

## Mental Toughness: an Investigation study on Paralympian and Non-Paralympian Throwers of India

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### Abstract

Mental toughness (MT) is widely acknowledged as a key personal resource that underpins high-level athletic performance and sporting success. The substantial increase of MT studies in sports throughout the last past few decades has advanced knowledge of the notion and its consequences for athletes. Studies have focused on the concept of mental toughness as it relates to certain activities and sports in elite athletes; however, there is little research on mental toughness in para-sports.

**The objective of the Study-** This study built on prior research by looking at what traits were most relevant for identifying mental toughness in para-sports from the perspective of elite para-athletes. The aim of this study was to investigate the mental toughness levels of elite Indian Para-throwers in terms of various subscales of mental toughness.

**Methods-** The sample of the present study consists of elite para-throwers; the sample group consists of a total of 10 Para Throwers (5=Paralympian Thrower, 5=Non-Paralympian Thrower), who participated at the international levels including Paralympic, World Championship. To collect demographic information a Personal Information form developed by the investigator and a Psychological Performance Inventory (PPI) developed by Loehr was utilized to determine the Mental Toughness attitudes of the individuals.

**Results-** To analyse the data; the T-test was used to review the connections between variables. Finally, the significance level is accepted as  $p < 0.05$ . According to the findings of the research, there are statistically significant differences ( $p < 0.05$ ) in terms of motivation level, whereas Self-confidence, Negative Energy Control, Attention, Visualization, Positive Energy, and Attitude Control were the same in both groups. However, Paralympian throwers athletes had significantly and meaningfully higher motivation levels ( $M = 28.60 \pm SD = 1.14$ ) than Non-Paralympian thrower athletes ( $M = 24.00 \pm SD = 1.41$ ).

**Conclusions-** The study outcome suggests that coaches and trainers can work on the mental toughness of para-athletes to prepare for and compete in world-level events such as the Paralympics, Para-world championships, and also at the grassroots level this Psychological domain should be a part of athlete's training mode.

**Keywords:** Mental toughness (MT), Para-athletes, Psychological Performance Inventory (PPI), Paralympian Thrower, Non-Paralympian Thrower.

### 1. INTRODUCTION

Athletes' success or failure is influenced by a variety of factors. It is determined by a number of factors, including biological,

strategic, tactical, and psychological ones. In sports, the psychological component is generally the deciding factor between a victor and a loser (Brewer, 2009). For example, according to Weinberg and Gould

(2003), mental aptitude accounts for more than half of an athlete's success while competing against opponents (Liew, 2019). Mental toughness (MT) is routinely mentioned by athletes, coaches, and applied sports psychologists as one of the most essential psychological attributes connected to outcomes and success in top sport. It is, nevertheless, one of the most misunderstood words in applied sport psychology (Connaughton, 2002).

MT is defined as the capacity to focus on the process of a specific sporting discipline without allowing the pressure of the match circumstances or the sense of occasion to overwhelm the players (Fox, 2000; Golby, Sheard, & Lavalley, 2003; Gucciardi, 2011). In general, athletes with mental toughness can raise their game to the highest level during critical periods in a game (Crust, & Clough, 2005). MT is a psychological notion that has been demonstrated to be a significant factor in sports, MT is defined by Gucciardi (2015) as "a personal capacity to consistently produce high levels of subjective like personal goals or strivings or objective performance like sales, race time, and GPA etc. despite everyday challenges and stressors as well as significant adversities" (p.28). There is conclusive proof that, in general, more boisterous games may boost performance since it motivates players to exert greater effort and "do or die" for the team's success. On the other hand, there is evidence, which is valid, that player mental toughness in specific situations or positions can hinder individual skill performance as well as team success (Kamlesh, 1984).

For decades, researchers have investigated the association between sport and mental toughness, aggression, stress, and other psychological characteristics. There are several studies in the literature about sports mental toughness, (Lin, 2017; Gucciardi, 2009; Sheard, 2009; Stamatis, 2020; Brace, 2020).

