
ESTIMATION OF KHO-KHO PERFORMANCE ON THE BASIS OF SELECTED COORDINATIVE ABILITIES

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Abstract

Purpose: The purpose of the study was “Estimation of kho-kho performance on the basis of the selected coordinative abilities.” **Methodology:** for the present study the subjects were selected from different colleges of Kumaun University, Nainital, Uttarakhand. Total seventy two male subjects were selected by using purposive random sampling technique. All the subjects (kho-kho players) were going to be participated in inter-college tournaments of Kumaun University, Nainital. The age of the subjects were ranged from 18 to 25. With the help of experts researcher could have select coordinative variables namely: Reaction Ability, Rhythm Ability, Differentiation Ability and Orientation Ability. The Reaction Ability, Rhythm Ability, Differentiation Ability and Orientation Ability variables were tested by using Ball Reaction Exercise Test, Sprint at Given Rhythm Test, Backward Medicine Ball Throw Test and Numbered Medicine Ball Run Test respectively. The data were collected by using standard tools. For this purpose each subject was given two trails and best one trail was taken for the sake of the present study. The level of significance was set at 0.05. **Statistical Technique:** The collected data were analyzed by using descriptive analysis, Pearson’s Product Moment Correlation Coefficient, Step-Wise Multiple Correlation and Regression Analysis techniques. **Results:** There was a significant negative relationship between Reaction Ability and Orientation Ability with the kho-kho performance while there was a insignificant relationship between Rhythm Ability and Differentiation Ability. **Conclusions:** On the basis of the findings it was concluded that Reaction Ability and Orientation Ability both are the best predictors for the kho-kho performance.

Key Words: Estimation, Coordination, Multiple correlation and Regression.

1. Introduction

The modern era is very challenging/ competing/technical in all aspects of life. In this era competition is very high especially in terms of games and sports. If a country wants to sustain its position at national and international level on top then there are some major challenges i.e. high level of qualitative researches, accurate and effective guessing and sound practicability of the things.

Normally the term estimation, prediction, forecasting and extrapolation are found to be similar. These terms are interchangeably being used but bit difference is there. The term estimation is derived from Latin which means to form an approximate judgement or opinion regarding the worth; amount, size and weight etc. or calculate approximately. Estimation is the estimation of parameters. It is of two types namely; accurate and uncertainty. It is used when our interest is in the predictor variables (X) and how they relate to (Y). It refers to fixed effects. In estimation an estimator seeks to know a property of the true state of nature. It has large certainty. An estimator uses data to guess at a parameter. An estimator is a guess about true state of nature. Estimation is often done by sampling which is counting a small number of examples something and projecting that number onto a larger population. Estimation may be of two types i.e. point estimation and interval estimation. It is normally used in mathematics, economics and business. In this study research scholar has same view point means conceptual meaning of estimation is considered in the present study. Conceptual meaning is bit different from the dictionary meaning of estimation. Conceptual meaning of estimation is prediction.

The term prediction has been derived from Latin which means before, dicere and to forecast or guess something. It is a statement about an uncertain event. It is often, but not always, based upon experience of knowledge. There is no universal agreement about the exact difference between the two terms, different authors and disciplines ascribe differently. Although guaranteed accurate information about the future is in many cases impossible, prediction can be useful to assist in making plans about possible developments. Howard H. Stevenson writes that prediction ".....in business is at least two things: important and hard."

Good prediction is one of the key skills necessary to be a successful competitive Pokémon player. Prediction is the only tool a player has at his or her disposal to overcome a poor team match-up; hence, it is important to be able to predict effectively. The ability to predict your opponent is one of the main stumbling blocks for new players and the leap to overcome it can be a great one. Hopefully, for those struggling with prediction, this article can be a starting point for you to become a successful predictor in the future.

