International Journal of Physical Education, Sports and Health 2018; 5(1): 244-246

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2018; 5(1): 244-246

www.kheljournal.com
Received: 16-11-2017
Accepted: 19-12-2017

Dr. Durgeshnandini Titarmare
L.A.D. and Smt. R.P. College for Women, Nagpur, Maharashtra, India

Correspondence
Dr. Durgeshnandini Titarmare
L.A.D. and Smt. R.P. College for Women, Nagpur, Maharashtra, India

A study on association between visual-motor skills and cognitive prophecy in male badminton players

Dr. Durgeshnandini Titarmare

Abstract
The objective of the present study was to assess the association between visual and motor skills with intelligence in a group of male badminton players. To conduct the study 40 inter-university male badminton players (Average age 23.19 years) were selected as sample. Mirror drawing test was used to assess hand-eye coordination of selected varsity male badminton players while cognitive prophecy in the form of intelligence was assessed with the help of MGTI prepared by Mehrotra (1984). Pearson correlation coefficient revealed a significant association between intelligence with visual and motor skills i.e. hand-eye coordination of male badminton players. It was concluded that hand-eye coordination and intelligence are part of cognitive skills and thereby showing a meaningful relationship with each other in a group of male badminton players.

Keywords: Intelligence, visual-motor skills, badminton

Introduction
Hand-eye coordination is an extremely complex cognitive ability. Hand-eye coordination requires a combination of visual and motor skills. It is performed by visual input received by eyes and executed by our hands. In other words, hand-eye coordination is visual skills that provided information for controlling, direction and manoeuvre hand movements. According to Ludeke and Ferreira (2003) [4], hand-eye coordination may be referred to as perceptual-motor response with the movement of hands according to visual information provided by eyes. It is the skill of an individual to synchronised his/her motor responses with the hands according to visual stimuli. It is a measure of an individual s ability to perform a quick and accurate response to a stimulus with the movement of the hands. Hemphill (2000) [1] noted that there are two kinds of situations in which athletes use their eye-hand coordination: Pro-action situations in which the movement is initiated by the athlete based on visual information about a target, such as throwing a baseball and serving in tennis. In these situations, accuracy rather than speed of movement is the priority. Magill (2006) [5] referred to these situations as self-paced motor skill performances. Reaction situations in which the athlete must wait for the stimuli to be presented before moving, such as catching a baseball or returning the serve in tennis. Magill (2006) [5] referred to these situations as externally-paced motor skill performances. Neuroscientists have extensively researched human gaze behavior, with studies noting that the use of the gaze is very task-specific (Vidoni *et al*., 2009) [11] but that humans typically exhibit proactive control over movements to guide movements. Usually, the eyes fixate upon a target before the hands are used to engage in a movement, indicating that the eyes are used to provide spatial information for the hands (Johansson, 2001) [2]. Furthermore, the duration that the eyes appear to be locked onto a goal for a hand movement varies, with the eyes sometimes remaining fixated until a task is completed. Other times, the eyes seem to scout ahead toward other objects of interest before the hand even grasps and manipulates the object. Conversely, humans can aim eye movements toward the hand without vision, using spatial information from hand proprioception. The more dominant behavior in humans, studies have shown that when eyes and hands are used for core exercises, the eyes generally direct the movement of the hands to targets (Liesker *et al*., 2009) [3]. Furthermore, the eyes provide initial information of the object, including its size, shape, and possibly grasping sites which are used to determine the force needed to be exerted by the fingertips for engaging in a given task.

For shorter tasks, the eyes often shift onto another task to provide additional input for planning further movements. However, for more precise movements or longer duration movements, continued visual input is used to adjust for errors in movement and to create more precise movements.

The greatest and statistically significant correlations with the factor of general intelligence are obtained in motor variables whose structure is characterized by predominant coordination, balance, speed of alternative movements and explosive strength, then in motor tasks consisting of unusual movement structures, where maximum speed is required along with the correct performance of the task. Other motor abilities do not have statistically significant relations to intelligence (Popoviæ 2010) [8].

Since psycho-motor abilities are part of the cognitive domain number of researcher examined the possible linkage between intelligence with psycho-motor abilities. However, the results are somewhat confounding with Rabbit *et al*. (1999) [9] reported strong correlation between psychomotor abilities and general intelligence while Mohan *et al*. (1982) reported a non-significant association between psychomotor ability and intelligence. One such sport in which hand-eye coordination is necessary for sports performance is badminton. Badminton is considered to be one of the fastest racket sport and requires psychomotor abilities of the highest order. Apart from psychological, physiological, biomechanical factors psycho-motor and cognitive abilities are also required to perform at the highest level in badminton. Despite the literature on the linkage between intelligence and psychomotor abilities, no study yet have been conducted in which association between hand-eye coordination in male badminton players was assessed with their intelligence. To fill this void, the present study was planned.

