



ISSN: 2456-0057

IJPNE 2017; 2(1): 232-235

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www.journalofsports.com

Received: 15-11-2016

Accepted: 19-12-2016

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A comparative study on reaction ability and kinesthetic perception of adolescents and young adults

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Abstract

The aim of the study was to compare the reaction ability and kinesthetic perception on adolescents and young adults. Total 60 school and college going females were selected as subject for this study. Age of the subjects were ranged from 12-24 years. All subjects were equally divided into two groups namely adolescents and young adults. Reaction time and kinesthetic perception were considered as the parameters of this study and these were measured by Nelson hand and foot reaction test and Depth perception jump test respectively. In statistical procedure, mean and Standard Deviation were used as descriptive statistics and to analyse the significant difference statistical 't'- test was applied. There was a significant difference found in Hand reaction time and Kinesthetic perception. Difference also found in Foot reaction time though it was not statistically significant.

Keywords: reaction ability, kinesthetic perception

Introduction

Success in sports often depends on how effectively and quickly the performers detect, find and use relevant sensory information. Many times, an athlete who wins a competition, is able to quickly detect the movement patterns of the opponent based on proprioceptive stimulations, which consist of sensory organs (Hendrayana, 2017) [3]. Reaction time is simply as the sudden movement (Slater-Hammel, 1955) [9] or the time between a stimulus and a response. In other word, it is an interval between the onset of a signal (stimulus) and the initiation of a movement response (Şenel & Eroğlu, 2006) [8]. It plays an important role for an athlete to improve their sports performance. It also acts as a reliable indicator of rate of processing of sensory stimuli by central nervous system and its execution in the form of motor response. Due to many factors, reaction ability can fluctuate. The main factors are age, sex, vision, practice, fatigue, intelligence, muscle type etc. (Jain *et al.*, 2015) [4]. On the other hands, kinesthetic sense is known as the 'position sense'. It is the ability to control, coordinate and perceive the position, effort and movement of the body during muscular action (Das *et al.*, 2015; S. Mariyappan & Raj, 2017) [1, 10] that can detect the changes in body position and movements without relying on information from the five senses. A well kinesthetic perception can tell a person where different parts of the body is located even if the eyes are closed or that person is standing in a dark room. It is actually attributed to the action of the proprioceptors (Flynn, 1964) [2]. A proprioceptor is the sensory receptor (organ which transmit a signal to a sensory nerve) which is located in the deep tissues (skeletal muscles, tendons, ligaments etc.). Perception is not only the passive receipt of these signals, but it's also is shaped by the recipient's learning, memory, expectation, and attention. Prior studies found a positive impact of reaction ability and kinesthetic perception which are requisite in sports performance (Jensen & Munro, 1979; Misra *et al.*, 1985) [5, 6]. As, both reaction ability and kinesthetic perception are depended mostly on activity of CNS and genetics, so the present researcher was interested to look for how the reaction ability and kinesthetic perception fluctuates according to age between adolescents and young adults.

Objectives

The objective of this study was to investigate the difference on reaction ability and kinesthetic perception of adolescents and young adults.

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Hypothesis

It was hypothesised that- H0: There would be no significant difference on reaction ability and kinesthetic perception of adolescents and young adults.

Methodology

Selection of the subjects

A total no. of 60 female school and college going students were randomly selected from East Medinipur, West Bengal for this study as subject. The age of the subjects was ranged from 12-24 years. The total subjects were equally divided into two groups on the basis of their age category i.e., adolescents (12-16 years) and young adults (18-24 years).

Selection of the Parameters

Reaction ability and kinesthetic perception were considered as the parameters for this study. These parameters were measured by Nelson hand and foot reaction test and Depth perception jump test respectively.

Table 1: Contains the details of instruments and tools that were used in this study

Sl. No.	Variables	Instruments & Tools
1	Age	Birth certificate
2	Height	Anthropometric rod
3	Body weight	Weighing machine
4	Reaction ability	Nelson hand and foot reaction test
5	Kinesthetic perception	Depth perception jump

In statistical procedure, mean, Standard Deviation were used as descriptive statistics and to analyse the significant difference statistical 't'- test was applied.

