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The relationship between speed and some of the endurance characteristics of talented students in sprint races.

صفة السرعة وعلاقتها ببعض خصائص صفة التحمل لدى التلاميذ الموهوبين رياضيا في نشاط الجري السريع.

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Abstract: This study aims to identify the relationship between the characteristics of speed and some characteristics of endurance during the selection and detection process of talented students in sprint running. Researchers in this study relied on the descriptive approach, where a sample consisting of (72) students was intentionally selected. This study was conducted using the following research tools. Firstly, 30 meters of fast running to measure speed. Secondly, Brixie's running test (05 minutes) to measure endurance. Thirdly, a jump squat test is used to measure force endurance. Fourthly, a running test (30 meters x5) with 30 seconds of rest is used to measure speed endurance. Finally, after collecting and processing the data statistically, it was concluded that there is a correlation between the speed characteristics and some endurance characteristics among the study sample members. The study recommended the need to implement scientific criteria and standards in the process of detecting and selecting talented students in sprint running.

Keywords: sprint; speed; endurance; talented students; strength endurance; sprint endurance.

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الملخص: تهدف هذه الدراسة للتعرف على العلاقة بين صفة السرعة وبعض خصائص صفة التحمل خلال عملية الانتقاء والكشف عن الموهبة الرياضية في سباق الجري السريع، اعتمدنا على المنهج الوصفي، وعلى عينة متكونة من (72) تلميذ تم اختيارها بشكل قصدي، أما أدوات البحث استخدمنا اختبار الجري بسرعة 30 متر لقياس السرعة، اختبار بريكسي جري (05) دقائق لقياس التحمل. اختبار الوثب عموديا لقياس تحمل القوة. اختبار الجري (30 متر*5) مع 30 ثانية راحة لقياس تحمل السرعة، بعد جمع البيانات ومعالجتها إحصائيا تم التوصل لوجود علاقة ارتباطية بين صفة السرعة وبعض خصائص صفة التحمل لدى أفراد عينة الدراسة أوصت الدراسة بضرورة تطبيق المحددات والمعايير العلمية في عملية الكشف والانتقاء عن التلاميذ الموهوبين رياضيا في نشاط الجري السريع.

الكلمات المفتاحية: العدو السريع؛ السرعة؛ التحمل؛ التلاميذ الموهوبين؛ تحمل القوة؛ تحمل السرعة.

1-Introduction:

Undoubtedly, athletics is one of the most fundamental and common forms of sports. Practicing athletics is easily accessible to everyone. This is due to the nature of its exercises, which have been part of everyday life since childhood. It is easy to determine endurance levels through them. Athletics is often called the "queen of sports" because it is included in all major sports competitions, including the Olympic Games (Hassan, 1986: 07). The diversity of its athletic disciplines characterizes this sport. We find the sprint running activities among these disciplines that combine competition enthusiasm and performance aesthetics. To enter the arena of these competitions, a specialized athletics coach must invest in the most talented students in this specialization. This starts with selecting individuals who possess the necessary qualifications through the process of talent detection and selection using modern scientific methods. This ensures the proper initiation of the talent formation and refinement process, which is our aim throughout our study.

Many specialists in the field of sports training, testing, measurement, as well as educational sciences refer to the definition of selection as a "multifaceted problem from a planning, economic, philosophical, and educational perspective" (Houda and El Khodri, 1994: 18). It defined by Gazorla as "revealing what is hidden, knowing among the total number of practicing and non-practicing children who can have the chances to develop abilities in the long term through physical exercise in the high-level sports activity." (Gazorla, 1992). The formulation of specific criteria adapted to the evaluation of abilities in each type of sport is an essential condition for identifying and selecting talents (Yahya, 2002: 28).

The accuracy and precision of the initial talent-selecting process significantly impact the investment's success rate and potential. They are leading to higher levels of achievement. This notion aligns with Janih's interpretation of talent, which associates it with natural and unintentional abilities that we refer to as inherent aptitudes. Furthermore, Farouk Al-Rousan defines a talented child as an individual who demonstrates exceptional performance compared to their peers, highlighting distinguished skills such as technical and athletic proficiencies (Al-Rousan, 1998: 47).

