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# The Relationship Between Physical Fitness and Learning Concentration of Grade VII Students

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***Keywords***

Physical fitness; learning concentration; physical education; Nusantara Student Physical Fitness Test (TKPN); Grid Concentration Test

***Abstract***

This study aimed to determine the level of physical fitness, the level of learning concentration, and the relationship between physical fitness and learning concentration among seventh-grade students of SMP Negeri 1 Semarang. This research employed a quantitative correlational design with a cross-sectional approach. The sample consisted of 62 students selected through cluster random sampling. Physical fitness was measured using the Tes Kebugaran Pelajar Nusantara (TKPN), while learning concentration was assessed using the Grid Concentration Test. Data were analyzed using descriptive statistics, Kolmogorov-Smirnov normality test with Monte Carlo approach, linearity test, and Pearson Product Moment correlation at a significance level of 0.05. The results indicated that both variables were normally distributed and linearly related. The Pearson correlation analysis showed a positive and statistically significant relationship between physical fitness and learning concentration ($r = 0.274$, $p = 0.031$). The coefficient of determination ($r^2 = 0.075$) revealed that physical fitness contributed 7.5% to students learning concentration. In conclusion, physical fitness has a positive but low significant relationship with students learning concentration.

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## INTRODUCTION

The development of digital technology such as online games and smartphones has fundamentally changed students behavior in this modern era. This advancement provides easy access to information, knowledge, and entertainment, but instead causes a decline in learning interest because students prefer playing with gadgets rather than engaging in formal academic activities, resulting in laziness in studying and reluctance to perform physical activities needed to maintain health (Persada et al., 2023). Excessive dependence on increasingly diverse mobile phone features has become the main factor in changes to daily behavior, particularly the decline in participation in sports or body movement, which ultimately reduces overall physical fitness levels. In daily activities, humans require sufficient energy to complete tasks effectively and efficiently, where physical health is closely related to physical and mental education as the main foundation.

Physical education plays an essential role in the school education system. Physical education is defined as a subject that involves practical physical activity, discussion of sports facilities and infrastructure, sports history, and health aspects to shape students character comprehensively (Prasetyo et al., 2020). Its purpose is to develop students attitudes or values, intelligence, physical abilities, and psychomotor skills so that they become mature, independent, and able to apply this knowledge in daily life (Raihan et al., 2025). Physical education learning fosters various aspects such as maintaining health, improving critical thinking skills, emotional stability, and physical fitness, thus providing real benefits such as increasing learning enthusiasm without significant fatigue (Sari et al., n.d.).

Being physically fit is being able to do ordinary physical duties well without being too weary. Cardiovascular endurance, muscle strength, flexibility, body composition, speed, agility, balance, coordination, and reflexes are all vital factors of being fit (Lengkana & Muhtar, 2021; Marsanda & Kurniawan, 2023). From this explanation, it is a condition in which a person can carry out activities comfortably without obstacles, achieved through proper nutritional intake, sufficient physical activity, and optimal rest, which are highly needed by humans to keep the body healthy and optimal (Lengkana & Muhtar, 2021). Junusul Hairy, 2010 in (Panggraita et al., 2020) stated that there are two basic components of fitness, namely organic fitness for internal endurance and dynamic fitness for external performance, which form the basis of physical perfection such as ideal body composition and resistance to fatigue.

The benefits of physical fitness on the learning process are very significant. A person who is healthy and fit can protect themselves from outside forces, keep their body's functions in balance, improve blood flow, make their heart muscle work harder, make their joints more flexible, focus better, and handle stress better (Asmana et al., 2023; Lisnawati et al., 2019). Students' with low physical fitness tend to be less motivated, have difficulty concentrating, and achieve low academic performance, whereas optimal physical fitness can improve physical and mental readiness in facing daily activities, such as learning activities (Arsyad et al., 2022; Prasetya et al., 2023). Learning concentration is defined as the focusing of thoughts and attention on learning activities influenced by the brain's focusing ability, measured through the Grid Concentration Test, and highly dependent on physical conditions such as oxygen supply to the brain (Hardianti, 2022; kurniasih, 2020).