Result

The results obtained from the data were as follows:

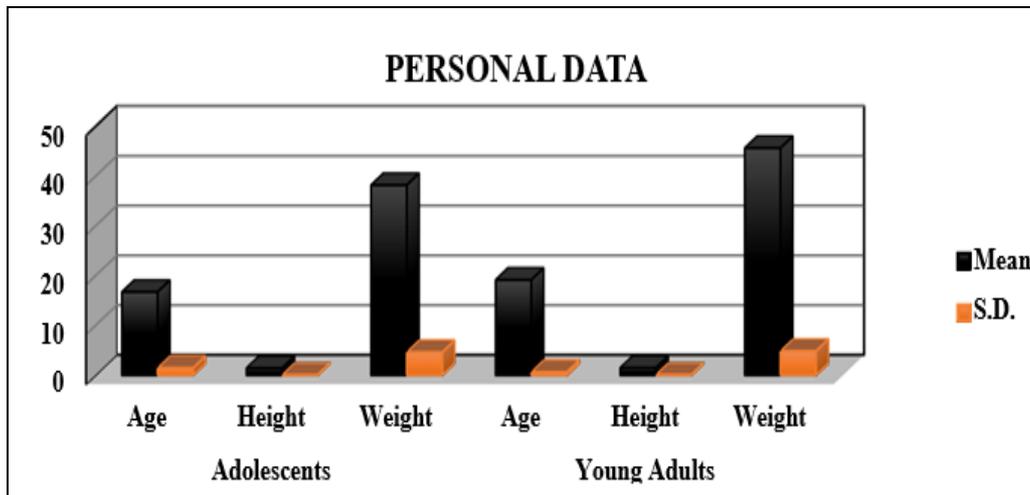
At first, in table 2 the personal data of the subjects were presented.

Table 2: Shows the details of personal data of the subjects

Group Variables	Adolescents		Young Adults	
	Mean	S.D.	Mean	S.D.
Age (Years)	16.76	±1.50	19.20	±0.66
Height (cm.)	144	±0.09	149	±0.10
Weight (kg.)	38.26	±4.66	45.70	±4.89

From table 2, it was found the mean (S.D.) of personal data i.e., age, height and weight of the adolescent group were 16.76 (±1.50), 144 (±0.09), 38.26 (±4.66) and young adult

group were 19.20 (±0.66), 149 (±0.10), 45.70 (±4.89) respectively. Below in graph 1, the personal data of the subjects were presented.



Graph 1: Graphical representation of personal data of adolescents and young adults

Table-3 contains the statistical details of reaction ability of the subjects

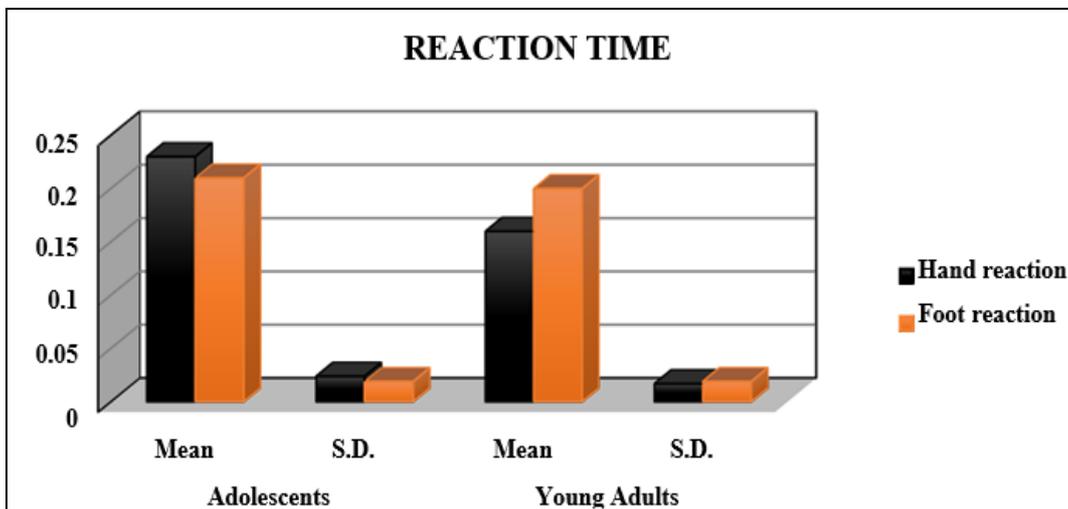
Table 3: Shows the difference of Mean and S.D. of reaction ability of the subjects

Reaction ability	Adolescents		Young Adults		't' value
	Mean	S.D.	Mean	S.D.	
Hand reaction	0.23	±0.024	0.16	±0.017	3.80*
Foot reaction	0.21	±0.019	0.20	±0.019	0.0059

t0.05⁵⁸ = 2.009

From table no.3, it was observed that the mean (S.D.) on the hand and foot reaction of adolescent subjects were 0.23

(±0.024) & 0.21 (±0.019) and young adult subjects were 0.16 (±0.017) & 0.20 (±0.019). From the above data, t-value of hand and foot reaction were found 3.80 and 0.0059 at the 0.05% level of significance. It was evident that the calculated value of 't' for hand reaction was higher than the table value i.e., 3.80>2.009. So, it can be assessed that there was significant difference on hand reaction ability between adolescents and young adults. On the other side, the calculated value of 't' for foot reaction was lower than the table value i.e., 0.0059<2.009. So, it can be explored that there was no significant difference on foot reaction ability between adolescents and young adults.