Minimal research has examined psychological processes underpinning Elite Indian Para-Throwers' performance. The

majority of study has been undertaken with non-elite disability athletes, so there is very little information about how Paralympic athletes employ mental skills compared to able-bodied competitors (Martin and Malone, 2013). Athletes with disabilities, on the other hand, have been shown to have higher levels of resiliency and self-efficacy than athletes without disabilities. Paralympic athletes with various injuries may offer insight into previously unknown attributes and methods (Martin, 2011).. The study's primary goal was to examine the levels of mental toughness among Paralympian throwers and Non-Paralympian throwers competed at the Tokyo Paralympics, World Para Athletics Championships and Para-Asian games. Secondly, this study examined the current status of mental toughness in Paralympian throwers and non-Paralympian throwers in an elite sample of Indian Para-Throwers' who competed at international level. As a result, the researcher hypothesis that-

- 1) there will be a significant difference in MT level between Paralympian thrower and non-Paralympian thrower.
- 2) there will be a significant difference in various sub-domains of mental toughness between the Paralympian thrower and non-Paralympian thrower.

## 2. METHODOLOGY

### Subjects Selection of Study

For the objective of this study, 10 para-athletes were chosen as participants who represented India at International level. Five Paralympian throwers and five Non-Paralympian throwers volunteered for the research after taking a consent form. The participants were between the ages of 20 and 38. The participants were split into two groups. Paralympian throwers are placed in Group A, whereas Non-Paralympian throwers are placed in Group B. To collect demographic information a Personal

Information form developed by the investigator (Table1).

Table. 1 Socio-demographic information of the Para-athletes

Factors		Total Population (%)	Male (%)	Female (%)
Subject		10 (100%)	7 (70%)	3(30%)
Age	20-25	1 (10%)	1 (10%)	
	26-30	1 (10%)	1 (10%)	
	31-35	3 (30%)	1 (10%)	2 (20%)
	36-40	5 (50%)	4 (40%)	1 (10%)
Participation Level	Paralympics	5 (50%)	4 (40%)	1 (10%)
	Para-World	3 (30%)	2 (20%)	1 (10%)
	Para-Asian	2 (20%)	1 (10%)	1 (10%)

### Assessment Criterion

The scores obtained from Loehr's Psychological Performance Inventory (PPI)- Mental Toughness Questionnaire were used as the criteria measure to test the hypotheses.

### Psychological Performance Inventory (PPI)-

Loehr's (1986) developed the Psychological Performance Inventory to help you get a clearer idea of your mental strengths and weaknesses, This scale that determines the mental toughness based on Five Point Likert Scale (ALMOST ALWAYS, OFTEN, SOMETIMES, SELDOM, and ALMOST NEVER). There are 42 items on this scale, add each of the seven columns separately.

### Statistical Tools

The independent T-test was performed to evaluate the Mental Toughness level score using SPSS version 25. The significance level was established at 0.05 to test the hypothesis.

## 3. RESULTS

T-test (in Table 2), showing the descriptive statistics information of the mean, standard deviation, and standard error of the mean for the data on Mental Toughness level of

Paralympian and Non-Paralympian throwers about dependent variable: mental toughness. Mental toughness had various sub-domains (Self-confidence, Negative Energy Control, Attention, Visualization, Motivation, Positive Energy, and Attitude Control) to compare between Paralympian and Non-Paralympian throwers .

In Table 3, T- test (equality of mean) for Mental Toughness variables between Paralympian and Non-Paralympian thrower is given. It can be seen from Table 3 that the value of t-statistic for motivation domain is 5.662. This t-value is significant as its p value is 0.000 which is less than .05. Thus, the null hypothesis of equality of population means of two groups is rejected, and it may be concluded that the motivation level in both the groups is different. Further, motivation level of Paralympian throwers is more than that of Non-Paralympian Throwers, and therefore, it may be concluded that the motivation level of Paralympian throwers is more than that of Non-Paralympian Throwers. In rest of the other sub domains of mental toughness (Self-confidence, Negative Energy Control, Attention, Visualization, Positive Energy, and Attitude Control) there is no significant difference at 0.05 level of testing hypothesis between Paralympian throwers and Non-Paralympian Throwers.

Table 2. Descriptive statistics on Mental Toughness level between Paralympian and Non-Paralympian thrower.

