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STUDY ON EVALUATION OF CONCENTRATION ABILITY AMONG SPORTS AND NON-SPORTS PERSONS THROUGH NUMBER SCANNING SPEED

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ABSTRACT:
This study aims to evaluate the concentration ability among sports and non-sports persons using the number scanning speed test as a cognitive performance indicator. The research investigates whether individuals engaged in regular sports activities demonstrate superior concentration abilities compared to those who do not participate in sports.
A total of 200 participants were selected from schools and colleges in Nagpur, equally divided into two groups: sports persons (athletes involved in regular training) and non-sports persons (individuals with no structured physical activity). Each participant underwent a standardized number scanning speed test, which required identifying specific numerical sequences within a given time frame. The test was used as a proxy for measuring selective attention and processing speed—key components of concentration.
The results indicated that sports persons significantly outperformed non-sports persons in both accuracy and speed during the number scanning task. Statistical analysis using independent samples t-test confirmed a significant difference between the two groups ($p < 0.05$), supporting the hypothesis that involvement in sports enhances concentration ability.
Furthermore, a positive correlation was found between years of sports engagement and scanning speed performance, suggesting that long-term participation in sports may have cumulative benefits on cognitive function.
These findings underscore the importance of physical activity in enhancing cognitive skills such as concentration. They also provide empirical support for integrating sports and physical education into academic curricula to improve students' mental focus and academic performance.

Keywords: *Concentration, Number Scanning Speed, Cognitive Performance, Sports Participation, Attention*

INTRODUCTION

LITERATURE REVIEW

CONCEPT OF CONCENTRATION

Concentration, often referred to as focused attention, is the cognitive process of selectively concentrating on one aspect of the environment while ignoring other distracting stimuli (Posner & Petersen, 1990). It plays a crucial role in learning, decision-making, and performing complex tasks effectively. In educational and professional settings, high levels of concentration are directly linked to improved productivity and performance (Eisenberg et al., 2005).

In sports, concentration is considered one of the most critical psychological attributes for success. Athletes must maintain intense focus under pressure, make split-second decisions, and remain attentive to dynamic changes in the game environment (Williams & Krane, 2015). Thus, understanding how concentration can be enhanced through lifestyle factors like sports becomes essential.

Cognitive Abilities in Sports

Sports demand more than just physical prowess; they require well-developed cognitive functions such as perception, memory, decision-making, and attention (Hikaru et al., 2011). Research has consistently shown that athletes, especially those in team or fast-paced individual sports, exhibit better executive functioning and faster reaction times compared to non-athletes (Mantini et al., 2007).

Moreover, studies indicate that participation in sports can lead to neuroplastic changes in brain regions associated with attention, motor control, and spatial awareness (Best, 2010). These findings suggest that sports training may act as a form of cognitive exercise that improves brain efficiency over time.

Number Scanning Speed: Definition and Importance

Number scanning speed refers to the ability to quickly locate and identify numbers in a sequence amidst distractors. It is widely used in psychological testing to assess visual scanning, selective attention, and information processing speed (Anand & Chander, 2017). This test is particularly useful in evaluating attention span and concentration in individuals across different age groups.

In educational psychology, number scanning speed tests are employed to diagnose attention deficits and monitor cognitive development. In occupational settings, they are used for selection processes where sustained attention is vital, such as air traffic control and data entry jobs.

Previous Studies on Concentration and Sports

Several studies have explored the relationship between sports participation and cognitive functions. For instance, Ludyga et al. (2016) found that acute bouts of aerobic exercise enhance executive functions and attention in adolescents. Similarly, Pesce et al. (2009) reported that children who engage in regular physical activity show improved attention and academic achievement.

However, there remains a gap in literature regarding the use of standardized cognitive tools like number scanning speed to compare concentration abilities between sports and non-sports persons. This study seeks to bridge that gap by employing an objective and measurable cognitive task to quantify differences in concentration ability based on sports engagement.

MATERIAL & METHODS

PARTICIPANTS SELECTION

A total of 200 participants were selected from various schools and colleges in Nagpur. Participants were divided into two equal groups:

- Group A (Sports Persons): Individuals actively participating in sports (at least 3 days per week) for a minimum of one year.
- Group B (Non-Sports Persons): Individuals with no regular participation in sports or physical activity.

Age range: 16–25 years

Gender: Equal representation of male and female participants

Sampling Method: Stratified random sampling

Instruments and Materials

- Demographic Questionnaire: Collected information on age, gender, educational background, and sports history.
- Number Scanning Speed Test: A validated test consisting of multiple rows of randomly arranged digits. Participants were instructed to scan each row and underline a specific target number within a set time limit (usually 2 minutes).
- Stopwatch
- Standardized Instructions Sheet
- Answer Sheets

Experimental Design

A quasi-experimental design was adopted. Two independent groups (sports and non-sports) were tested on a dependent variable (number scanning speed score). The independent variable was the level of sports participation.

