Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-4 Issue-3 || June 2025 || PP. 8-10 https://doi.org/10.55544/sjmars.4.3.2

An Examination that Involves Analysis and Comparison of Cognitive Abilities within the Context of Both Sports and Non-Sports Persons

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www.sjmars.com || Vol. 4 No. 3 (2025): June Issue

Date of Submission: 16-05-2025	**Date of Acceptance:** 27-05-2025	**Date of Publication:** 06-06-2025

ABSTRACT

Study Aim: This study aimed to investigate the difference in cognitive abilities between sports and non-sports persons.
Material and Methods: A total of 110 school-aged children participated in this cross-sectional study, comprising 40 sports persons and 70 non-sports persons. Cognitive ability was assessed using the Cognitive Abilities Test (CAT–SVSP), developed by Vishal Sood and Pooja Sharma.
Statistical Analysis: Unpaired t-test was employed for the present investigation.
Results: The results showed no significant difference in cognitive ability scores between sports persons (M = 47.85, SD = 5.8675) and non-sports persons (M = 47.84, SD = 5.23). The t-value was 0.0066, which was below the critical value of 1.984, indicating no significant difference.

Keywords- Cognitive Abilities, School-aged Children, Sports Persons, Non-Sports Persons.

I. INTRODUCTION

Cognitive abilities are essential for human development and functioning, encompassing the mental skills required for acquiring information, reasoning, solving problems, and adapting to various situations. These abilities involve key processes such as attention, perception, memory, language, logical thinking, and executive control, all of which play a critical role in learning and everyday decision-making (Sternberg, 2012). In both psychology and education, these abilities are often used to assess intellectual capacity and predict academic success (Gottfredson, 2002). These mental functions begin to develop early in life and are influenced by a range of factors, including genetic growth, environmental stimulation, education, and socio-cultural background (Anderson, 2002; Diamond, 2013). Among these, executive functions—such as the ability to focus, control impulses, and switch between tasks—are particularly important for setting and achieving goals (Miyake et al., 2000). These abilities are tied to the development of the brain's frontal regions and continue to evolve throughout adolescence (Best & Miller, 2010). Studies have shown that strong cognitive skills often lead to better school performance, more effective learning, and improved problem-solving in children (Blair & Razza, 2007). On the other hand, when these skills are underdeveloped, children may struggle with memory, attention, and overall academic progress (Gathercole & Alloway, 2008). In recent decades, researchers have increasingly explored how physical activity—especially through participation in sports—can benefit cognitive development. Physical movement has been found to support brain health by increasing blood flow, promoting the growth of new neurons, and strengthening brain connections

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(Hillman, Erickson, & Kramer, 2008). Structured physical activity and sports programs have been associated with improvements in memory, attention, and higher-level thinking skills across various age groups (Tomporowski et al., 2008). In addition to biological mechanisms, sports can positively influence mental skills through psychological pathways, such as building confidence, reducing stress, and enhancing motivation (Etnier et al., 2006). However, the extent of these benefits often depends on the kind of activity, how often it is performed, and the individual's age and developmental level (Sibley & Etnier, 2003). Although many studies support a link between physical activity and cognition, some findings remain mixed, pointing to the need for more focused research in this area (Chang et al., 2012). Against this backdrop, the current study investigates whether participation in sports leads to measurable differences in cognitive abilities among school-aged children. By comparing standardized test scores of sports and non-sports participants, this study seeks to offer new insights into the potential mental advantages associated with athletic involvement.

II. MATERIAL AND METHODS

The study included 110 school-aged children (N = 110), divided into 40 Sports Persons (N_1 = 40) and 70 Non-Sports Persons (N_2 = 70). A quantitative, comparative design was used to compare cognitive ability levels. Purposive sampling was used keeping in view of administrative feasibility. The participants participated in the study voluntarily and all the subjects were also informed about the objective and protocol of the study. For this study, the Cognitive Abilities Test (CAT–SVSP), developed by Vishal Sood and Pooja Sharma, was used. This scale consists 76 items divided into Four Cognitive Abilities:

i. Verbal
ii. Numerical
iii. Abstract Reasoning
iv. Verbal Reasoning.

