

A Study of Some Physical Variables Among High School Students

دراسة لبعض المتغيرات البدنية لدى تلاميذ المرحلة الثانوية

Mohammed zeroual ¹, boudouh abderaouf ²

¹ universitiy of biskra , mohammed.zeroual@univ-biskra.dz

² university of ouargla , raoufobda@gmail.com

Received: 15/07/2025

Accepted: 17/08/2025

Published:30/09/2025

Abstract :

The aim of this study is to examine some physical variables or components among high school students who practice physical activity and those who do not, and to investigate whether there are differences in the studied components. The sample of the study consisted of 30 students from the municipality of Ouargla, selected purposefully. In our study, we used a set of physical tests as tools (the 20m Nafat test, the 40m speed test, and the T agility test). Statistical analysis was performed using Excel and SPSS programs through calculating means, standard deviations, and differences. The study concluded that there were no statistically significant differences between students who practice physical activity and those who do not.

Keywords: Physical Variables , High School Students .

الملخص : تهدف هاته الدراسة لدراسة بعض المتغيرات أو المكونات البدنية لدى تلاميذ المرحلة الثانوية من الممارسين للنشاط البدني وغير الممارسين وهل توجد فروق في المكونات المدروسة ، وتمثلت عينة الدراسة في 30 تلميذ من بلدية ورقلة وتم اختيارها بطريقة قصدية واعتمدنا في دراستنا كأداة على مجموعة من الاختبارات البدنية (اختبار نافات 20 م ، اختبار السرعة 40 م ، اختبار T للرشاقة) وتمت المعالجة الاحصائية باستخدام برامج exel و spss عن طريق المتوسطات الحسابية والانحرافات المعيارية وحساب الفروق ، وتوصلت الدراسة الى عدم وجود فروق ذات دلالة احصائية بين الممارسين وغير ممارسين للنشاط الرياضي .

الكلمات المفتاحية : المتغيرات البدنية ، تلاميذ المرحلة الثانوية

*** Introduction and problematic of the study:**

According to physical education and sports specialists, the terms "physical attributes" or "motor attributes" are used to refer to a person's physical or motor abilities, which include strength, speed, endurance, agility, and flexibility. These attributes are linked to what is known as "sports form", which consists of physical, technical, tactical, and psychological elements (Sayed Abdel Jawad, 1984, p. 283).

The concept of physical attributes is widely used in the field of sports research. It refers to those abilities that allow the body to function and be prepared for performance based on the comprehensive and interrelated development of attributes such as endurance, strength, speed, flexibility, and agility. To develop these attributes, a scientific background in motor habits is essential (Mahmoud Awad Basyouni & Faisal Yassin Al-Shati, 1992, p. 179).

From a functional and physiological perspective, the development of physical attributes such as muscular strength, speed, endurance, agility, and flexibility are all closely interconnected during any developmental process. This is because the various functional and physiological aspects of the athlete form an integrated unit that works in coordination. They cannot be separated from one another (Abdul Jabbar Saeed Mohsen, 2016, p. 27).

Many studies have proven that "physical education and recreational sports activities are not sufficient to compensate for the decreased physical activity in daily life." Therefore, other forms of physical activity must be considered.

School sports are defined as the combination of pedagogical, scientific, health-related, and athletic methods through which the body gains health, strength, agility, and proper posture.

2. Are there statistically significant differences between students who participate in sports activities and those who do not in terms of speed?
3. Are there statistically significant differences between students who participate in sports activities and those who do not in terms of agility?

- General Hypothesis:

There are no statistically significant differences in physical attributes between students who participate in sports activities and those who do not.

Sub-Hypotheses:

1. There are no statistically significant differences between students who participate in sports activities and those who do not in terms of endurance.
2. There are no statistically significant differences between students who participate in sports activities and those who do not in terms of speed.
3. There are no statistically significant differences between students who participate in sports activities and those who do not in terms of agility.

The practical chapter :

1. Research Methodology

In this study, we adopted the descriptive method, which was chosen based on the nature and objectives of the research, as it aligns well with the descriptive approach.

2. Study Population and Sample

The sample consisted of 30 high school students, aged between 17 and 18 years, divided into two equal groups:

- 15 students who practice sports activities, and
- 15 students who do not practice sports activities.

Table 01: Sample Characteristics

Group	Practicing Students		Non-Practicing Students	
	Mean (M)	Standard Deviation (SD)	Mean (M)	Standard Deviation (SD)
Age (years)	17.7333	0.45774	17.6667	0.8795
Height (m)	1.7440	0.07781	1.6347	0.04015
Weight (kg)	60.0667	6.71317	59.5333	10.45307
Body Mass Index (BMI)	19.8520	2.82639	22.2960	3.54507

3. Study Limitations

The physical fitness tests were conducted on a sample of 30 students, randomly selected from the target population during the 2020/2021 academic year. The tests administered were:

- Endurance (20m Shuttle Run Test - "Navette Test"),
- Speed (40m Sprint Test), and
- Agility (T-Test).

