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Manjunath Sajjan
Assistant Professor
Department of Physical
Science and Sports
V. V. Sangh's Arts, Commerce
and BCA College, Vijayapur,
Karnataka, India

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Mental toughness among Athletes: A comparative study

Manjunath Sajjan

Abstract

In this study, we assessed the mental toughness between the athletes of open and closed skill sports. Forty (N=40) male athletes of 19 to 24 years of age group (mean \pm s: age = 21.1 ± 2.8 years) were purposively sampled to participate in the present study. They were further divided into two groups which includes twenty (n= 20) open skill athletes and twenty (n= 20) closed skill athletes. All the subjects, after having been briefed about the objective and protocol of the study, gave their consent and volunteered to participate in this study. Participants completed the mental toughness battery constructed by Goldberg (1998)^[12] to measure mental toughness. Statistical technique i.e. the student't' test was applied to find out the significant differences between athletes of open and closed skill sports. To test the hypothesis, the level of significance was set at 0.05. The results revealed significant differences between the athletes of open and closed skill sports on the sub-variables i.e. ability to handle pressure, concentration, confidence, motivation and overall mental toughness. However, insignificant differences were noticed with regard to the sub-variables i.e. reboundability. But while comparing the mean values of both the groups, it has been observed that players of open skill sports have demonstrated better reboundability than the players of closed skill sports. It is concluded from the findings that open skill athletes had significantly higher ability to handle pressure, confidence, motivation and overall mental toughness. Moreover the closed skill athletes had shown greater ability with regard to concentration.

Keywords: Football, gymnastic, mental toughness and athletes

Introduction

There are so many positive aspects to sport participation as a player; athletic events are also often allied with mental behavior. The concept of mental toughness has recently attracted much attention from sport psychology researchers attempting to understand on individual psychological factors and their influence on performance in sport. The emerging knowledge base, to attain victorious sport performance mental toughness is considered to be multidimensional (comprising cognitive, affective, and behavioural components) and an important psychological construct. The psychological factors involved in athletic performance have long been of interest to athletes, coaches, sport psychologists, sports scientists and all other concerned with sports, they have to indentify and determine psychological attributes which affects the performance. Each psychological variable has its unique contribution towards sports performance but some of the variables are preferably and specifically suitable for few games. As a sports person mental toughness along with flow state is very important pre-requisite for achieving success in any sport. Gucciardi *et al.* (2008)^[14] found evidence that mental toughness can explain how physically talented athletes become great athletes. Bull *et al.* (2005)^[2] observed on the basis of research that there is also the potential for difference in mental toughness for every individual, sport and situation, from one sports to the other. It is further illustrated that mental aspects affect the athlete's performance in competition. It is only when the mind gets tense then the body gets tense. In competition, some athletes cannot seem to control their emotions, as demonstrated by increased emotionality and for that increased heart rate and respiration rate (physiological arousal). Physiological arousal often negatively impacts on performance (Loehr *et al.*, 1992).^[20] The mind then is the source of our success or failure. A review of literature pointed to mental toughness as being one of the more important determinants of peak athletic performance.

According to Clough *et al.* (2002)^[4] mentally tough individual has a high sense of self-belief and an unshakeable faith that they control their own destiny.

Correspondence
Manjunath Sajjan
Assistant Professor
Department of Physical
Science and Sports
V. V. Sangh's Arts, Commerce
and BCA College, Vijayapur,
Karnataka, India

The mentally tough individuals are competitive in many situations and have lower anxiety levels than others. Furthermore, they remain relatively unaffected by competition or adversity. Elite athletes and coaches have argued that successful athletes are not always the most physically talented, but rather the most mentally tough. It is widely acknowledged that the importance of mental toughness for achieving performance excellence in sport settings. However, mentally tough athletes approach competition with a positive attitude and controlled emotions. More recent investigations have also adopted a context-specific approach in which mental toughness is examined within an individual sport to provide a context-rich understanding of this phenomenon. Recent reviews of the literature have attempted to assess the current state of knowledge and issues surrounding mental toughness to encourage the pursuit of quality research. Perhaps the most common finding from the available empirical literature is that mental toughness appears multifaceted and made up of multiple key components broadly the intensity of perceived emotion, attitudes, and behaviours. This present study was conducted to determine the significant difference between open and closed skill athletes with regards to Mental Toughness. Open skilled sports are sports which include execution of skills which are determined by the constant change of the environment. Skills are adapted to the instability of the environment which are predominantly perceptual and paced externally (Knapp, 2002). [17] These sports are such as football, handball and basketball etc. A