Furthermore, when it comes to discussing technical skills in sports, it is essential to consider the physical qualities and capabilities inherent in talented individuals, particularly in the sprint discipline. Moreover, speed is one of the most influential qualities; it also plays a vital role. Kamal Jamil emphasizes the significance of short-distance running in athletics and other sports, as it enhances a student's speed, which is a fundamental and indispensable element of physical fitness (Jamil, 2005: 107). A. Lesserteur further elaborates on the concept of speed, stating that it is associated with the rapid contraction and relaxation of specific muscle groups required to execute maximum movements within a given timeframe (Lesserteur, 2009: 113). As for endurance characteristics, they have a significant influence on this specialization; as Yahya Ismail points out, endurance is an essential characteristic for athletes in all sports and events as it is one of the critical characteristics that develop multiple other physical characteristics and other functional systems in the body. This is to reach a high degree of work efficiency. (Yahya, 2002: 150).

M. Dufour defines endurance as the psychological and physical

ability to resist fatigue (Dufour, 2011: 15). The most important indicators that express the trait of endurance are endurance of strength and endurance of speed. Mohamed Sobhi believes that endurance of strength and endurance of speed are compound qualities whose importance arises from the element of stamina, which makes the adjective progress from the general to the specific (Sobhi, 1995: 306). Auais El Jebali definition of speed endurance is "the ability to endure fatigue in working conditions and sports performance." He indicates that the speed endurance characteristic represents the relationship between endurance and speed. Therefore, the level of digital achievement in many running activities in athletics, especially in sprinting, can depend on it.

Moving to the characteristic of strength endurance, Hart defines it as the ability of the body and its internal vital systems to resist fatigue during continuous effort. Endurance is characterized by a long performance period and has a strong relationship with the level of muscle strength (El Jebali, 2001: 395). Therefore, these characteristics and physical attributes are fundamental requirements and essential criteria for many sports, especially the specialization of sprinting, during the process of detecting and selecting talented students.

From previous and similar studies that dealt with this topic, it is worth to mention the following studies. Jakub Faker and Tomas Venture conducted a study entitled "The relationship between speed and explosive power of the lower extremities of semi-elite soccer players." The study aimed to determine the relationship between speed (including acceleration, maximum speed, and change of directional speed) and the explosive force of the lower extremities, represented by the counter-movement jump (CMJ), in semi-elite football players. The researchers employed a descriptive approach in this study, involving 20 elite players. A series of tests was used to collect data, including the 10-meter running test, 30-meter running test, countermovement jump test (CMJ), and agility test with rotation of the dominant and non-dominant lower extremities. The researchers concluded that significant relationships exist between speed attributes and explosive power among semi-elite soccer players. They also confirmed that improving the explosive power of the lower extremities could enhance speed and specialized speed.

In addition, a study entitled A Comparative Study of Endurance

among Basketball Players of the Senior Class, according to the variables of playing positions and height. The study aimed to identify the differences in endurance among basketball players according to the playing positions, as well as to identify the differences in this capacity between players according to the variable of height. This is until the most distinguished playing positions are identified in the endurance capacity. For this purpose, the researchers used the comparative descriptive approach on a sample consisting of (22) senior players; they were selected randomly, and the researchers concluded that the first hypothesis was not fulfilled, as there were no statistically significant differences in endurance among the players according to the playing positions. Statistically significant differences in endurance among the players according to the height variable, divided into two populations: 1.90 meters, 1.90 meters, or more. (Bouattia Toufik, others. 2020).

Another study conducted by Bektash Bahia and Salami Syed Ali entitled The Contribution of Semi-Sports Games in Developing the Speed Characteristic of Intermediate School Students (11-13). The average is (11-13) years, where the researchers used the experimental method, and the study population consisted of 600 students from the middle school of Ras Al-Souta, Algeria. The study sample consisted of (40) students (males and females) chosen deliberately due to the nature of the research. The researchers used an educational program consisting of a group of classes to measure the extent to which the characteristic of speed developed as a study tool. Tests are also used as a statistical means to interpret and explain the results. The study concluded that a significant improvement in speed development among middle school students was achieved through applying the semi-sports program (Bektach et al., 2020).