Previous research consistently shown a positive correlation between physical fitness and learning concentration. First, (Sugiarto et al., 2025) discovered a strong correlation between junior high school students' concentration and physical fitness, with a 32.2% contribution; second, (Farhan Hafidz Sidik et al., 2024) reported a significant positive relationship with an 18.16% contribution in physical education learning; third, (Kwon et al., 2024) demonstrated that 30 to 50 minutes of physical activity increased the likelihood of concentration by 2.3 times; fourth, (E. P. Putra, 2019) found a weak relationship with concentration of approximately 4.4%; like (I. P. Y. P. Putra et al., 2021) and (Hermawan et al., 2022) highlighting the significance of physical activity in facilitating the brain's oxygen supply.

Based on the researcher's preliminary observations in the field on seventh-grade students of SMP Negeri 1 Semarang, it was observed that some students were quite active when participating in learning. However, their level of learning concentration was still relatively low. This can be seen from the students lack of focus on the material delivered by

the teacher, the presence of students chatting, daydreaming, and showing signs of drowsiness and fatigue during the physical education learning process.

These problems are consistent with previous research findings (Sidik et al., 2024) and (Sugiarto et al., 2025). In addition, based on preliminary information, the school has never conducted the Nusantara Student Physical Fitness Test (TKPN) as an indicator of students' fitness levels, and there is no available empirical data regarding their level of learning concentration.

**Table 1.** Observation Results

| Subject | Preliminary Observation Results |
|---|---|
| Grade VII Students of SMP Negeri 1 Samarang | 1. Physical fitness tests have never been conducted using the Nusantara Student Fitness Test.<br>2. Students frequently lose focus, feel drowsy, and experience fatigue during the learning process.<br>3. The degree of student learning focus remains presently unknown. |

Based on **Table 1** above, it can be observed that preliminary observations indicate that physical fitness tests have never been conducted at SMP Negeri 1 Semarang, and students' learning concentration levels remain empirically unmeasured.

Although previous studies have shown a positive relationship between physical fitness and learning concentration, most of these studies were conducted in different contexts and have not focused on specific local conditions. In addition, there is still limited empirical data regarding students' physical fitness measured using the Nusantara Student Physical Fitness Test (TKPN) and their learning concentration using the Grid Concentration Test, particularly among seventh-grade students in SMP Negeri 1 Semarang. This indicates a research gap in providing standardized and context-specific data.

This study offers novelty by examining the relationship between physical fitness and learning concentration using standardized instruments within a local context that has not been previously investigated. Therefore, this study aims to analyze the level of physical fitness, the level of learning concentration, and the relationship between the two among seventh-grade students of SMP Negeri 1 Semarang.

The urgency of this study lies in its theoretical and practical contributions. Theoretically, this study strengthens the understanding of the relationship between physical fitness and learning concentration in secondary-level physical education learning in Indonesia. Practically, this study is beneficial for students to improve achievement through awareness of the importance of fitness, for teachers as a basis for designing learning integrated with physical activity, and for schools in developing health education programs based on empirical data.

The research problems in this study include: (1) what is the level of physical fitness of seventh-grade students, (2) what is the level of learning concentration of seventh-grade students, and (3) is there a significant relationship between the two. The objective of this study is to identify and analyze these three aspects empirically using the Nusantara Student Physical Fitness Test (TKPN) and the Grid Concentration Test. The hypotheses proposed are $H_0$: there is no significant relationship between the two, whereas $H_1$: there is a significant relationship between physical fitness and learning concentration.

Despite various studies on physical activity and student performance, a notable research gap exists concerning the direct correlation between standardized physical fitness levels and learning concentration in Indonesian secondary education. This study offers novelty by utilizing the updated 2022 Nusantara Student Physical Fitness Test (TKPN) as a primary instrument, combined with the Grid Concentration Test, to examine seventh-grade students at SMP Negeri 1 Semarang. By addressing these gaps, this research provides standardized, contemporary, and context-specific data that contributes to both theoretical and practical advancements in physical education and student development.