closed skill sport athlete basically knows when and how to execute the movements /skills, which are unlikely to change or influenced by external factors. Closed skill sports may include skills which are trained in a set pattern and have clear beginning and endings, such as gymnastics, athletics, swimming, shooting etc. Closed sports include skills which have the tendency to be self-paced and require focus on a relatively unchanged environment (Lerner, Ostrow, Yura, & Etzel, 1996). [19] Although, researchers have found that mental skills have better impact on athlete's, not many studies in India focus in its. Therefore, at the bottom-line the objective of the study was to know and compare the differences between open and closed skill athletes on different sub-variables of mental toughness.

Methodology

Participants

The participants were forty university level athletes who regularly participated in a variety of open and closed skill sports (e.g. football, handball, basketball, swimming, triathlon, gymnastics, tennis, athletics) in the Lakshmi Bai National Institute of Physical Education, India. The sample consisted of 40 men (mean \pm s: age = 21.1 ± 2.8 years). They were further divided into two groups which includes twenty ($n=20$) open skill athletes and twenty ($n=20$) closed skill athletes. The groups have been presented in Table 1. The purposive sampling technique was used to obtain the required data. All participants completed an informed consent form before data collection.

Table 1: Details of Selected Open and Closed Skill Sports

Sl. No	A-Open Skill Sport	Sample	B-Closed Skill Sport	Sample
1	Football	20	Gymnastic	20

Measures

Mental toughness was measured by applying mental toughness questionnaire developed by Dr. Alan Goldberg (1998). Mental toughness questionnaire consists of 30 items measuring the mental toughness in five areas, i.e. rebound ability, ability to handle pressure, concentration, confidence and motivation. There was only true/false answers option in this questionnaire and subjects have to tick only one option. The questionnaire is suitable for the age group as selected for the study.

Data Analysis

Descriptive statistics (Mean, Standard Deviation, Skewness, Kurtosis, Standard Error of Skewness and Standard Error of Kurtosis) were calculated for all measures. Data screening

was used to ensure all dependent variables met the assumptions necessary for the use of parametric statistics before data analysis. In addition, independent t-tests were used to test the between-group differences between open and closed skill sports athletes in mental toughness. The level of $p \leq 0.05$ was considered significant. Statistical Package for Social Science (SPSS) version 20.0 was used.

Results

Descriptive data for responses to the mental toughness questionnaire are shown in Table 2. Measures of skewness and kurtosis found the data to be normally distributed and as such use of parametric statistics was deemed appropriate. Results of the independent t-test are presented in Table 2.

Table 2: Descriptive Statistics of Mental Toughness of Open and Closed Skill Sports Athletes

	Descriptive Statistics					
	Mean	Std. Deviation	Skewness		Kurtosis	
			Statistic	Std. Error	Statistic	Std. Error
Reboundability	3.58	0.81	0.047	0.374	-0.414	0.733
Ability to Handle Pressure	3.55	0.85	0.237	0.374	-0.556	0.733
Concentration Ability	3.45	0.75	0.179	0.374	-0.141	0.733
Level of Confidence	3.43	0.64	-0.649	0.374	-0.483	0.733
Motivation	3.43	0.96	0.133	0.374	-0.843	0.733
Overall Mental Toughness	17.43	2.17	0.020	0.374	-0.754	0.733

N=40

For testing the normality of the data (Table 2) skewness and kurtosis (descriptive statistics) has been performed. As a guideline, a skewness value more than twice its standard

error indicates a departure from symmetry. Since none of the variables skewness is greater than twice its standard error, hence all the variables are symmetrically distributed.

Similarly, as a guideline, kurtosis values more than twice its standard error indicates a significant kurtosis. The value of kurtosis for the data to be normal of any of the variable is not more than twice its standard error of kurtosis hence none

of the kurtosis values are significant. In other words the distribution of all the variables is meso-kurtic. The results pertaining to significant difference, if any, between open and closed skill athletes were assessed using the Student's t test and the results are presented in Table 3.

