International Journal of Physiotherapy Research and Clinical Practice

Original Article

Exploring Visual Reaction Time Patterns Among Athletes: A Comprehensive Study

Haji Abubakar Khamis[1], **Huba Khamis Rashid**[2,*]

[1] *Insurance Coordinator in Ampola Tasakhtaa Hospital, Zanzibar, Tanzania*
[2] *Assistant Lecturer, Assistance Assistant Coordinator Unit of Clinical Medicine, School of Health and Medical Sciences, State University of Zanzibar, Zanzibar, Tanzania*

ARTICLE INFO

Article history:
Received 19.01.2024
Accepted 04.05.2024
Published 14.05.2024

* *Corresponding author.*
Huba Khamis Rashid
dr.huba@suza.ac.tz

https://doi.org/10.54839/ijprcp.v3i1.24.4

ABSTRACT

Reaction time, the temporal interval between stimulus application and the onset of response, plays a pivotal role in sports performance. Visual Reaction Time (VRT), specifically, denotes the time required to respond to visual stimuli. This study sought to meticulously evaluate the reaction time in a sample of 98 subjects, employing reaction time software for precise measurements. During the reaction time assessment, visual stimuli were presented five times, and the final reaction time was derived by computing the average, excluding the highest and lowest values. The outcomes unveiled noteworthy variations in VRT, particularly in inter-sport comparisons such as athletics versus Football, athletics versus volleyball, and athletics versus boxing, this investigation contributes valuable insights into the nuanced dynamics of visual reaction time across diverse sporting disciplines.

Keywords: Reaction time; Performance Metrics Temporal Dynamics; Visual Reaction Time; sport player

1 INTRODUCTION

In the realm of sports, the hardware system encompasses the mechanical and optometric attributes of the visual system, which are not specific to particular activities. These include visual acuity, ocular health, and binocular abilities such as accommodation (focus and fusion), depth perception, color discrimination, and peripheral vision. These visual functions are quantifiable through established optometric techniques. On the other hand, the software system is more intricately linked with cognitive aspects, including visualization, visual concentration, visual perception, reaction time to visual stimuli, and visual search. The exploration of visual perception in athletes remains an area with incomplete research. While some reports suggest superior visual functions in athletes compared to non-athletes, with professional athletes exhibiting enhanced parameters of the visual system in comparison to their lower-level counterparts, a comprehensive understanding is yet to be achieved.

Sport is delineated as the ability to consistently manifest athletic prowess. Individuals recognized as experts in sports exhibit markedly elevated skills, aptitudes, or performances compared to novices[1]. Typically, experts excel in extracting and efficaciously utilizing environmental information, assimilating it with their existing knowledge to discern and execute judicious responses. Proficient performers, through their adept manipulation of perceptual cues, demonstrate an attenuation of the temporal constraints inherent in reaction time tasks[2].

Proficiency in decision-making necessitates adept performers to discern and integrate the most pertinent visual information at their disposal while disregarding less significant sources. For example, adept decision-making in chess hinges on the capacity to search for and identify structured patterns of play, facilitating the encoding and recall of meaningful associations between chess pieces. Similarly, the acquisition of expertise in airport-security screening results from the ability to perceptually organize and identify objects within security images, allowing targeted objects to stand out amidst other distracting elements. In dynamic externally

paced activities, such as driving, crossing a road, and engaging in sports, the heightened temporal demands necessitate rapid and accurate recognition of key objects to optimize performance. Expert drivers, for instance, exhibit superior abilities to recognize and anticipate potential hazards, leading to a reduction in vehicle accidents. Similarly, skilled athletes in fastball sports like soccer, field hockey, and basketball demonstrate enhanced decision-making capabilities, primarily attributed to their proficiency in searching for and recognizing meaningful patterns of play. Furthermore, they excel in identifying sources of information that offer early indications of movement outcomes.

The current study aims to assess the impact of decision-making speed on cognitive processes, specifically reaction time, by comparing and correlating this factor among different groups of players.

2 METHODOLOGY

The present study was conducted at the State University of Zanzibar, Zanzibar, Tanzania District 98 players of the age group of 12 to 18 years. The research informed consent was obtained from each subject for inclusion in the study. After obtaining consent, reaction time was measured with reaction time software[3]. It was carried out with adequate light and in a silent atmosphere. VRT was measured when the subject had to respond to different color stimulus appearing on the screen by pressing the key on the screen. During the reaction time testing visual stimuli were given five times and the average reaction time after omitting the highest and lowest reaction time, was taken as the final reaction time. Subjects were given practice session before measuring the actual reaction time. Data was collected and was statistically analyzed. Reaction time was reported as mean, standard deviation. The level of significance between sports player Game wise was tested by post hoc test, by SPSS software.

3 RESULT

As per Table 1, the game wise mean of VRT for Athletics 321.80, (±38.38), Volleyball 300.40, (±27.58), Boxing 255.55, (±27.50), F-, Football 220.21, (±27.50), value is significant at 0.05 significant level (F= 17.19, p= 0.001).

Table 1: VRT for Athletics

	N= (Athletics- 48, Football-23, Volleyball-27, Boxing- 23.)				Test	
VRT	Athletics	Volleyball	Boxing	Football	F	Sig
	321.80, (±38.38)	300.40, (±27.58)	255.55, (±27.50)	220.21, (±27.50)	17.19	0.001

Table 2: Multiple Comparisons VRT

Game (I)	Game (J)	Mean Difference (I-J)	Std. Error.	Sig.
Athletics	Football	42.400*	6.929	0.001
Athletics	Volleyball	32.366*	8.916	0.009
Athletics	Boxing	53.233*	9.438	0.001
Volleyball	Boxing	20.857	10.945	0.119

4 CONCLUSION

Among the various games, football players exhibited the shortest visual reaction time (VRT), followed by boxing players, volleyball players, and, lastly, athletics players.

Significant differences in VRT were observed between different sports groups, including athletics and football, athletics and volleyball, athletics and boxing, as well as volleyball and boxing.

REFERENCES

1. Cox H, Sang HY. Playing position and psychological skill in american football. *Journal of Sport Behavior*. 1995;18:183–194. Available from: https://www.scirp.org/reference/ReferencesPapers?ReferenceID=1524466.
2. Buskirk ER, Hodgson JL. Age and aerobic power: the rate of change in men and women. *Journal of fitness*. 1987;15(9):1824–1829. Available from: https://pubmed.ncbi.nlm.nih.gov/3493922/.
3. Shelton J, Kumar GP. Comparison between Auditory and Visual Simple Reaction Times. *Neuroscience and Medicine*. 2010;1(1):30–32. Available from: http://dx.doi.org/10.4236/nm.2010.11004.