Hypothesis

In the present study, it was hypothesized that hand-eye coordination in male badminton players will be significantly associated with their cognitive ability in the form of intelligence.

Methodology

To test the abovementioned hypothesis, the following procedure was adopted.

Sample

To conduct the study 40 inter-university male badminton players (Average age 23.19 years) were selected as sample. The age range of selected male badminton players was 18 to 25 years. The sample for the present study was randomly selected.

Tools

The hand-eye coordination of the subjects was assessed by the mirror drawing test. This was done by the digital mirror drawing apparatus. In this test, error while drawing is recorded and fewer errors indicate good hand-eye coordination.

Mixed Type Group Test of Intelligence constructed by Mehrotra (1984) was used to assess cognitive prophecy of selected male badminton players. This test is divided into two section - i.e. verbal and non-verbal intelligence test. The overall score gives IQ scores of a subject. This 50 item test is highly valid and reliable.

Procedure

Mirror Drawing test and MGTI was administered to each male badminton player under the researcher's supervision. Errors made while drawing a figure was recorded for each male badminton players. The scoring for MGTI was carried out as per answer key provided with the manual. The data was tabulated and Pearson Correlation Coefficient was computed. The same is shown in table 1.

Results

Table 1: Pearson Correlation Coefficient between Hand-Eye Coordination and Cognitive Prophecy as Assessed by Intelligence among Male Badminton Players

	N	Hand-Eye Coordination	Intelligence
Hand-Eye Coordination	40	1	-.681**
Intelligence	40	-.681**	1

df(38)=0.39 at .01 level

A perusal of statistical facts reported in table 1 indicates a significant but negative correlation between hand-eye coordination and intelligence in a group of male badminton players ($r = -.681$, $p<.01$). It goes to show that when scores on intelligence test increases, the subject commits less error in mirror drawing apparatus. It means that intelligence and hand-eye coordination are highly correlated and hand-eye coordination is dependent upon cognitive prophecy.

Discussion

Planinsec (2002a) [7] reported that cognitive influence is more important while performing complex task demanding eye-hand coordination. Thomas and Chissom (1972) [10] also reported a strong association between perceptual motor-related skills with intelligence. The result of the present study denotes the same finding. It can also be explained by the neuronal connections while performing visual-motor skills such as eye-hand coordination.

Conclusion

Based on results, it was concluded that a certain degree of cognitive prophecy is essential for good eye-hand coordination. It may also be concluded that cognitive prophecy in the form of verbal and non-verbal intelligence can predict the magnitude of hand-eye coordination ability of male badminton players.

References

1. Hemphill D. Training hand-eye coordination on a new device. Unpublished (Sport and Exercise Science) Honours thesis. Sydney: University of Western Sydney 2000.
2. Johansson RS, Westling G, Bäckström A, Flanagan JR. Eye–hand co-ordination in object manipulation. Journal of Neuroscience 2001;21(17):6917-6932.
3. Liesker H, Brenner E, Smeets J. Combining eye and hand in search is suboptimal. Experimental Brain Research 2009;197(4):395-401.

4. Ludeke A, Ferreira JT. The difference in visual skills between professional versus non-professional rugby players. S Afr Optom 2003;62(4):150-158.
5. Magill RA. Motor Learning and Control: Concepts and Applications. 6th Edition. New York: McGraw-Hill, 2006.
6. Mohan J, Bhatia S. Intelligence, sex and psychomotor performance. Indian Psychological Review 1989;28(3):34-35.
7. Planinsec J. Developmental changes in relations between motor performance and fluid intelligence. Studia Psychologica 2002a;44:85-94.
8. Popoviæ B. Specifiènosti Antropološkog Statusa Devojèica Mlaðeg Školskog Uzrasta Pod Uticajem Programiranog Vežbanja Razvojne Gimnastike. (Specificity of anthropological status in girls of younger school age under the influence of programmed exercising of developmental gymnastics) Doctoral dissertation. Faculty of Sport and Physical Education. In Serbian 2010.
9. Rabbit P, Banerji N, Szymanski A. Space fortress as an IQ test? Predictions of learning and of practiced performance in a complex interactive video-game. Acta Psychologica 1989;71:243-257.
10. Thomas JR, Chissom BS. Relationships as assessed by canoncial correlation between perceptual-motor and intellectual abilities for preschool and early elementary age children. Journal of Motor Behavior 1972;4:23-29.
11. Vidoni ED, McCarley JS, Edwards JD, Boyd LA. Manual and oculomotor performance develop contemporaneously but independently during continuous tracking. Experimental Brain Research 2009;195(4):611-620.