Moreover, Boufadene conducted a correlational study focusing on the physiological parameters of soccer players under 19 years old. The study investigated the relationship between critical factors such as anaerobic threshold, maximum oxygen consumption (VO2 max), endurance, speed, and strength. The study measured the maximum aerobic speed (VMA) to evaluate the students' peak performance. Additionally, it estimated their maximum oxygen consumption (VO2Max) to assess their aerobic capacity. The researcher used a descriptive approach using correlational studies, with a sample size of 24 Widad Amel Mostaganem team players. To estimate maximum

aerobic capacity, the Conconi test was administered, while the "Luc Léger" test measured maximum oxygen consumption. The study revealed a statistically significant correlation between maximum aerobic capacity, strength, and speed endurance (Boufadene Outmane, 2016).

In light of these proven theoretical data, the problem of the current study is based on studying the relationship between speed and some of the endurance characteristics of talented students in sprint activities.

- Is there a statistical correlation between speed and speed endurance among talented students in sprint activities?

- Is there a statistical correlation between speed and strength endurance for talented students in sprint activities?

- Is there a statistical correlation between speed and endurance among talented students in sprint activities?

Here is the general hypothesis:

- There is a statistical correlation between speed characteristics and endurance characteristics among sport-talented students in sprint activities.

This general hypothesis includes a group of sub-hypotheses, which are as follows:

- There is a statistical correlation between speed and speed endurance among talented students in sprint activities.
- There is a statistical correlation between speed and strength endurance for talented students in sprint activities.
- There is a statistical correlation between speed and endurance among talented students in sprint activities.

2- General objective of the study:

1) Examining the correlation between speed and some endurance characteristics in the light of the process of identifying sport-talented sprinting for middle school students.
2) Identifying the role of the correlation between speed and some endurance characteristics in the light of the process of identifying sport-talented in sprinting for middle school students.

The importance of the study lies in the following:

- The importance of this age range in the identifying and selecting process of sports talent in sprinting activities.
- The importance of studying the relationship between the speed characteristics and the endurance characteristics to know how these characteristics affect each other. Moreover, how it affects the prediction process.
- The importance of studying speed and endurance characteristics as two essential and influential elements for sprinting activities.

3- Procedural definition of the concepts mentioned in the research:

- **Talent selection in the field of sports:** Zatsiorsky defines it as a process through which the most talented players are selected over multiple periods and based on sports preparation stages (Abou El-Ala, 2010: 03).
- **Scouting**: Jürgen Weineck defines it as the process of noticing extraordinary things or behaviors of a human being (Edgar, 1985: 326).
- **Talent:** A talented child can excel in the future if given the right direction and care (Nushi, 1980: 182).
- **Sports talent:** An extremely exceptional case in terms of technical performance compared to other cases (Jürgen, 1999: 89).
- **Endurance:** It is the ability of the individual student to continue to perform effectively without decreasing his efficiency or the ability of the student to resist fatigue (Moufti, 2001: 147).
- **Strength endurance:** It is the ability to maintain the level of performance efficiency for the most extended possible period by increasing the ability of the body's systems to resist fatigue and delay its onset (Fahmi, 2009: 180).
- **Speed endurance:** It is the ability to continue to perform symmetrical or asymmetrical movements efficiently and effectively for long periods at high speeds without decreasing the level of performance efficiency (Moufti, 2001: 149).
- **Athletics**: It is a group of sporting events and a suitable means aimed at good physical preparation and development of the body and mind together. It is of various types, such as running, jumping, throwing, pushing, and walking (Gerard, 1984: 15).
- **Sprint (running):** sprint, also called dash, in athletics (track and field), a footrace over a short distance with an all-out or nearly all-out burst of speed, the chief distances being 100, 200, and 400 meters and

100, 220, and 440 yards (www.britannica.com).

4- Methodology:

4-1 Method and tools:

-The exploratory study:

We conducted a pilot study on a sample of 06 students to test the data collection tools. Additionally, I will see how the sample responded.

-Approach used:

This study follows the descriptive approach because the study applies the quantitative research.

-Field of the study:

A- Time domain: This study took place from 09/03/2023 to 05/05/2023.