III. STATISTICAL ANALYSIS

The data were analyzed using descriptive statistics and graphical techniques to explore distribution patterns and group characteristics. To assess differences between the groups, an independent samples t-test was conducted. All statistical analyses were carried out using SPSS (Statistical Package for the Social Sciences), version 20.0, with a significance level of 0.05 applied for hypothesis testing.

IV. RESULTS

Table-1: Descriptive statistics and independent samples t-test result for cognitive ability between Sports and Non-Sports Persons.

T Test Summary		
	Sports Person	Non-Sports Person
Mean	47.85	47.8429
Variance	34.4275	27.361
Stand. Dev.	5.8675	5.2308
n	40	70
t	0.0066	
d.o.f	108	
critical value	1.984	
since t < critical value	**=>**	**no sig. diff.**

The mean score for sports persons was 47.85 (SD = 5.8675), while the mean for non-sports persons was 47.8429 (SD = 5.2308). An independent samples t-test was conducted, resulting in a t-value of 0.0066 with 108 degrees of freedom. Since the calculated t-value is less than the critical value of 1.984, the difference between the two groups is not statistically significant. This indicates that there is no significant difference in the cognitive ability between sports and non-sports persons.

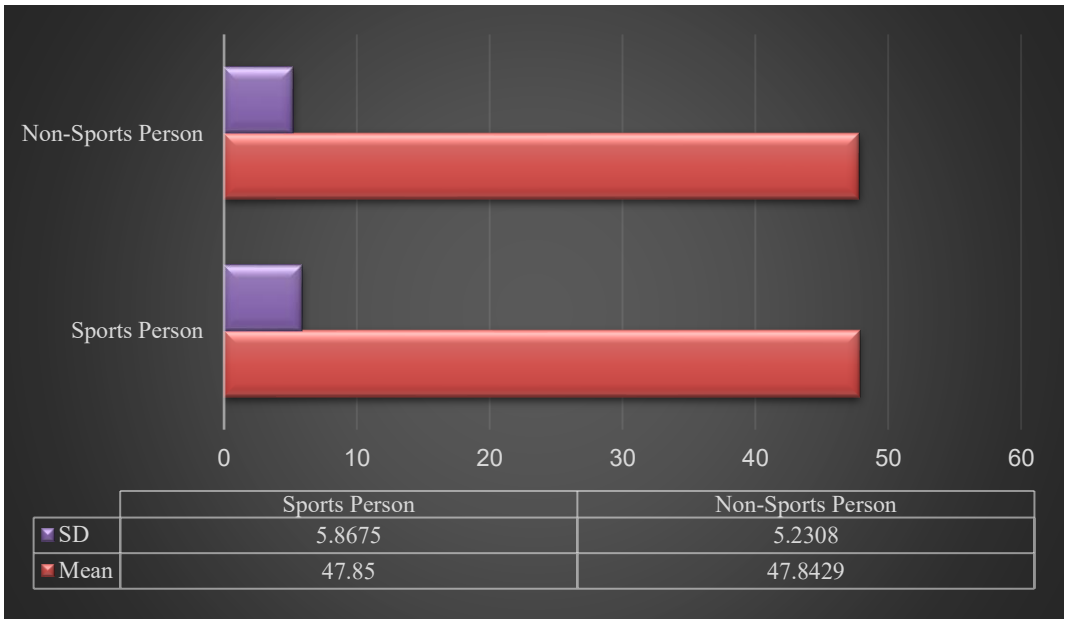

Figure-1: Graphical illustration regarding descriptive statistics and independent samples t-test result for cognitive ability between Sports and Non-Sports Persons.

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