Table 3: Comparative statistics of open and closed skill sports athletes on the variables of Mental Toughness

Variables	Levene's Test		Open Skill Sport Football=20		Closed Skill Sport Gymnastic=20		Mean Difference	SE of Mean Difference	t-value	Sig. (p-value)
	F-value	Sig. (p-value)	Mean	SD	Mean	SD				
Reboundability	0.918	0.344	3.70	0.73	3.45	0.89	0.25	0.26	0.972	0.337
Ability to Handle Pressure	2.560	0.118	3.95	0.89	3.15	0.59	0.80	0.24	3.363	0.002*
Concentration Ability	0.689	0.412	3.10	0.64	3.80	0.70	-0.70	0.21	-3.310	0.002*
Level of Confidence	0.456	0.504	3.75	0.44	3.10	0.64	0.65	0.17	3.728	0.001*
Motivation	1.014	0.320	3.90	0.91	2.95	0.76	0.95	0.27	3.581	0.001*
Overall Mental Toughness	1.400	0.244	18.40	2.23	16.45	1.64	1.95	0.62	3.149	0.003*

*Significant at 0.05 level; Degree of freedom= 38

Table 3 presents the results of athletes of open and closed skill sports with regard to the variable mental toughness. The descriptive statistics shows the mean and SD values of players of open skill sports on the sub-variable reboundability as 3.70 and 0.73, Ability to handle pressure as 3.95 and 0.89, concentration were 3.10 and 0.64, confidence were 3.75 and 0.44, motivation were 3.90 and 0.91, overall mental toughness were 18.40 and 2.23 respectively. However, the athletes of closed skill sports mean and SD values on the sub-variable reboundability as 3.45 and 0.89, Ability to handle pressure as 3.15 and 0.59, concentration were 3.80 and 0.70, confidence were 3.10 and 0.64, motivation were 2.95 and 0.76, overall mental toughness were 16.45 and 1.64 respectively. But while comparing the mean values of both the groups, it has been

observed that players of open skill sports have demonstrated better reboundability than the players of closed skill sports. It can be noticed that players of open skill sports have exhibited better ability to handle pressure than the players of closed skill sports. Players of closed skill sports have shown better concentration than the players of open skill sports. Open skill sports athletes have demonstrated better confidence than the players of closed skill sports. Players of open skill sports have demonstrated significantly better on motivation than the players of closed skill sports. It has been observed that players of open skill sports have demonstrated significantly better on overall mental toughness than the players of closed skill sports. The comparison of mean scores of both the groups has been presented graphically in Figure 1.

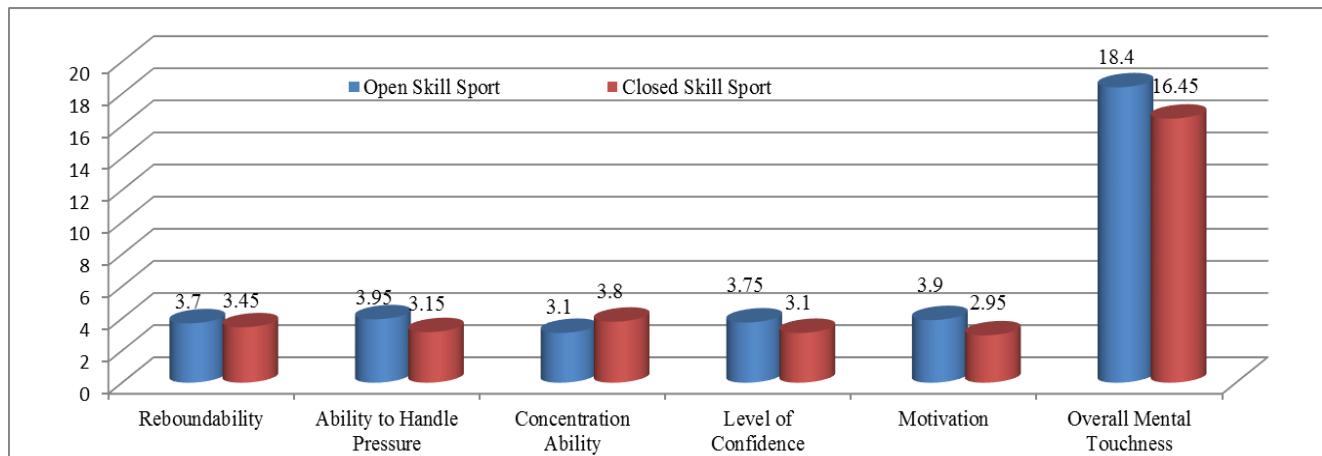


Fig 1: Graphical Representation of Mean Score of Mental Toughness in Open and Closed Skill sports athletes

From Table 3, F- and T-table for the testing of variances and equality of means of two unrelated groups of football and gymnastic with regard to reboundability, handling pressure, concentration ability, confidence ability, motivation, overall mental toughness. To test the equality of variances, Levene's test was used. The F-value is insignificant as the p-value is more than .05. Thus the null hypothesis of equality of variances may be accepted, and it is concluded that the variances of the two groups are equal.