B- Spatial domain: This study was conducted in 12 middle schools in the region of Bordj Bou Arréridj.

Population and sample:

The study applied non-probability sampling, and the process was as follows. This study picked a sample of 06 fourth-grade students from 12 middle schools, and the population is 72.

- Variables of the study:

A- Independent variables: In this study, endurance is the independent variable.

B- Dependent variables: In this study, speed is the dependent variable.

- Data gathering techniques:

Based on scientific criteria, data-gathering tools are used to measure speed by conducting sprint race tests. Additionally, a sprint test of 30*5 meters with a 30-second break to measure speed endurance. Furthermore, a jump squat test (explosive squat jumps) is used to measure strength endurance. For endurance, the researchers used the 5-minute Brixie running test.

- Statistical tools:

This study used the following statistical tools: Arithmetic average, Standard deviation, Pearson correlation coefficient, Simple Regression, and ANOVA test. They were analyzed by the SPSS software.

4-2 Presentation and Analysis of Results:

Table N°1: regression coefficients of endurance and speed for students in sprint activities.

	Unstandardized coefficient		Standardized coefficient	t	Sig	R	R2	Adjusted R2
Model	B	Ecart standard	Beta					
(Constant)	2,76	0, 64		3,84	0,88	0,82	0,67	0,66
Brixie test endurance	-0,00	0,00	-0,26	-3,01	0,00			
Speed endurance	0,52	0,08	0,54	6,24	0,00			
jump squat strength endurance	-0,06	0,02	-0,19	-2,41	0,02			

Source: Prepared by researchers with the SPSS program in 2020.

Theoretical conditions:

Agreement of the value and signals of the regression coefficients:

It is noted that the variables of our case study fall within the framework of talented student selection and detection in the field of sports training. We refer to the simple linear regression model obtained from the research data. It shows a significant relationship between the research variables, the independent variables (endurance, strength endurance, speed endurance), and the dependent variable (speed) in the sprinting activities.

The model formula: $Y = -X_1 + 0{,}52X_2 - 0{,}06X_3 + 2{,}76$

From this model, we conclude the following:

The B_0 variable has a positive value and does not equal zero (2,76)

The B_1 variable has positive value equal to (-0,00)

The B_2 variable has positive value equal to (0,52)

The B_3 variable has positive value equal (-0,06)

The results show that there is no contradiction between the theoretical conditions and the results of the regression model explaining the relationship effect of the independent variable effect (endurance,

strength endurance, and speed endurance) and the dependent variable (speed) of talented students in sprinting activity.

Interpretation of the model:

It is apparent that the evaluation of both regression coefficients is based on the modified determination coefficient, which is found in Table N°1. This shows the significant relationship between the independent variable (endurance, strength endurance, and speed endurance) and the study sample's dependent variable (speed). In comparison, the value of the estimated modified determination coefficient is (0,66).

This means that the variables of the study chosen for the model explained what was worth (66%) of the effect of the independent variable (endurance, strength endurance, and speed endurance) on the dependent variable (speed). This means that (66%) of the changes that occur in the dependent variable are attributed to the independent variable of the study sample.

Moreover, (34%) are due to other factors. These results reflect the validity of the variables chosen for the study and their ability to explain the regression model results. As for the statistical significance of this model, it was justified by the level of relevance estimated at the probability value (0,00), which is statistically significant and in line with the study's hypotheses.

Mathematical conditions:

Table N°2: variance analysis of some endurance variables and speed for students in sprint activities**.**

Source	**average-of-squares**	**freedom degree**	**sum-of-squares**	**F**	**Sig**
Regression	13,27	3	4,42	46,34	0,000
errors-in-variables	6,39	67	0,10		
Total	19,66	70			

Source: Prepared by researchers with the SPSS program in 2020.

Interpretation of the model:

The purpose of calculating the ANOVA variants table is to analyze the average-of-squares of the dependent variable (SST), the sum-of-squares of the regression (SSR), and the sum-of-squares of the errors (SSE).

Module formula: $R^2 = \frac{\text{SSR sum-of-squares}}{\text{SST sum-of-squares}} = \frac{13,27}{19,66} = 0,67$

The coefficient of determination equals the correlation coefficient$\sqrt{R^2} = \text{r}$.