Independent 't'- Test for Group Statistics of Paralympian and Non-Paralympian thrower.					
	Athlete	N	Mean	S.D.	Std. Error Mean
Self-confidence	Paralympian	5	23.60	4.03	1.80
	Non-Paralympian	5	25.80	4.86	2.17
Negative Energy Control	Paralympian	5	22.40	2.50	1.12
	Non-Paralympian	5	22.40	5.31	2.37
Attention	Paralympian	5	20.60	5.54	2.48
	Non-Paralympian	5	20.40	2.50	1.12
Visualization	Paralympian	5	21.40	3.91	1.74
	Non-Paralympian	5	21.40	7.92	3.54
Motivation	Paralympian	5	28.60	1.14	.50
	Non-Paralympian	5	24.00	1.41	.63
Positive Energy	Paralympian	5	21.20	3.76	1.68
	Non-Paralympian	5	24.20	3.49	1.56
Attitude Control	Paralympian	5	22.40	4.50	2.01
	Non-Paralympian	5	24.80	2.58	1.15

Table. 3 T- test of equality of mean for Mental Toughness variables between Paralympian and Non-Paralympian thrower.

t-test for Equality of Means		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Self-confidence	Equal variances assumed	-.778	8	.459	-2.20	2.82
	Equal variances not assumed	-.778	7.735	.460	-2.20	2.82
Negative Energy Control	Equal variances assumed	.000	8	1.000	.00	2.63
	Equal variances not assumed	.000	5.697	1.000	.00	2.63
Attention	Equal variances assumed	.073	8	.943	.20	2.72
	Equal variances not assumed	.073	5.571	.944	.20	2.72
Visualization	Equal variances assumed	.000	8	1.000	.00	3.95
	Equal variances not assumed	.000	5.840	1.000	.00	3.95
Motivation	Equal variances assumed	-5.662	8	<b>.000</b>	-4.60	.812
	Equal variances not assumed	-5.662	7.656	.001	-4.60	.812
Positive Energy	Equal variances assumed	-1.306	8	.228	-3.00	2.29
	Equal variances not assumed	-1.306	7.954	.228	-3.00	2.29
Attitude Control	Equal variances assumed	-1.033	8	.332	-2.40	2.32

	Equal variances not assumed	-1.033	6.381	.339	-2.40	2.32
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#### 4. DISCUSSION

Minimal quantitative research has specifically focused on para sports elite para throwers and the associated psychological factors required for success in sports and in para-sports it becomes more important as para-athletes need to be mentally ready like physical. Therefore, the purpose of this study was to analyse significant difference in MT level between Paralympian thrower and non-Paralympian thrower and to analyse any significant difference in various sub-domains of mental toughness between the Paralympian thrower and non-Paralympian thrower.

The Mental Toughness attitudes of the Para-throwers were assessed using Loehr's Psychological Performance Inventory (PPI). To assess the links between variables, the T-test was utilised to analyse the data. Finally,  $p0.05$  is agreed upon as the significant level. According to the study's findings, there are statistically significant differences ( $p0.05$ ) in motivation levels, although self-confidence, negative energy control, attention, visualisation, positive energy, and attitude control were all the same in both groups. Paralympic throwers, on the other hand, exhibited a considerably greater motivation level ( $M = 28.60$   $SD = 1.14$ ) than non-Paralympic throwers ( $M = 24.00$   $SD = 1.41$ ). Stronger levels of mental toughness are connected with superior performance in both cognitive and motor skills (Clough, 2002; Crust & Clough, 2005), and elite athletes had higher mental toughness than lower level performers (Golby, 2003; Thomas, Schlinker, & Over, 1996). Coaches and trainers can focus on para-athletes' mental toughness to help them prepare for and compete in world-class events, according to the findings of the study.

Furthermore, previous researches have concluded that mental toughness is an

important factor for success in mixed martial arts, football (soccer), tennis, hockey, Australian football, cricket, rugby league, and endurance athletes, despite the fact that mental toughness has only received a small amount of attention in quantitative studies of para-athletes (Chen, 2013; Wieser, 2014; Cowden, 2016; Walker, 2016; Gucciardi, 2008 & 2009; Golby, 2004; Zeiger, 2018). Other studies show that mental toughness components are claimed to be higher in those who can tolerate physical exertion for longer durations, which supports the findings of the current study on mental toughness for para-throwers (Crust, 2005). Approximately 88% of relevant studies found athletes with higher levels of MT tend to achieve more or perform better (Cook, 2014). The strength of many of these studies is the use of sport-specific measures to objectively evaluate performance, which, compared to competitive standard, provide more direct evidence supporting the influence of MT on athletic performance. (Gucciardi, 2015).