From Table 3, it can be clearly seen that all of the variables has shown significant differences between open and closed skill sports athletes except reboundability. The 't'-value

0.972 as shown in the table above was found statistically insignificant ($P>0.05$). The significant value of "t" at 0.05 levels for degree of freedom 38 is 2.02 and even in all the variables the p value is less than 0.05. Thus it is concluded that there is significant difference in the Ability to Handle Pressure ('t'-value 3.363), Concentration ('t'-value -3.310), Confidence ('t'-value 3.728), Motivation ('t'-value 3.581) and Overall Mental Toughness ('t'-value 3.149) between open and closed skill sports athletes and there is insignificant difference in the Reboundability ('t'-value 0.972) between open and closed skill sports athletes.

Discussion

The purpose of the present research was to compare the mental toughness of open and closed skill sports athletes. As the results of this research shows from the findings of Table 3 with regard to mental toughness that significant differences have been observed on the sub-variables; ability to handle pressure, concentration, confidence, motivation and overall mental toughness between open and closed skill sports athletes. When compared the mean values of both the groups, it has been found that players of open skill sports athletes have performed significantly better on reboundability, ability to handle pressure, confidence, motivation, and overall mental toughness and closed skill sports athletes have performed significantly better on concentration. This is because of the nature and skills of their game which effects on the performance related to concentration. Concentration is a vital psychological skill in all aspects of sport and a slight loss of concentration may cause failure to perform (Dosil, 2006) [11]. However, no significant differences have been observed on the sub-variables; reboundability between open and closed skill sports athletes.

The results showed that players of open skill sports have better mental toughness in contrast to players of closed skill sports. A great amount of stress during closed skill sports, athletes would break under the pressure and would not be able to perform up to their talents. An open skill sports player with high motivation in them normally will put an extra effort with a planned goal to overcome their weakness in order to increase their performance. The results were similar with the previous work in this field, Bandura (1986) [1], relate his study between motivation and positive motivational words to increase athlete's motivation level and performance specifically in football. Moreover, Kruger (2010) [18] found that specific psychological skills (e.g., achievement motivation, goal setting, self-confidence, imagery, and mental preparation) distinguished between successful and less successful field hockey players. Correspondingly, Coetzee, Grobbelaar, & Gird, (2006); [5] substantiated this observation with his findings on the differences between successful and less successful soccer teams regarding their mental preparation, peaking under pressure, concentration, confidence, and achievement motivation. Although previous studies have highlighted similar trends; Rathore, Singh, & Dubey, (2009); [22] wherein they found that the team game players were more mentally tough as compared to individual game players on the variable mental toughness. Mohammad, Omar, & Abu, (2009); [21] found that Malaysian professional football players are at excellent level in mental toughness. Gould, Hodge, Peterson, & Petlichkoff, (1987) [13] expressed that mental toughness determine the success of an athlete and seen as an important element help them to become a champion.

Conclusion

The primary objective of this study was to know and compare the differences between open and closed skill athletes on different sub-variables of mental toughness. The results indicated that there is a significant difference between the athletes of open and closed skill sports on the subvariables i.e. ability to handle pressure, concentration, confidence, motivation and overall mental toughness from which it can be concluded that open skill athletes had

significantly higher ability to handle pressure, confidence, motivation and overall mental toughness. To summarize, against this backdrop, it is surprising that no study has endeavored to examine the integrative role of psychological constructs (i.e., mental toughness, psychological skills) and sports factors in the achievement of successful performance. Researchers and practitioners at present are exclusively recommending mental skills training to develop and maintain mental toughness (e.g. Bull *et al.*, 1996; Clough *et al.*, 2002). [3] It could be concluded from the review of the literature that the overwhelming majority of investigations on mental toughness, have been conducted within the context of elite sport. Subsequently, there is a need for more research within the context of young, developing sportspersons to examine the psychological and sport background of overall performance to provide a strong theoretical foundation for applied psychological intervention programmes.

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