There is only one scenario where you should completely disregard the potential risk and only concentrate on reward. That scenario is when, unless you take a bold, risky action, you are guaranteed to lose. The primary objective of any competitive game is to win by any legal means. If you are in a situation where the current battle is all but loss unless you take a risky action, you should indeed take that risky action. If you incorrectly predict, you may lose "worse", but in terms of competitive play a loss is a loss no matter how close it is. Your sole goal is winning and if risky prediction is your only way of achieving said goal, it's a situation of "what do I have to lose?" Obviously, there is a balance to this and the appropriate ratio of risk versus reward for individual players is something that can only be discovered through personal battle experience.

Coordinative ability's components are reaction ability, acceleration ability, locomotion ability and movement time. Coordinative abilities are the replacement of the term agility. It is a complex ability that includes differentiation ability, Orientation ability, coupling ability, balance ability, reaction ability, rhythmic ability and adaptation ability (**Singh, 1993**). Coordinative abilities should not be equated with motor skills, though both are inter related and independent. Both are determined by the motor coordination process. The difference lies in the degree of generality of the coordinative process. In a motor skill processes are largely automatized for the execution of a particular movement. In coordinative abilities these processes are just stabilized and perfected for the execution of a wide number of movements similar to each other. The learning of movements, however, has a positive effect on the coordinative abilities and vice-versa.

Coordinative abilities find expression in the quality of movement as well as in the ability to learn movements. The movements on the other hand are essential for the improvement of coordinative abilities. These abilities are always appear in a complex combination with one another as well as the conditional abilities, and processes of will, cognition and other psychic factors involved in the process of action or behaviour regulation.

Coordination describes the synchronization of your senses and your body parts in a way that enhances motor skills. Volleying a table tennis ball is an example of hand eye coordination. A variety of tests measure coordination, including juggling or hitting a ball. Coordination is more difficult to describe than agility because it cannot be observed directly. An athlete with a high level of coordination is able to combine all forms of fitness- not just those that are part of motor fitness- in an effective and controlled way. The more coordinated and athlete is, the more efficient he/she will be during competitive activities.

2. Objective of the study:

The purpose of the study was **"Estimation of kho-kho performance on the basis of the selected coordinative abilities."**

3. Methodology

The present study was a predictive research in which survey method was used. Total six colleges were selected as a population for the present study. All the colleges were affiliated from the Kumaun University, Nainital (Uttarakhand). By using purposive random sampling technique the total seventy two (72) male kho-kho players were selected as the subjects. All the subjects were participating in inter college competitions.

In this study coordinative variables namely: reaction ability, rhythm ability, differentiation ability & orientation were selected as independent variables and kho-kho performance was selected as a dependent variable. All the test items and their standard tools and techniques were selected. All the coaches, physical education teachers and subjects are personally requested by the research scholar for the administration of the different test items and collection of the data. The data was collected in both the morning and evening sessions during inter college coaching camps. All the instructions and information were made by the research scholar before administrating all the test items of the present study.

The data were collected by using the standard tools present at that time. For the

evaluation of kho-kho performance the five points rating scale as suggested by the **Baumgartner and Jackson's (1983)** was adopted and a particular evaluating criterion was set by the research scholar. Total performance was evaluated, out of 35 points. Further, for making it easier, the subjects were evaluated from out of 20 points. Total kho-kho performance was evaluated by different elements. The kho-kho performance of each selected subjects was evaluated by the panel of three experts/judges. For the evaluation of kho-kho performance of each selected subject, a proper kho-kho match was conducted. During this match judges/experts observed and evaluated to the kho-kho players. Two trails were given to each selected subject to perform coordinative abilities test items. Only one best attempt was considered as a final score for the subject. The average score (out of 20) of the three judges was considered as a final score for the each selected subject. The collected data was analyzed by using Pearson's Product Moment Correlation, Multiple Correlation and step by step regression statistical techniques. Kho-kho Performance was predicted by the Regression Equations. The level of significance was set at 0.05 levels.

4. Statistical procedure employed:

In order to assess, the contribution of selected Anthropometric, Coordinative Abilities and Motor Fitness Variables on kho-kho performance, the necessary data were collected then the collected data were interpreted by applying descriptive statistics, Pearson's Product Moment Correlation Coefficient and Multiple Step Wise Regression Statistical Techniques. The level of significance was set at 0.05.

