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## Factor structure study on psychological traits among different playing positions in handball players of Kerala

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### Abstract

The purpose of the study was to analyze the mental toughness variables among the pivot players, back players, goal keepers and wing players in handball. For the purpose of the study a total of 60 male players of intercollegiate level are selected from three universities namely Calicut University, MG University and Kerala University. The age of selected players was ranging from 18 to 28. Among 60 selected players such as pivot players, back players, goal keepers and wing players 15 in number respectively. The method adapted for the selection of the subjects, administration of questionnaires and methods employed for statistical treatment of data have been explained.

The result of the study revealed that all the sub variables of mental toughness was not significant difference among different playing positions in inter collegiate level men Handball players of Kerala. Thus, it was concluded that mental toughness was similar in all playing positions of inter collegiate level men Handball players. It may be due to the nature of the game.

Factor analysis (principle component analysis) was done to find out prominent factors comprising of any one or all of the selected mental toughness variables among the selected four groups separately. The unloaded factors obtained were then rotated by varimax method to find out the final solution.

**Keywords:** Mental toughness, handball playing positions, factor analysis

### Introduction

Not a single person is similar with another person in this world from the physical, physiological and psychological point view if we consider the psychological aspects: no one is similar in their behavior with another person. The behavior and nature of the individual are different from community to community, job to job. Similarly the natures of the sports man are different from game to game and play position to position.

In the game of Handball each of the seven players on team is assigned to a particular position on the field of play. A team is made up of one goalkeeper and six outfield players who fill various defensive and attacking positions. Positions describe both the player's main role and their area of operation on the court.

Sports are a psycho social activity. It has both psychological and social dimensions besides physical, physiological and technical aspects. Sports play a very important role in the modern world Man's interest in sports is found in all societies of the world it is important to individual, a group, a nation and indeed the world.

### Methodology

Sixty intercollegiate level men handball players were selected as a subject for this study, the subject select from the intercollegiate winners and runners in Handball from three universities in Kerala, Calicut university, MG university and Kerala university, these sixty Handball players divided into four playing positions in Handball game. They are goal keeper, wing players, back players, and pivot player, each playing positions having 15 players. The age of subjects were ranged from 18 to 28. The mental toughness variable selected for this study was self-confidence, negative energy, attention control, visual and imagery control, motivational level, positive energy and attitude control

### Statistical Technique Used

For the purpose of measuring selected mental toughness variable, descriptive statistics such as

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mean, median, std deviation, skewness, and kurtosis, std error of skewness and std error of kurtosis were done. The hypothesis was tested at significant level of 0.05. The data were analyzed using analysis of variance (Anova) Test and factor analysis

**Results and Discussion of the Study**

Analysis of variance was conducted for analyzing the mental toughness variables namely, self-confidence, negative energy, attention control, visual and imagery control, motivational, level positive energy and attitude control among different playing positions in inter collegiate level men Handball players of Kerala. The result of the study revealed that all the sub variables of mental toughness was not significant difference among different playing positions in inter collegiate level men Handball players of Kerala. Thus, it was concluded that mental toughness was similar in all playing positions of inter collegiate level men Handball players. It may be due to the nature of the game.

**Factor Analysis**

**Table 1:** Principal component analysis of mental toughness variables (Un-rotated factor loadings) of Goal Keepers

	Factor 1	Factor 2
Eigen value	3.640	1.663
Total variance. Exp	51.995	23.756
Cumulative variance. Exp	51.995	75.751
Self confidence	.911	.158
Negative energy	.767	.126
Attention control	.877	.077
Visual and imagery control	.338	.877
Motivational control	.314	.882
Positive energy	.707	-.148

The confidence factor characterized by five variables namely self-confidence, negative energy, attention control, positive energy and attitude control were found as the most prominent principal component factor among male goalkeeper position Handball players.

The motivation factor characterized by two variables namely visual imagery control and motivational level were found as the second most prominent Principal component factor among male goalkeeper position Handball players.

**Table 2:** Principal component analysis of mental toughness variables (Varimax solution) of Back players

	Factor 1	Factor 2
Eigen value	2.934	1.635
Total variance. Exp	41.911	23.362
Cumulative variance. Exp	41.911	65.273
Self confidence	.230	.837
Negative energy	.756	.286
Attention control	-.328	.857
Visual and imagery control	.937	-.184
Motivational level	.868	.058
Positive energy	.703	.184
Attitude control	-.024	.351

The sensory factor comprising of four variables namely negative energy, visual and imagery control, motivational level and positive energy were found as the most prominent principal component factor among male Back position Handball players

The confident factor characterized by two variables namely attention control and self-confidence were found as the

second most prominent principal component factor among male Back position Handball players.

**Table 3:** Principal component analysis of mental toughness variables (Varimax solution) of wing players

	Factor 1	Factor 2	Factor 3
Eigen value	3.490	1.516	1.034
Total variance. Exp	49.860	21.662	14.776
Cumulative variance. Exp	49.860	71.522	86.298
Self confidence	.789	.299	-.303
Negative energy	.035	-.046	.961
Attention control	-.100	.885	.288
Visual and imagery control	.470	.710	.135
Motivational level	.131	.970	.041
Positive energy	.923	-.024	.182
Attitude control	.862	.318	.041

The energy factor characterized by three variables namely self-confidence, positive energy, attitude control were found as the s most prominent Principal component factor among male Wing position Handball players.

The motivational factor comprising of three variables namely attention control, visual and imagery control and motivational level were found to be third most significant factor among male forward position handball players.

The energy factor characterized by only one variables namely negative were found as the third most prominent principal component factor among male wing position Handball players.

**Table 4:** Principal component analysis of mental toughness variables (Varimax solution) of Pivot players

	Factor 1	Factor2	Factor 3
Eigen value	2.456	2.214	1.317
Total variance. Exp	35.089	31.629	18.810
Cumulative variance. Exp	35.089	66.718	85.528
Self confidence	.354	-.363	.767
Negative energy	.610	.316	-.261
Attention control	.221	.952	.066
Visual and imagery control	-.407	.285	.820
Motivational level	.089	.960	.103
Positive energy	.945	.108	-.039
Attitude control	.911	-.168	.148

The energy factor characterized by three variables namely negative energy, positive energy and attitude control were found as the most prominent Principal component factor among male pivot position handball players.

The motivational factor characterized by two variables namely attention control and motivational level were found as the second most prominent Principal component factor among male pivot position handball players

The sensory factor characterized by two variables namely self-confidence and visual and imagery control were found as the third most prominent Principal component factor among male pivot position handball players

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