The tests were conducted at Colonel Si Cherif Ali Malah Secondary School in Ouargla, after obtaining consent from the school administration and the physical education teacher.

To ensure valid results, it was confirmed that the participants had not engaged in any physically exhausting activity for at least 48 hours prior to the testing day.

The 30 students were divided into two groups:

- 15 practicing sports activities,
- 15 not practicing sports activities.

After a 20-minute warm-up, the following testing sequence was followed:

1. Endurance Test (20m Shuttle Run - Navette),
2. 5 minutes of recovery, then the
3. Speed Test (40m Sprint),
4. 5 to 8 minutes of recovery, followed by the
5. Agility Test (T-Test) at the end of the session.

* Physical Fitness Tests :

– 40-Meter Sprint Test (<https://www.topendsports.com/testing/tests/sprint-40meters.htm>)

- Purpose of the Test:
To assess speed and acceleration.
- Required Equipment:
A suitable, flat surface (minimum 50 meters), cones, photo cells (electric timers) or any precise timing device (stopwatch).

- **Test Description:**

After a full 20-minute warm-up, followed by a few short acceleration sprints, the participant stands behind the starting line in a standing start position.

Upon the signal, the participant runs 40 meters at maximum speed toward the finish line.

Each participant performs two attempts, and the best attempt is recorded.

- **Scoring:** The best time is recorded, either via stopwatch or electronic timing device.

T-Test for Agility

Purpose of the Test:

To measure speed, agility, and the ability to change body direction quickly while maintaining control.

- **Required Equipment:**

Stopwatch, appropriate surface, cones, and recording form.

- **Test Description:**

The student begins at cone A, as illustrated in the diagram. Upon the starting signal, they must perform the test as fast as possible with minimum time, following the route and movement pattern:

A- B - D -C - B - A

Notes:

- The athlete must side-step between cones $D \rightarrow C \rightarrow B$, with their back turned to the starting point.
 - The base of each cone must be touched.
- Scoring:
The result is recorded using the stopwatch after the attempt ends.
(Bahrain Olympic Committee, 2011, p. 18)

– 20m Shuttle Run Test (Navette Test) 1983 – Epreuve progressive de course navette .

- Purpose of the Test:
To estimate maximum aerobic capacity ($VO_2 \text{ max}$).
- Required Equipment:
A sports field, audio cassette or digital recording (Navette Test audio), measuring tape, cones, loudspeaker, and score sheet.
- Test Description:
Two parallel lines are drawn on the ground, 20 meters apart. The length of each line corresponds to the number of participants, maintaining a 1-meter gap between individuals.

The test starts with a signal from the audio recording, which begins at a speed of 8 km/h.

Participants start at one line, and upon the signal, run back and forth between the lines, following the preset pace indicated by beeps.

The speed increases gradually by 0.5 km/h every minute.

The test ends when the participant is no longer able to maintain the required pace. (Georges Cazorla & Luc Leger, 1993, p. 17)

- **Exposure , analyses and result exam :**

1- Age

Table 02: Comparison of age between physically active and inactive students.

Sample	Physically Active Students	Physically Inactive Students
Age	Mean = 17.7333	Std. Dev. = 0.45774

From Table 02, we observe a difference in the mean age of the studied students.

The mean age for active students was **17.7333** years with a standard deviation of **0.45774**, while for inactive students it was **17.6667** years with a standard deviation of 0.8795. This indicates a slight difference in favor of inactive students.

2 - Height

Table 03: Comparison of height between physically active and inactive students.

Sample	Physically Active Students	Physically Inactive Students
Height	Mean = 1.7440 m	Std. Dev. = 0.07781

Table 03 shows a difference in the mean height, where active students had a mean height of 1.7440 m compared to 1.6347 m for inactive students. This difference favors the active students.

3- Weight

- 2- **Table 04:** Comparison of weight between physically active and inactive students.

Sample	Physically Active Students	Physically Inactive Students
Weight	Mean = 60.0667 kg	Std. Dev. = 6.71317

Table 04 indicates a slight difference in weight. Active students had a mean of **60.0667 kg**, while inactive students had a mean of **59.5333 kg**. Despite the difference, it slightly favors inactive students due to the lower weight.

3- Body Mass Index (BMI)

- Table 05:** Comparison of BMI between physically active and inactive students.

Sample	Physically Active Students	Physically Inactive Students
BMI	Mean = 19.8520	Std. Dev. = 2.82639

From Table 05, we can see that active students had a lower BMI (mean = 19.8520) compared to inactive students (mean = 22.2960), indicating better physical condition in favor of the active students.