5. Findings of the study:

The collected data were analyzed by using SPSS 18 version and the following results have been found. Here the results are presented in a tabular form. For the purpose of; relationship of coordinative abilities with the kho-kho performance, the collected data was analyzed by using the correlation matrix (Pearson Product Moment Correlation) and for the purpose of; prediction of Kho-Kho performance on the basis of selected Coordinative Abilities, Step wise regression analysis was used. The level of significance was set at 0.05.

TABLE - 1

DESCRIPTIVE STATISTICS OF COORDINATIVE ABILITIES AND KHO - KHO PERFORMANCE

Variables	Mean	SD	N
Kho - Kho Performance	15.59	1.64	72
Reaction Ability	2.73	1.15	72
Rhythm Ability	1.39	.28	72
Differentiation Ability	8.46	3.02	72
Orientation Ability	6.02	.74	72

The mean score of male Kho -Kho players of selected colleges of Uttarakhand on Kho - Kho performance is 15.59 with SD 1.64. The mean score of male Kho -Kho players of selected colleges of Uttarakhand on Reaction Ability is 2.73 with SD 1.15. The mean score of male Kho - Kho players of selected colleges of Uttarakhand on Rhythm Ability is 1.39 with SD .28. The mean

score of male Kho –Kho players of selected colleges of Uttarakhand on Differentiation Ability is 8.46 with SD 3.02. The mean score of male Kho –Kho players of selected colleges of Uttarakhand on Orientation Ability is 6.02 with SD .74.

TABLE – 2
CORRELATION VALUES OF DIFFERENT COORDINATIVE ABILITIES WITH KHO -KHO PERFORMANCE

Variables	r- value	p-value
Reaction Ability	-.943	.000
Rhythm Ability	-.015	.449
Differentiation Ability	-.082	.245
Orientation Ability	-.975	.000

From table 2, It can be seen that the Performance of the male Kho-Kho Players from selected colleges of Uttarakhand have significant relationship with Reaction Ability and Orientation Ability as the calculated ‘r’ values are -.943 and -.975 respectively at 0.05 level of significance with the degree of freedom 71. The Reaction Ability and Orientation Ability showed negative correlation with kho-kho performance. Here negative values of Reaction Ability and Orientation Ability have also found positive relationship because, as the scores of independent variables (Reaction Ability and Orientation Ability) decreases then the scores of dependent variable (kho-kho performance) will be increased. Therefore, it may be said that lesser the scores of reaction ability and orientation ability better will be the kho-kho performance.

From table 2, It can be seen that the Performance of the male Kho-Kho Players from selected colleges of Uttarakhand have no significant relationship with Rhythm Ability and Differentiation Ability as the calculated ‘r’ values are -.015 and -.945 respectively at 0.05 level of significance with the degree of freedom 71. So it may be said that Rhythm Ability and Differentiation Ability have not any contribution to the kho-kho performance.

It is therefore, evident that Reaction Ability and Orientation Ability are the essential components for male kho-kho player’s performance while Rhythm Ability and Differentiation Ability are not prime components for male kho-kho player’s performance.

TABLE - 3
MODEL SUMMARY ALONG WITH THE VALUES OF R AND R SQUARE

Model	R	R square	Adjust R square	Std. error of the estimate
1	.975 ^a	.950	.949	.368
2	.978 ^b	.957	.955	.345

(a) Predictors: (Constant), Orientation Ability.

(b) Predictors: (Constant), Orientation Ability and Reaction Ability.

(c) Dependent Variable: Kho – Kho Performance

From table 3, model-1 (Constant) R was .975 (adjusted), the R Square .950 with adjusted R Square .949 and std. error of the estimate was .368. It can be said from the table that there is 95% contribution of coordinative variable (Orientation Ability) on the Kho – Kho performance among the male Kho – Kho Players of selected colleges of Uttrakhand.

