as a psychological trait can predict distress tolerance and resilience in Paralympic athletes. Similarly, Singh et al. (2022) concluded that mental toughness is the key to athlete success in sports fields. Moreover, by comparing the mental toughness of Paralympic and non-Paralympic athletes, they concluded that Paralympic athletes were more motivated to win compared to their non-Paralympic counterparts [20].

Mental toughness is a personality trait that is composed of challenge, control, commitment and confidence and can be associated with higher levels of resilience. It can help a person in stressful situations to turn an event or situation into an experience for growth and development instead of encountering a debilitating situation. In other words, people who have a strong sense of commitment are diligent in finding ways to transform their experiences into new and original experiences and rely on their abilities instead of evading difficult situations. These people believe that they can influence the course of events in their lives and surroundings through their efforts. Thus, they do not consider themselves passive victims of circumstances [14, 21]. Furthermore, individuals who are strong in challenging stressful situations, believe that they can achieve self-fulfillment through the continuous growth of wisdom and reasoning and by obtaining experiences rather than through easy ways [14]. Mental toughness strategies along with positive thinking and resilience in facing everyday tasks also increase people’s distress tolerance. Mental toughness is a personality trait that influences other psychological factors, such as self-control, self-awareness, and self-esteem [22, 23].

**Table 1.** The participants' demographic characteristics

Variables	Categories	No. (%)
Gender	Female	60(46.9)
	Male	68(53.1)
Education	Lower education	2(1.6)
	High school diploma	36(28.1)
	Associate degree	29(22.7)
	Bachelor's degree	44(34.4)
	Postgraduate degree	17(13.3)
Age (y)	<18	7(5.5)
	18-23	33(25.8)
	23-28	28(21.9)
	28-33	24(18.8)
	33-38	22(17.2)
	>38	14(10.9)
Sports	Shooting	6(4.7)
	Tennis	10(7.8)
	Fencing	9(7.0)
	Sailing	10(7.8)
	Weight-lifting	6(4.7)
	Basketball	10(7.8)
	Badminton	12(9.4)
	Volleyball	11(8.6)
	Boccia	11(8.6)
	Goalball	10(7.8)
	Soccer	11(8.6)
	Cycling	8(6.3)
	Swimming	6(4.7)
Judo	8(6.3)	
Total		128(100.0)

**Table 2.** The descriptive statistics for the research variables

Variables	Mean±SD
Resilience	78.79±8.15
Distress tolerance	45.96±7.06
Challenge	27.75±6.67
Control	36.00±6.52
Commitment	31.18±6.21
Trust	41.50±7.89
Mental toughness	137.48±9.80

Iranian Rehabilitation Journal

**Table 3.** The correlation matrix of resilience and mental toughness and its subscales

Variables	1	2	3	4	5
Resilience	1				
Challenge	0.478*	1			
Control	0.114*	0.441*	1		
Commitment	0.669*	0.716*	0.600*	1	
Trust	0.327	0.507	0.516	0.539	1

\*P<0.001.

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**Table 4.** The correlation matrix of distress tolerance and mental toughness and its subscales

Variables	1	2	3	4	5
Distress tolerance	1				
Challenge	0.353*	1			
Control	0.279*	0.441*	1		
Commitment	0.254*	0.716*	0.600*	1	
Trust	0.330	0.507	0.516	0.539	1

\*P<0.001.

Iranian Rehabilitation Journal

**Table 5.** The results of multivariate regression analysis

Variables	Non-standard Coefficients		Standard Coefficients		Sig.	
	B	Standard Error	β	T		
Mental toughness	Resilience	0.430	0.040	0.692	10.749	0.0001*
Mental toughness	Distress tolerance	0.198	0.028	0.535	7.113	0.0001*

\*P<0.001.

Iranian Rehabilitation Journal

In another study, Wilson (2017) showed that mental toughness acts as a driving force of posttraumatic growth, and athletes need mental toughness after failure to overcome the problems caused by its consequences. However, mental toughness is not the only psychological trait required by professional athletes, as self-compassion, kindness, and mindfulness are also important [24]. Besides, in a meta-analysis review of 76 studies, Crum (2022) concluded that mental toughness is one of the most important psychological characteristics for athletes to win and overcome problems, and this feature can be taught to athletes [25].

Mental toughness helps a person control their life during crises in life. People with high mental toughness perceive changes and problems in life in a positive and challenging way and often seek to create new changes and new experiences in different aspects of their lives. These people have more resilience and show more tolerance and patience in the face of problems [14, 21]. Resilience, stress coping strategies, personality traits, goal setting, and motivation are important psycho-social factors affecting a Paralympic athlete's performance [26].

Training, preparing and monitoring Paralympic athletes are essential; however, relevant authorities should not only focus on physical, athletic, and skill preparation. Rather, the focus on psychological training and preparation is also considered important in the success of athletes [27]. Psychological preparation programs for athletes should focus on positive self-talk, goal setting, increasing self-confidence, and reducing negative emotions such as anxiety, mental rumination, and the lack of distress tolerance [23].

This study focused on time sports and did not consider individual sports separately. Thus, future studies can examine mental toughness in athletes engaging in time and individual sports. Future studies can also explore other influential psychological variables such as self-compassion and self-efficacy in Paralympic athletes. Besides, the present study revealed that age and type of sport can be factors affecting the results. Therefore, these two important variables should be considered in future studies.

## Conclusion

The findings from the present study revealed that mental toughness as a psychological trait can positively affect the performance and success of Paralympic athletes and increase their resilience and distress tolerance. Paralympic athletes need mental preparation for participating in world sports competitions. Physical readiness is essen-

tial for these athletes, but they also need personality traits such as mental toughness, resilience, and tolerance of distress to learn from their failures. Thus, mental health professionals might help them to understand that failure is not fatal.

## Ethical Considerations

### Compliance with ethical guidelines

The present study was approved by Ethics Committee of Iran National Ethics Committee in Biomedical Research (Code: IR.IAU.SRB.REC.1401.137). To comply with the ethical principles, informed consent was obtained from the participants for filling out the questionnaires.

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### Authors' contributions

All authors contributed equally to preparing this article.

### Conflict of interest

The authors declared no conflict of interest.

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