## METHODS

The study used a quantitative method with a correlational design and a cross-sectional framework to look at how students' physical fitness affected their ability to concentrate on learning. Data was collected all at once, with no repeated measurements. Because of this, the relationship between the variables was looked at based on the subjects' conditions during the research. The study was carried out on February 3, 2026, at SMP Negeri 1 Semarang.

The research population consisted of 287 seventh-grade students distributed across nine classes. The class was the sample unit, and the sampling method was cluster random sampling. The random selection method chose two classes, VII-C and VII-E, which had a total of 64 students at initially. Two students were unable to complete the entire battery of tests due to health issues, leading to a final sample size of 62 individuals for the study.

The research data were numerical quantitative data derived from primary sources. Primary data were obtained directly through the administration of physical fitness tests and a learning concentration test.

To measure physical fitness, this study employed the Nusantara Student Physical Fitness Test (TKPN), published by the Ministry of Youth and Sports of the Republic of Indonesia (2022). The assessment covers Body Mass Index (BMI), V Sit-and-Reach, a 60-second Sit-Up, a 30-second Squat Thrust, and the Progressive Aerobic Cardiovascular Endurance Run (PACER). with scores converted according to official guidelines. Learning concentration was measured using the Grid Concentration Test referring to the concept of Harris and Bette L. Harris p. 189 in (Krisnana et al., 2021), in the form of a 10×10 number matrix completed within one minute, with scoring based on the number of correctly and sequentially identified numbers.

The data collection procedure began with the administration of the Grid Concentration Test in the classroom at the beginning of the Physical Education (PJOK) lesson, followed by a warm-up session and the implementation of the TKPN test series on the school field according to the official testing guidelines.

Data analysis was conducted using IBM SPSS Statistics version 26. Descriptive analysis was used to obtain the mean and standard deviation values. At a significance level of 0.05, the Kolmogorov-Smirnov test with a Monte Carlo method was performed to assess for normalcy. The Test for Linearity was used to check for linearity. If the data were normally distributed and the relationship between variables was linear, The Pearson Product-Moment correlation test was used, and if the parametric assumptions weren't met, the Spearman Rank correlation test was applied. The magnitude of the contribution of physical fitness to learning concentration was calculated using the coefficient of determination ($r^2$), expressed as a percentage. The Pearson correlation formula used mathematically is presented in **Figure 1**

$$r = \frac{\sum(X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum(X - \bar{X})^2 \sum(Y - \bar{Y})^2}}$$

**Figure 1.** Formula for the Pearson Product–Moment Correlation Coefficient (r)

## RESULTS AND DISCUSSION

The data collected in this study were analyzed using SPSS version 26 through several stages, including descriptive statistical analysis, normality testing using the Kolmogorov-Smirnov test with Monte Carlo approach, linearity testing, and Pearson Product Moment correlation analysis. The results are presented in the form of tables and are interpreted as follows.

**Statistical Description**

**Table 2** presents the descriptive statistics of the research variables, namely physical fitness (TKPN) and learning concentration.

**Table 2.** Descriptive Statistics of Research Variables

| Descriptive Statistics | | | | | |
|---|---|---|---|---|---|
| Variable | N | Min. | Max. | Mean | Std. Dev. |
| TKPN | 62 | 1,7 | 4,6 | 2,371 | 0,5227 |
| Concentration | 62 | 6 | 31 | 13,92 | 5,074 |

Based on **Table 2**, the physical fitness variable (TKPN) obtained the scores ranged from 1.7 to 4.6, with a mean of 2.371 and a standard deviation of 0.5227. The relatively small standard deviation indicates that the distribution of students' physical fitness scores tends to be homogeneous. The mean number indicates that, generally, students' physical fitness levels are classified as sufficient according to the TKPN assessment standards.

Meanwhile, the learning concentration variable obtained The scores ranged from 6 to 31, with a mean of 13.92 and a standard deviation of 5.074. The larger standard deviation compared to the physical fitness variable indicates that students' learning concentration levels are more varied.