From table 3, model-2 (Constant) R was .978 (adjusted), the R Square .957 with adjusted R Square .955 and std. error of the estimate was .345. It can be said from the table that there is 95.7% contribution of coordinative variables (Orientation Ability and Reaction Ability) on the Kho – Kho performance among the male Kho – Kho Players of selected colleges of Uttrakhand.

**TABLE-4
ANALYSIS OF VARIANCE ON DEPENDENT VARIABLE VS. SELECTED MODELS**

Model	Sum of square	Df	Mean square	F- value	p-value
Regression	180.307	1	180.307	1326.444	.000 ^a
Residual	9.515	70	.136		
Total	189.823	71			
Regression	181.581	2	90.791	760.144	.000 ^b
Residual	8.241	69	.119		
Total	189.823	71			

(a) Predictors: (Constant), Orientation Ability

(b) Predictors: (Constant), Orientation Ability and Reaction Ability

(c) Dependent variable: Kho – Kho Performance

The linear regression model-1 which produced R^2 .950, *From Table 3*, it can be seen that the $F(1, 70) = 1326.444 > .000$. This table reports that the model-1 (Constant) has significant at 0.05 level. It can therefore be concluded that the Kho – Kho Performance had significant positive regression with Reaction Ability, indicating that Kho-Kho Players with higher Reaction Ability were expected to have better Kho – Kho performance.

The linear regression model-2 which produced R^2 .957, *From Table 3*, it can be seen that the $F(2, 69) = 760.444 > .000$. This table reports that the model-2 (Constant) has significant at 0.05 level. It can therefore be concluded that the Kho – Kho Performance had significant positive regression with Orientation Ability and Reaction Ability, indicating that Kho-Kho Players with higher Orientation Ability and Reaction Ability were expected to have better Kho – Kho performance.

TABLE-5

REGRESSION COEFFICIENT OF SELECTED VARIABLES IN DIFFERENT MODELS ALONG WITH THEIR T-VALUES

Model	Unstandardized coefficients		Standardized coefficients	t	Sig
	B	Std. Error	Beta		
(constant)	28.527	.358		79.729	.000
Orientation Ability	-2.148	.059	-.975	-36.420	.000
(constant)	26.486	.709		37.342	.000
Orientation Ability and	-1.656	.160	-.751	-10.320	.000
Reaction Ability	-.338	.103	-.238	-3.266	.000

(a) Dependent variable: Kho- Kho Performance

The Standardized Beta Coefficients shows the contribution of each variable to the model-1. The value i.e., -.975 indicates that a change in the predictor variable i.e., Orientation Ability, has a sound effect on the criterion variable i.e., Kho – Kho performance.

From the above table, it is clear that the t- value 79.729 which is significant at 0.05 level. Thus it indicates that the independent variable (Coordinative Variable) has significant impact on the dependent variable (Kho – Kho Performance).

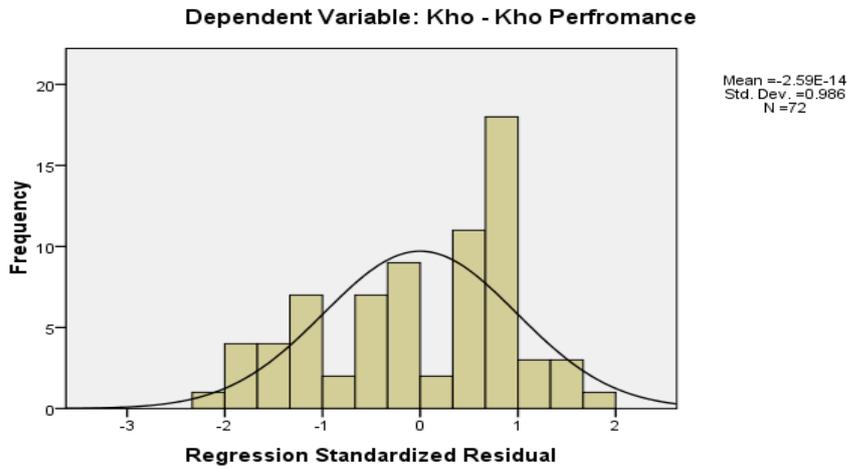
The Standardized Beta Coefficients shows the contribution of each variable to the model-2. The value i.e., -.751 and -.238 indicates that a change in the predictor variables i.e., Orientation Ability and Reaction Ability, has a sound effect on the criterion variable i.e., Kho – Kho performance.