Graph 2: Graphical representation of reaction time of adolescents and young adults

Table-4 contains the statistical details of perception jump of the subjects

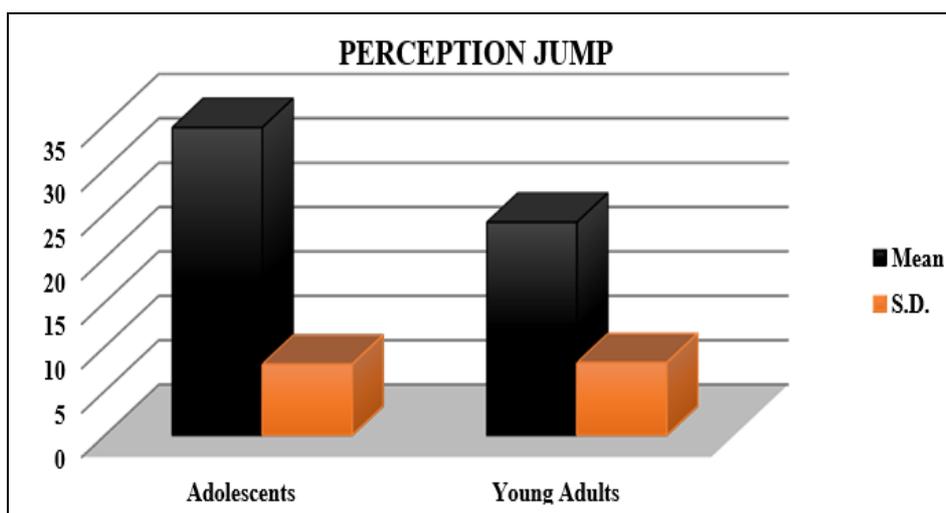
Table 4: Shows the difference the Mean and S.D of perception jump test of the subjects

Depth Perception Jump	Adolescents		Young Adults		t' value
	Mean	S.D.	Mean	S.D.	
	34.67	± 8.01	24.00	± 8.19	3.19*

$t_{0.05}^{58} = 2.009$

From the table 4, it was observed that the mean (S.D.) of the perception jump adolescents and young adults were 34.67 (±8.01) and 24.00 (±8.61). From the above data, t- value was found that was 3.19 at the 0.05% level of significance.

It was evident that the calculated value of 't' is higher than the table value i.e., $3.19 > 2.009$. So, it can be assessed that there was significant difference of kinesthetic perception between adolescents and young adults.



Graph 3: Graphical representation of perception jump of adolescents and young adults

Discussion

In this study, reaction ability and kinesthetic perception were studied and compared between adolescent and young adult school and college going subjects. From this study, it was revealed that there was a significant difference on hand reaction ability and kinesthetic perception. Foot reaction ability that also been studied and also had a difference but it was not statistically significant. The result of this study agreed with Samanta *et al.*, 2016 [7]. They Conducted a comparative study on kinesthetic perception and reaction ability between Kathak and Aerobics female dancers in 2016. From that study, they found all parameters were significant difference between kathak and aerobic dancers. In the present study, hand reaction and kinesthetic perception were also found significant difference between adolescents and young adults. The significant difference that occurred while analyzing hand reaction ability and kinesthetic perception of adolescents and

young adults were may be due to the age and activity of CNS. Every person usually uses hand fingers to grip a bat, ball or any object. So, the fingers of the hand are more active than legs. This activation of the hand fingers become more stronger with the functions of CNS and age. And as kinesthetic perception is related to six sense, so this perception ability also matures more with age. In spite of these shortcomings, present researchers demonstrated objective findings in this study, primarily the superior reaction ability of hand, kinesthetic perception of young adults versus adolescents.

Conclusions

Based on the results of the study the following conclusions were drawn:

1. There was a significant difference on Hand reaction ability between adolescents and young adults.

2. There was no significant difference on Foot reaction ability between adolescents and young adults.
3. There was a significant difference on Kinesthetic perception between adolescents and young adults.

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