**Table 3.** Frequency Distribution of the Nusantara Student Physical Fitness Test

| Category | Frequency | Percentage (%) |
|---|---|---|
| Poor | 13 | 21.0 |
| Fair | 40 | 64.5 |
| Goog | 8 | 12.9 |
| Very Good | 1 | 1.6 |
| Total | 62 | 100.0 |

**Table 4.** Frequency Distribution of the Learning Concentration Test

| Category | Frequency | Percentage (%) |
|---|---|---|
| Poor | 6 | 9.7 |
| Fair | 26 | 41.9 |
| Good | 21 | 33.9 |
| Very Good | 9 | 14.5 |
| Total | 62 | 100.0 |

The majority of students were categorized as having sufficient physical fitness (64.5%), while most students' learning concentration levels were in the sufficient (41.9%) and good (33.9%) categories. These findings indicate that although physical fitness is generally at a moderate level, learning concentration shows relatively broader variation.

**Normality and Linearity Testing**

Before conducting the correlation analysis, assumption tests were performed. The **Table 5.** shows the research outcomes of the normality test.

**Table 5.** Normality Test of the Nusantara Student Physical Fitness Test and the Learning Concentration Test

| One-Sample Kolmogorov-Smirnov Test | | |
|---|---|---|
| Variable | Sig. (2-tailed) | Interpretation |
| TKPN | 0,157 | Normal |
| Concentration | 0,42 | Normal |

The Monte Carlo significance values for physical fitness (0.157) and learning concentration (0.420) are greater than 0.05 (p > 0.05), indicating that both variables are normally distributed. Parametric statistical analysis can therefore be used.

A linearity test was performed as a precondition for the Pearson Product–Moment correlation analysis once the normality assumption was verified. This test was done to make sure that the TKPN variable and learning concentration have a straight line relationship. The table shows the research outcomes.

**Table 6.** Linearity Test of the Relationship between the Nusantara Physical Fitness Test and Learning Concentration.

| Variable | Sig. Deviation from Linearity | Interpretation |
|---|---|---|
| TKPN – Concentration | 0.464 | Linear |

The linearity test shows that the significance value of Deviation from Linearity is 0.464 (p > 0.05), which means that there is no deviation from linearity. So, we may say that the link between physical fitness and learning concentration is linear.

**Correlation Analysis**

The results of the Pearson Product Moment correlation test are presented in **Table 7.**

**Table 7.** Results of the Pearson Product–Moment Correlation Test.

| Variable | r | Sig. (2-tailed) | N |
|---|---|---|---|
| TKPN – Concentration | 0.274 | 0.031 | 62 |

Based on **Table 7**, the Pearson correlation coefficient (r) between physical fitness and learning concentration is 0.274 with a significance value of 0.031 (p < 0.05). This indicates that there is a positive and statistically significant relationship between physical fitness and learning concentration.

The positive correlation suggests that higher levels of physical fitness tend to be associated with higher levels of learning concentration. However, the correlation coefficient value of 0.274 indicates that the strength of the relationship is low.

The coefficient of determination ($r^2$) is 0.075. This means that physical fitness accounts for 7.5% of the difference in learning concentration, whereas the other 92.5% is due to other characteristics that this study did not look at.

**CONCLUSION**

The research and data analysis concerning the correlation between physical fitness (TKPN) and the learning concentration of Grade VII students at SMP Negeri 1 Semarang indicate a significant relationship between physical fitness and students' learning concentration. The results of the Pearson Product Moment correlation test showed a correlation coefficient (r) of 0.274 with a significance value of 0.031 (p < 0.05). This value indicates that the relationship between the two variables is positive and falls into the low category. This means that the better the students' physical fitness, the better their level of learning concentration. The coefficient of determination of 7.5% indicates that physical fitness contributes 7.5% to the learning concentration of Grade VII students. Meanwhile, 92.5% of the variation in learning concentration is influenced by other factors beyond the variables examined in this study. Thus, the findings support the research hypothesis that physical fitness is related to the learning concentration of Grade VII students at SMP Negeri 1 Semarang.

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