From the above table, it is clear that the t- value 37.342 which is significant at 0.05 level. Thus it indicates that the independent variables (Coordinative variables) have significant impact on the dependent variable (Kho – Kho Performance).

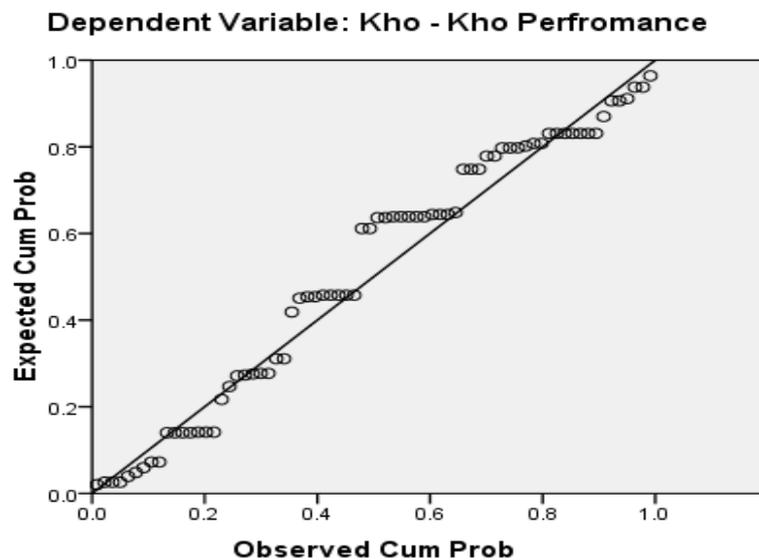
The Standardized Beta Coefficients shows the contribution of each variable to the model. The value i.e., -.188, .056, -.073, and -.124 indicates that a unit change in this predictor variable i.e., Reaction Ability, Rhythm Ability, Differentiation Ability and Orientation Ability, respectively, have a moderate effect on the criterion variable i.e., Kho – Kho performance.

From the above table, it is clear that the t- value 10.593 which is significant at 0.05 level. Thus it indicates that the independent variable (coordinative variables) has significant impact on the dependent variable (Kho – Kho performance).

Histogram



Normal P-P Plot of Regression Standardized Residual



6. Results of the study

- i. The **Reaction Ability** showed significant negative relationship with the kho-kho performance of male kho-kho players of Uttarakhand.
- ii. The **Rhythm Ability** showed insignificant relationship with the kho-kho performance of male kho-kho players of Uttarakhand.

- iii. The **Differentiation Ability** showed insignificant relationship with the kho-kho performance of male kho-kho players of Uttarakhand.
- iv. The **Orientation Ability** showed significant negative relationship with the kho-kho performance of male kho-kho players of Uttarakhand.

7. Conclusions of the study:

Based on the above analysis and within the limitations of the present study the following conclusions were made:

- i. From the selected coordinative variables **Reaction Ability** had showed significant contribution in predicting the kho-kho performance of male kho-kho players of Uttarakhand.
- ii. From the selected coordinative variables **Rhythm Ability** had showed insignificant contribution in predicting the kho-kho performance of male kho-kho players of Uttarakhand.
- iii. From the selected coordinative variables **Differentiation Ability** had showed insignificant contribution in predicting the kho-kho performance of male kho-kho players of Uttarakhand.
- iv. From the selected coordinative variables **Orientation Ability** had showed significant contribution in predicting the kho-kho performance of male kho-kho players of Uttarakhand.

In coordinative variables, multiple correlation analysis yielded two models for predicting the kho-kho performance. In which second model (Orientation Ability & Reaction Ability) was better than first model.