- **Analysis of the First Hypothesis :**

The first hypothesis states that there are no statistically significant differences between physically active and inactive students in terms of endurance.

Table 06: Differences in endurance between physically active and inactive students.

Endurance	N	Mean	Std. Dev.	df	Sig.	Significance Level
Active	15	17.7333	0.45774	28	0.448	0.05
Inactive	15	17.6667	0.48795			

The table shows a slight difference in favor of active students. However, since the Sig value = 0.448, which is greater than the significance level (0.05), we accept the null hypothesis and reject the alternative. Thus, no statistically significant difference exists in endurance between active and inactive students.

- **Analysis of the Second Hypothesis**

The second hypothesis states that there are no statistically significant differences between physically active and inactive students in terms of speed.

Table 07: Differences in speed between physically active and inactive students.

Speed	N	Mean	Std. Dev.	df	Sig.	Significance Level
Active	15	8.2213	0.63402	28	0.141	0.05
Inactive	15	10.6207	0.85888			

Here, the difference favors active students who had better speed (lower time). Despite this, the Sig value = 0.141 is greater than 0.05, so we again accept the null hypothesis and confirm that there is no statistically significant difference in speed.

- Analysis of the Third Hypothesis :

The third hypothesis states that there are no statistically significant differences between physically active and inactive students in terms of agility.

Table 08: Differences in agility between physically active and inactive students.

Agility	N	Mean	Std. Dev.	df	Sig.	Significance Level
Active	15	8.5123	0.86476	28	0.136	0.05
Inactive	15	10.2180	2.96691			

Although the average agility score is better (lower time) in active students, the Sig value = 0.136 is still greater than 0.05. Hence, we accept the null hypothesis and conclude that there is no statistically significant difference in agility between both

- Discussion of the Results of the First Sub-Hypothesis :

Based on the results obtained in Table 06, which shows the differences between physically active and inactive students in terms of endurance, it is evident that there are no statistically significant differences between the two groups. This finding supports the first sub-hypothesis of the study, which states that there are no statistically significant differences between physically active and inactive students in the trait of endurance.

Our results are in agreement with the findings of the study by Djebaili Elias (2019), which indicated that there were no statistically significant differences

among high school students in the regions of Biskra and Khenchela across four physical traits (endurance, speed, agility).(Djebaili Elias, 2019, p 77–89).

Our results are also consistent with the findings of Djebaili Elias (2019) which showed no statistically significant differences in physical fitness elements (endurance, strength, speed, flexibility) among middle school students involved in elite school sports teams, regardless of category . (Djebaili Elias, 2019p. 172).

The researcher attributes the lack of statistically significant differences between physically active and inactive students in endurance to the closeness of the results between both groups. This suggests that even inactive students may possess good aerobic capacity. The researcher posits that endurance is influenced more by physical activity and regular practice than by age. Particularly during adolescence, endurance is not strongly affected by age but can be significantly improved through systematic training due to the physiological changes that occur during this developmental stage—such as increased heart and lung capacity and greater blood circulation.

This explanation aligns with the views of Rachid Mohimedat and Loukia Youssef Islam (2017) in their book "Physical Fitness: Its Importance, Characteristics, and Training", where they emphasized that endurance is impacted more by practice than by age. They stated:

“Regular engagement in sports activities and systematic training for competitive participation impacts muscle mass and muscle fiber quality.” (Rachid & Youssef Islam, 2017, p. 129).

Based on these findings, we conclude that there are no statistically significant differences between physically active and inactive students in the trait of endurance, and therefore, the first hypothesis is confirmed.

- **Discussion of the Results of the Second Sub-Hypothesis :**

Based on the results obtained in Table 07, which represents the differences between physically active and inactive students in the trait of speed, it is evident that there are no statistically significant differences between the two groups. This confirms the second sub-hypothesis, which states that there are no statistically significant differences in speed between students who engage in sports and those who do not.

Our findings align with those of Djebaïli Elias (2019), whose study also found no statistically significant differences between high school students in Biskra and Khenchela in the four physical traits (endurance, strength, speed, agility).

They also agree with Djebaïli Elias (2019–2020), who found no statistically significant differences in physical fitness elements (endurance, strength, speed, flexibility) among middle school students participating in elite school sports teams, based on category. (*Previously cited, p. 172*).

The researcher attributes the lack of statistically significant differences in speed to the similar performance of both groups. During the field tests, it was observed that psychological factors influenced the speed of both active and inactive students. Both groups exhibited competitive behavior and a desire to outperform the other, which minimized the differences. Furthermore, speed is influenced by

test distance, muscle fiber type, muscle mass, psychological, and genetic factors — specifically, an individual's readiness and predisposition.