Data Collection Procedure

1. Ethical clearance was obtained from the institutional review board.

2. Participants were briefed about the purpose and procedure of the study.
3. Written consent was obtained before administration.
4. Demographic data was collected.
5. The number scanning speed test was administered in a quiet, distraction-free room.
6. Each participant had 2 minutes to complete the test.
7. Scores were calculated based on correct responses minus errors.

Data Analysis Technique

Collected data was analyzed using SPSS Version 26 . The following statistical methods were applied:

- Descriptive Statistics: Mean, Standard Deviation
- Independent Samples t-test: To compare group means
- Pearson's Correlation: To examine relationships between years of sports participation and scanning speed
- Graphs and Tables: Used for visual representation of findings

RESULTS & DISCUSSION

Table 1: Descriptive Statistics of Scanning Speed Scores

Group	N	Mean Score	SD
Sports	100	48.6	6.2
Non-Sports	100	39.4	5.8

Interpretation:

The mean score for the sports group (M = 48.6, SD = 6.2) was significantly higher than that of the non-sports group (M = 39.4, SD = 5.8), indicating better concentration ability among sports persons.

Table 2: Independent Samples t-test Results

Variable	t-value	df	p-value
Scanning Speed	9.47	198	<0.001*

* Significant at $p < 0.05$

Interpretation:

The t-test revealed a statistically significant difference between the two groups ($t = 9.47$, $p < 0.001$), confirming that sports persons perform significantly better in number scanning tasks, reflecting greater concentration ability.

Table 3: Correlation Between Years of Sports Engagement and Scanning Speed

Variables	Pearson's r	p-value
Years of Sports Practice	0.43	<0.001*

* Significant at $p < 0.05$

Interpretation:

There is a moderate positive correlation ($r = 0.43$, $p < 0.001$) between the number of years spent in sports and scanning speed scores. This suggests that prolonged engagement in sports may progressively enhance cognitive performance.

Comparative Analysis of Groups

The comparative analysis clearly demonstrates that individuals involved in sports excel in attention-based tasks. This aligns with previous research showing that physical activity increases blood flow to the brain, enhances neurotransmitter release, and promotes neural growth (Hillman et al., 2008).

Co-relation Between Concentration and Performance

The observed correlation implies that individuals who engage in sports not only develop physical fitness but also build stronger cognitive control mechanisms. Enhanced concentration translates into better academic and professional performance, reinforcing the need to integrate physical activity into daily life.

Implications of Findings

- Schools and institutions should encourage sports participation to boost students' cognitive abilities.
- Employers could consider incorporating physical wellness programs to improve workplace concentration and productivity.
- Future curriculum reforms should include mandatory physical education to enhance attention spans.

Limitations of Study

- The sample size was limited to Nagpur and may not represent the broader Indian population.
- The study relied on self-reported sports participation without verification.
- Only one cognitive test was used; multi-dimensional assessments would yield deeper insights.

Future Research Directions

- Longitudinal studies tracking cognitive changes over time with sports participation.
- Use of advanced neuropsychological tools (e.g., EEG, fMRI) to understand underlying brain mechanisms.
- Comparative studies across different types of sports (team vs. individual, contact vs. non-contact).

Practical Applications

Training Programmes for Enhancing Concentration

Schools and colleges can implement structured sports and mindfulness programs to improve students' concentration. Activities like yoga, martial arts, and team games can be integrated into the curriculum to enhance cognitive development.

Recommendations for Non-Sports Individuals

Even minimal physical activity (e.g., brisk walking, aerobics, cycling) can help non-sports individuals improve their attention span. Short breaks involving light exercises during work or study sessions can also enhance focus and reduce fatigue.

CONCLUSION

This study provides compelling evidence that individuals engaged in sports demonstrate superior concentration abilities compared to non-sports persons, as measured by the number scanning speed test. The results showed a statistically significant difference in performance between the two groups, with sports persons scoring higher in both accuracy and speed.

The findings are consistent with existing literature suggesting that physical activity enhances brain function by improving cerebral blood flow, promoting neurogenesis, and increasing neurotransmitter availability. Moreover, the positive correlation between years of sports practice and scanning speed indicates that the cognitive benefits of sports are cumulative and long-lasting.

These outcomes hold important implications for educational policy, workplace practices, and personal health strategies. Encouraging regular sports participation, especially among youth, can serve as a cost-effective method to enhance concentration, academic performance, and overall cognitive development.

Despite its limitations, this study contributes valuable insights into the cognitive advantages of sports and underscores the need for further exploration into the neurocognitive effects of physical activity. By integrating sports into daily routines, individuals can not only improve their physical health but also sharpen their mental faculties.

In conclusion, sports are not merely recreational activities—they are powerful tools for cognitive enhancement and lifelong brain health.

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