1. For predicting kho-kho performance on the basis of selected coordinative abilities, the regression equation was formulated as:

$$\text{Kho-kho Performance (Y)} = 26.486 + -1.656 (\text{Orientation Ability}) + -.338 (\text{Reaction Ability}).$$

8. References

Books

1. Barrow, H. M., & Rosemary, M. G. (1979). A Practical Approach to Movements in Physical Education. Philadelphia: Lea and Fibiger (1979).
2. Clarke, H.H. (1971). Research Process in Physical Education, 2nd Edition, New Jersey: Prentice Hall, Inc., Englewood Cliffs.
3. Hertz, P. (1985). Coordinative Faehigkeiten in Schul Sports. Berlin: Volb and Wissen Volloei Verlag,
4. Jonson, B.L., & Nelson, J.K. (1998). Practical Measurements for Evaluation in Physical Education. Surjeet Publications.
5. Kansal, D.K. (2008). Applied Measurement Evaluation and Sports Selection. Sports and Spiritual Science Publication.
6. Nelson, N.P. & Johnson, C.R. (1970) Measurement and Statistics in Physical Education, Belmont, California, Wordsworth Publishing Company Inc.
7. Singh, A. Gill, J.S. Bains, J.S. Brar, R.S. & Rathee, N.K. (2003) Essential of Physical Education. Kalyani Publishers, Ludhiana.

8. Singh, H. (1991) Science of Sports Training. D.V.S. Publication, New Delhi.

Periodicals and Journals

9. Bakshi, R. (1994) Comparison of Two Groups of Sports Person in Co- Coordinative Abilities. (Unpublished M.P.E. Dissertation) L.N.I.P.E.
10. Bhambri, R. N. (2005) Motor Fitness Variable as a predictor in playing ability of Table Tennis. A Thesis submitted to Panjab University, Chandigarh.
11. Chauhan, M.S. (2003) Prediction of Sprinting Ability of Haryana School Boys in Relation to their Anthropometric Measurements. Journal of sports & Sports Science, NSNIS, Patiala, 26 (1).
12. Chauhan, M.S. (2004) Prediction of Performance of University Throwers in Relation to their Anthropometric Measurements. Journal of sports & Sports Science, NSNIS, Patiala, 27 (3).
13. Dixit, P. (1982) Inter
- 14.
- 15.
16. relationship of Reaction Time, Speed of Movement and Agility and Comparison among Players from Selected Sports. Unpublished Master's Thesis, Jiwaji University.
17. Eric D.K.N. and Elijah, G.R (2013) Assessment of physical components as prediction factors of long jump performance characteristics of rugby seven players; IJSPP volume 8, issue 01, pp.17-21.
18. Gaurav, V. Singh, M. & Singh, S. (2010) Anthropometric Characteristics, Somatotyping and Body Composition of Volleyball and Basketball Players. Journal of Physical Education and Sports Management 1(3) 28-32.
19. Ghosh, M. and Kundu, B. (2014) Physical, physiological and anthropometric measures as determinants of performance in kho-kho skill-A Co relational study. International Journal of Humanities and Social Science Invention. August, 2014, issn: 2319-7722, vol. 3, issue-8, pp.04-12.
20. Goon, A.K and Ghosh, S. (2014) relation between some selected soccer skills with some anthropometric measurements of hill area teenage male soccer players; volume 3, issue 3, march 2014, issn no. 2277-8160.
21. Hill, J.F. (1972) Inter-relation of the Reaction time, Movement time, Motor ability and Physical fitness of Children five through Eight Years old. Dissertation Abstract International, 32:3759-A.
22. Hota, B.R. (2001) Relationship of Selected Coordinative Abilities to the Playing Ability of the Soccer Players (Unpublished M.P.E. Thesis), L.N.I.P.E.
23. Koley, S. Singh, S. & Sandhu, J.S. (2010) Anthropometric Characteristics, Hand Grip Strength, Vo2 Max, Indian Inter-University Volleyball Players, Journal of Human Sports & Exercise, 5 (3) 389-399.