



EYE-HAND COORDINATION AS PREDICTOR OF PISTOL SHOOTING PERFORMANCE

Sandeep Kaur*

Dr. Ajit Singh**

Research Scholar, Department of Physical Education, Panjab University Chandigarh* Assistant Professor,
Department of Physical Education, Post Graduate Government College Sector-11 Chandigarh**

ABSTRACT: The present study was designed to establish regression equation of Eye-Hand Coordination and shooting efficiency of national level female shooters of Northern India. To obtain the required data, two hundred twenty three (N=223) national level female pistol shooters were approached and administered test with regard to the variables under investigation. The sampling for the current investigation is done by using multistage sampling technique. All subjects had participated in the National competitions in 10 meter Air Pistol Shooting. The age of the subjects ranged between 18 to 25 years. Eye-Hand Coordination in shooting was investigated with the help of O'Connor Tweezer Dexterity Test Model 32022. To assess the Shooting efficiency of match performance, 40 shots hit on the target by shooter. In statistical procedure Descriptive statistics, Mean and Standard Deviation was calculated. Further Correlation was applied. Regression equation was established to investigate the relationship among the Eye-Hand Coordination shooting performance

KEYWORDS: Eye-Hand Coordination, Shooting Efficiency, Female shooters

INTRODUCTION

Shooting is the sport which has been performed in shooting range on different distances and the size of the target faces differ on each distance. It is static sport requiring fine movement control, proper endurance, higher self-confidence, good Eye-Hand Coordination and stability of mind. Shooting is considered as one of the sports events that can be taken up by any participant regardless of gender and age for professional involvement and recreational purpose.

No man can be truly perfect in shooting unless experience is taken according to his level and duration of practice. There are many gateways to achieve one's goal in shooting such as ability to co-ordinate of eye with hand, In shooting sports the most important factor is co-ordination. Eye-Hand Coordination is a complex phenomenon of body and mind. There are number of perceptions travel to the brain and only. few impulses

are brought to the co-ordinate with body. In shooting sports, squeeze the trigger of pistol perfectly and releasing shot without making any technical mistake is called good co-ordination. A player cannot be a sharp shooter until s/he is able to have good co-ordination of eye and hand.

Co-ordination means working of a particular muscles group of the body in association for particular development of movement. It is most significance in executing any movement with a predetermined goal. Co-ordination is important to execute movements more accurately, with less expenditure of energy, showing a better performance over a longer time. An individual begins losing co-ordination once he gets tired. Players under fatigue cannot learn movements with a high level of co-ordination having rhythm, accuracy and perfection etc. Fine motor skills are involved in the control of small muscle movements such as when an infant starts to use fingers with a purpose in co-ordination with the eyes.

Eye- hand co-ordination is evident in fine motor activities such as triggering, tracing or in gross motor activities such as catching, striking or volleying a ball (Ali, 2005). Coordinative abilities are understood as relatively balanced and generalized process of motor control and guideline processes. These enable an individual to complete a group of movements with better quality and effect (Harre, 1989). The most significant factor in any type of shooting is co-ordination. Releasing a accurate shot without making any sort of mistake; one is to coordinate trigger squeeze so that the gun goes off on the right point. One cannot be a sharp shooter unless and until one can have good coordinated stability.

OBJECTIVES OF THE STUDY

1. To establish regression equation of Eye-Hand Coordination and shooting efficiency of national level shooters of Northern India.

HYPOTHESIS OF THE STUDY

1. There is no relationship between Eye-Hand Coordination and Shooting Efficiency of national pistol level shooters of Northern India.

MATERIAL & METHODS

The female pistol shooters numbering 223 have been selected as a subject for the conduct of present study. All the female shooters are in the age group of 18-25 years, who have participated at national level. Pistol Shooters (10M) were selected for the sample and data gathered from different shooting ranges of North India such as Shooting range Panjab University Chandigarh((n=30), Best shooters academy Patiala (n=50) (Punjab),Dr. Karni Singh shooting range, Delhi (UT) (n=60), Marksmen Shooting range Patiala (n=15) , Punjabi University Patiala(n=10), Dashmesh rifle club Badal (n=58),. The sampling for the current investigation is done by using multistage sampling technique in which at two levels sampling is done. In the first stage i.e., at selecting states of Northern India random sampling technique was used. In the lottery method of random sampling, names of one state and two UTs were picked up i.e., Panjab, Delhi and Chandigarh. Following steps have been taken in procedure for tools for measurement of Eye-Hand Coordination and shooting efficiency variables. In this study, Eye-Hand Coordination in shooting was investigated with the help