In the current research, experts suggest that the determinants of mental toughness are mostly genetic as well as learned, experienced, and environment based (Bull et al., 2005; Gordon & Sridhar, 2005; Jones et al., 2002; Thelwell et al., 2005). It has been consistently shown that greater mental toughness is associated with better performance of both cognitive and motor skills. (Clough et al., 2002; Crust & Clough, 2005) and that elite athletes have greater mental toughness than lower-level performers (Golby et al., 2003; Thomas, Schlinker, & Over, 1996).

When it comes to interpreting the findings,, one of the major limitations of the study that may have influenced the results was its small sample size; this study was focused on one sport (throwing event) and one level of competitors (elite para-throwers), which may have influenced its generalization of the results. Another study

drawback was that the findings could have been influenced by the subjects' socioeconomic conditions, lifestyle, and training schedule, as well as the nature of the activity (throwing).

Over time, it has been concluded that this study performed well as a pilot study in detecting the mental toughness of Paralympic and Non-Paralympic throwers, and that this has been evidently absent in the field, signalling the feasibility of a broader examination. Future research is needed, according to the findings, to assess how well the demands of other population groupings are met (e.g., para-swimmers, para-shooters, para-weightlifters and para-badminton players). Future research should concentrate on other sports and genders. Additional areas of future studies should focus on other psychological factors such as self-confidence, anxiety, stress, self-esteem, and locus of control, among others, and can also be used to see if they improve other skill and performance-related components, which are equally important in sports.

## 5. CONCLUSION

According to the study's findings, there was a significant difference in motivation levels (sub-domain of MT) between Paralympian and non-Paralympian throwers, with Paralympian throwers being more motivated than non-Paralympian throwers, with MT eventually contributing in improving performance. According to Gucciardi et al. (2009), one of the elements that impedes effective mental toughness development is the coach's abilities to deal with his athletes. The main difficulties include an imbalanced drive for success that takes priority over personal player development needs, a focus on and overemphasis of player shortcomings. The findings of the study imply that coaches and trainers can focus on para-athletes' mental toughness in order to prepare for and compete in world-level competitions such as the Paralympics and Para-World

Championships, as well as at the grassroots level.

## Perspective section

Previous work on MT has emphasized in sports throughout the last past few decades has advanced knowledge of the notion and its consequences for athletes. Studies have focused on the concept of mental toughness as it relates to certain activities and sports in elite athletes; however, there is little research on mental toughness in para-sports.

For decades, researchers have investigated the association between sport and mental toughness, aggression, stress, and other psychological characteristics. There are several studies in the literature about sports mental toughness, (Lin, 2017; Gucciardi, 2009; Sheard, 2009; Stamatis, 2020; Brace, 2020).

Minimal research has examined psychological processes underpinning Elite Indian Para-Throwers' performance. The majority of study has been undertaken with non-elite disability athletes, so there is very little information about how Paralympic athletes employ mental skills compared to able-bodied competitors (Martin and Malone, 2013). Paralympic athletes with various injuries may offer insight into previously unknown attributes and methods (Martin, 2011). The study's primary goal was to examine the levels of mental toughness among Paralympian throwers and Non-Paralympian throwers competed at the Tokyo Paralympics, World Para Athletics Championships and Para-Asian games. Secondly, this study examined the current status of mental toughness in Paralympian throwers and non-Paralympian throwers in an elite sample of Indian Para-Throwers' who competed at international level. According to the findings of the research, there are statistically significant differences ( $p < 0.05$ ) in terms of motivation level, whereas Self-confidence, Negative Energy Control, Attention, Visualization, Positive Energy, and Attitude Control were the same in both

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### Conflicts of the Interest-

The authors confirm that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

### Author Contributions

Vikas Singh<sup>1†</sup>, Mahendra Kumar Singh<sup>2†</sup>, Tenzing Norzom Bhutia<sup>3</sup>

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