This interpretation is supported by Chnouf Khaled et al. (2019) in the *Journal of Sciences and Techniques of Physical and Sports Activities* at Mohamed Boudiaf University of Science and Technology in Oran. They noted that the 40-meter test distance might not reveal significant differences between active and inactive students. Moreover, several factors affect speed beyond the type of activity, including physiological traits like muscle fiber composition and nervous system efficiency. Muscle tissue may consist of red, white, or mixed fibers, influenced by genetic inheritance, which plays a crucial role in the development of the muscular system. (Khaled et al., 2019, p. 125).

Based on these findings, we conclude that there are no statistically significant differences between physically active and inactive students in terms of speed, thereby confirming the second hypothesis.

- Discussion of the Results of the Third Sub-Hypothesis :

According to the results in Table 08, which shows differences between physically active and inactive students in the trait of agility, there are no statistically significant differences between the two groups. This supports the third sub-hypothesis, which posits that there are no statistically significant differences in agility between students who participate in sports and those who do not.

Our findings are consistent with those of Djebaili Elias (2019), who reported no significant differences between students from Biskra and Khenchela in endurance, strength, speed, and agility. (*Previously cited, pp. 77–89*).

The researcher attributes the absence of differences in agility to the similar performance levels of both groups. During adolescence, students tend to prefer complex movement-based games such as running, jumping, skipping, and alternating hops all of which require a certain level of coordination.

Based on this, Kallahu categorized physical capacities dependent on physiological efficiency as physical abilities (strength, speed, endurance, flexibility). Meanwhile, abilities not directly influenced by physiological state—but rather by motor control—depend on motor sensation and the central/peripheral nervous system, and include balance, coordination, motor precision, agility, and motor flexibility. (*Khayoun, 2002, p. 21*).

From these findings, we conclude that there are no statistically significant differences in agility between physically active and inactive students, thus confirming the third hypothesis.

- **Discussion of the General Hypothesis :**

Based on the results from all sub-hypotheses, tables, and corresponding analyses, the general hypothesis—which states that there are no statistically significant differences in physical traits between physically active and inactive high school students—is confirmed.

These results are in agreement with:

- Djebaili Elias (2019–2020), which reported no statistically significant differences in physical fitness traits among middle school students participating in elite school sports teams, based on category.

After analyzing the results of the physical fitness tests, it was found that traits such as endurance, speed, and agility were comparable between active and inactive students, with no significant differences.

The researcher attributes this to several factors:

- Endurance (aerobic capacity) may be well-developed even in inactive students and is influenced more by practice than age.
- Speed may be affected by psychological and genetic factors, test distance, fiber type, and muscle mass, with both groups showing competitive tendencies during testing.
- Agility may be similar due to students' shared preference for coordinated motor games during adolescence, which enhances neuromuscular coordination in both active and inactive students.

Conclusion:

In light of these findings, we confirm the validity of the first, second, and third hypotheses, and conclude that physically active and inactive high school students demonstrate similar levels in the physical traits of endurance, speed, and agility.

References and quotations:

1. Abdel Jawad, S. (1984). *The relationship between muscular strength and joint range of motion among volleyball players at different levels*. In Proceedings of the "Sport for All" Conference. Helwan, Cairo.
2. Basiony, M. A., & Al-Shatei, F. Y. (1992). *Theories and methods of physical education*. University Publications.
3. Mohsen, A. J. S. (2016). *Physical, technical, tactical, and psychological preparation of athletes* (1st ed.). University of Jordan.
4. Zeroual, M. (2017). *Building a physical test battery for the selection of school football teams at the secondary level* (Doctoral dissertation, University of Biskra).
5. Topend Sports. (n.d.). *40 meter sprint test*. Retrieved July 14, 2025, from <https://www.topendsports.com/testing/tests/sprint-40meters.htm>
6. Bahrain Olympic Committee. (2011). *Fitness testing* (1st ed.).
7. Cazorla, G., & Léger, L. (1993). *Comment évaluer et développer vos capacités aérobies* [How to evaluate and develop your aerobic capacities]. Association Recherche et Évaluation en Activité Physique et en Sport.
8. Jebaïli, E. (2020). *Comparison of physical fitness elements among middle school students enrolled in elite school sports teams* (Doctoral dissertation, Mohamed Khider University – Biskra).
9. Mouhimidat, R., & Loukia, Y. I. (2017). *Physical fitness: Importance, characteristics, and training* (1st ed.). Dar Al-Ayyam for Publishing and Distribution.
10. Chenouf, K., et al. (2019). An analytical study of differences in the speed trait among practicing and non-practicing students. *Journal of Science and Techniques of Physical and Sports Activities*, University of Mohamed Boudiaf – Oran, 125.
11. Khayoun, Y. (2002). *Motor learning between logic and application*. Al-Sakhra Printing Library