of O'Connor Tweezer Dexterity Test Model 32022 after the competition. The instructions had given before the conducting the test. Three trials conducted for Eye and hand co-ordination, time taken in seconds to fill holes by shooter, counted as score. The subject asked to fill holes within 10 minutes, if shooter took time more than 10 minutes, trial was discontinued. Shooting efficiency investigated by used 40 shots hit on the shooting target, hitting number (1-10) by the shooter considered as scoring of shooting Efficiency (Match performance). This criterion is given by International Shooting Sports Federation in 10 meter air pistol shooting rule from 8.1 to 8.15. For the purpose of Statistical analysis In Descriptive statistics, Mean and Standard Deviation and Product Moment Correlation were used. To establish equation the Regression Equation was used. The hypothesis of the study had examined at 0.05 level of significance.

RESULTS & DISCUSSION

Table -1 Descriptive Statistics of Female pistol shooters of Northern India on Eye-Hand Coordination and Shooting Efficiency

Variables	N	Mean	Std. Deviation
Eye-Hand Coordination	223	484.23	44.92
Shooting Efficiency (Match Performance)	223	359.58	6.28

It can be seen from the *table 1* that the mean score of the female pistol shooters of Northern India on Eye-Hand Coordination is 484.23 with the standard deviation of 44.92. Further, the mean score of the female pistol shooters of Northern India on Shooting Efficiency (Match performance) is 359.58 with the standard deviation of 6.28.

Table – 2 Correlations between the Eye-Hand Coordination with Shooting efficiency (match performance) of Northern India Female Pistol Shooters

Variables	Shooting Efficiency (Match Performance)	p value
Eye-Hand Coordination	-.832**	.000

The *table 2* reveals the relationship between the Eye-Hand Coordination and Shooting efficiency (Match performance) of the female pistol shooters of Northern India. The r value.832 is significant which indicates that the relationship observed in the sample is highly negatively correlated with each other.

Figure-1 Distribution of the raw score of female National level shooters of Northern India on Eye-Hand Coordination (Shooting Efficiency match performance)

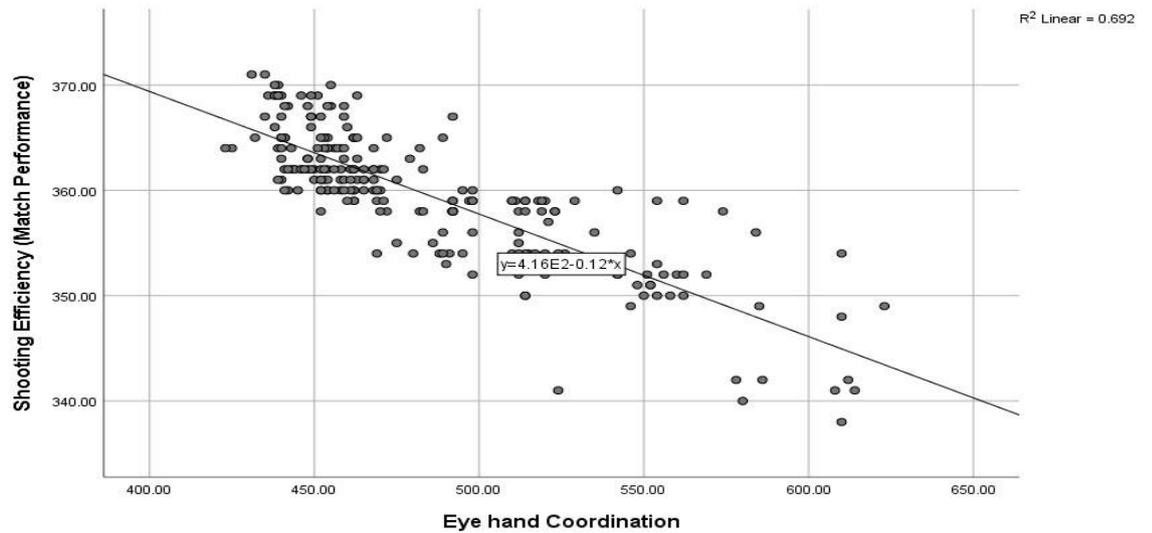


Table-3 Linear regression R Correlation between Eye-Hand Coordination and Shooting Efficiency (Match performance)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.832	.692	.691	3.49

From table 3, model 1, it can be seen that the r-value was .832, the R square .692, the adjusted R square .691 and std. error of the estimate was 3.49. It can be said from this table that there is 69.1 percent contribution of Eye-Hand Coordination on shooting efficiency (Match performance) of female pistol shooters from Northern India.

Table-4 Analysis of variance on dependent variable Shooting Efficiency (Match performance) vs. Eye-Hand Coordination

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	6068.47	1	6068.47	496.76	.000
Residual	2699.743	221	12.216		
Total	8768.21	222			

The linear regression model which produced R square .692, From Table 4, it can be seen that the model 1, is significant. It can therefore be concluded that the Eye-Hand Coordination had significant positive regression with Shooting efficiency (Match performance); indicating shooters with higher Eye-Hand Coordination were expected to have better Shooting efficiency.

Table -5 Regression coefficient of significant variable on dependent Variable: Shooting Efficiency**(Match performance) Unstandardized Standardized**

Model	Coefficients		Coefficients		T	Sig.
	B	Std. Error	Beta			
(Constant)	415.93	2.53			163.81	.000
Eye-Hand Coordination	-.116	.005		-.832	-22.28	.000

Using Regression Co-Efficient (B) of the model shown in table no.5, the Regression Equation can be developed which is as follows:

$$\text{Shooting Match Performance} = 415.93 + (-0.116) * (\text{Eye-Hand Coordination Score})$$

To conclude, it may be interpreted that the above regression equation is quite reliable as the r square is 0.692. In other words, the variable selected in the regression equation explains 69.2% of the total variability in the playing ability, which is satisfactory. Since the f value for the regression model is highly significant, the model is reliable. Therefore, it may be interpreted that the variable selected in the model, i.e. Eye-Hand Coordination, is good, valid in estimating shooting efficiency (match performance).

DISCUSSION OF THE FINDINGS

Shooting efficiency (match performance) is negatively correlated with Eye-Hand Coordination. The results of the study scrutinize that Eye-Hand Coordination contributes 69.1% to shooting efficiency (match performance). **Safari Suherman & Ali (2017)** found that higher ability in motor skills (higher Eye-Hand Coordination) has better results as far as accuracy of forehand topspin among the students of table tennis is concerned. **Paul Bishwas & Sandeep (2011)** evaluated the effect of sports vision and Eye-Hand Coordination training on sensory and motor performance of table tennis players and found better improvement on motor performance on the experimental group. The results after analysing the data suggest that the predictor has a significant contribution on the match performance situation. The reason behind this might be the demands imposed on the shooters. It may therefore be concluded that the competition demands imposed on shooters has made them perform better in that situation. Null hypothesis will be examined at 0.05 level of significance. The null hypothesis that there is no relationship between Eye-Hand Coordination and Shooting Efficiency of national pistol level shooters of Northern India is rejected.

CONCLUSION

It can therefore be concluded that shooting efficiency (match performance) is negatively correlated with Eye-Hand Coordination. The results of the study scrutinize that Eye-Hand Coordination contributes 69.1% to

shooting efficiency (match performance). It is concluded that the variable selected in the model i.e. Eye-Hand Coordination is valid in estimating shooting efficiency of match performance.

REFERENCES

Ali,O., İsmail,B., Günay,Y., Olgun,U., Deniz,Ş.,& Hayri,E..(2016). Effects of functional balance training on static and dynamic balance performance of adolescent soccer players. *International journal of sports science& training science*.2(2),73-81.

Harre (1989). "Principles of sports training" (Berlin: Sports vertay,1989): p.152.

Hartmann, C.; Minow, H. J. and Senf G. (2002). "Exercise and training " principles and methodology for physical and Sport therapy Ed.Ten. Munchen, :pp. 1-187.

Nozari,N. (2019). Identifying physical and physiological parameters to produce the best performance in a shooting sport athlete. ISSF athletes" handbook. Retrieved from <https://www.issf-sports.org/athletes/news.ashx?newsid=3317>

Paul, M., Biswas, S, K., & Sandhu, J, S. (2011). Role of sports vision and Eye-Hand Coordination training in performance of table tennis players. *Brazilian J of Biomotricity*, 5(2), 106-116.

Pipal, B, P., Davinder, K, G., & Dahiya, J. (2015). Correlation between Hand Grip Strength and Hand Eye Co-ordination with Performance in Adolescent Tennis Players. *International Journal of Science and Research*, 6(3).Retrieved from www.ijsr.net

Scoring and tie-breaking. (2017). ISSF shooting event. Retrieved from https://en.wikipedia.org/wiki/ISSF_shooting_events

Shooting Rules 6.3.12 and 6.3.15. (2008). Retrieved from *18General Technical Rules for all Shooting Disciplines, International Shooting Sport Federation*.
https://en.wikipedia.org/wiki/ISSF_shooting_events

Suherman, A., Ali, M. (2017).The effect of exercise method and hand-eye co-ordination towards the accuracy of forehand topspin in table tennis. *Research gate*. Retrieved from <https://www.researchgate.net/publication/315532439>