By substituting the given values, we find$0,82 = \sqrt{0,67} = \text{r}$.

Therefore, the results align with the results obtained in Table N°2. These results show that (82%) of the variations of total regressions of the dependent variable values are explained by the linear relationship of the independent variable's regression model Among the study sample. These results justify the value of the modified coefficient of determination obtained in Table N°2.

The overall significance of the model:

It is clear from Table N°2 that the calculated value of (F) is equal to (46,34), and the probability value P.VALUE is equal to (0,00), which is less than the level of significance (0,05). This means that at least one regression coefficient differs from zero and has an intangible value.

Partial significance of the model:

Previously, the results indicated that at least one regression coefficient differed significantly from zero. We conduct partial significance tests of the model using T-tests to discern which coefficients are statistically significant.

According to the results from Table N°1:

The constant part B_0= (4,33) at the probability value (0,00), which is less than the value (0,05), from which we conclude that the constant value in the regression model is significant.

The regression line B_1, the indicator degree of endurance for the study sample is (-3,01) at the probability value (0,00), which is less than the value (0,05). From it, we conclude that the degree inclination of the degree in the regression model is significant.

The regression line B_2, the indicator degree of the speed endurance for the study sample is (6,24) at the probability value (0,00), which is less than the value (0,05). From it, we conclude that the degree inclination of the degree in the regression model is significant.

The regression line B_3, the indicator degree of the strength endurance for the study sample is (-2,41) at the probability value (0,00), which is less than the value (0,05). From it, we conclude that the degree inclination of the degree in the regression model is significant.

4-3 Discussion and interpretation of the results:

Following the statistical analysis of the results obtained, it becomes evident that there exists a statistically significant correlation between the levels of the independent variables (endurance, strength endurance, and speed endurance) and the dependent variable (speed) among talented students engaged in sprinting activities.

This means that the correlation is confirmed between the two variables. Consequently, (66%) of the changes that occur in the dependent variable are attributed to the independent variable among the study sample, and (34%) are due to other factors. These results show the validity of the variables chosen for the study and their ability to interpret the regression model results. They also show that (82%) of the variations in total deviations in the dependent variable values are explained by the linear relationship of the regression model among the study sample.

To begin, the results can be interpreted such that the characteristic of speed is influenced by the degree of some indicators of endurance (endurance, strength endurance, and speed endurance). Therefore, individuals with higher levels of these endurance characteristics are more likely to exhibit more incredible speed and vice versa. This is supported by the study of Jakub Fikar and Tomas Venturi, who found a significant correlation between the 10-meter and 30-meter sprints, alongside a moderate correlation between anti-motion jump tests and the rotation of both dominant and non-dominant lower limbs. Consequently, improving the strength of the lower extremities can enhance speed, benefiting sports like football.

These results are also consistent with the study of Bouattia Toufik and others, where the study showed that there was no variation between the sample members in the endurance characteristic

according to the variable of playing positions and variable length since the area of the field is relatively small, so there will be a rapid transitional movement repeated many times from a quick attack and a faster return to defense (Bashar, 2017: 128). Therefore, Endurance is one of the essential elements for basketball players because it directly contributes to giving muscle groups the ability to continue physical performance and thus enhance speed.

Furthermore, our study's findings align with those of Boufadene Outmane, which highlighted a statistically significant correlation between maximum oxygen consumption and both strength and speed endurance within the research sample. This correlation underscores the significance of the body's efficiency in oxygen consumption, as emphasized by Abou El-Ala Ahmed Abdel-Fattah. He posited that efficient oxygen consumption is crucial for sustaining physical activity over prolonged periods, as it facilitates energy production. Consequently, efficient oxygen consumption enhances the body's capacity for physical performance, enabling more efficient and effective physical exertion (Abou El-Ala, 2003: 459).

Therefore, this elucidates the connection between maximum oxygen consumption and endurance, strength, and speed. These findings hold significance for the identification and selection of athletic talents, as they underscore a direct relationship between speed and specific indicators of endurance (such as endurance, strength endurance, and speed endurance). Essentially, the higher the levels of these endurance traits in a gifted student, the more likely they are to possess more excellent speed capabilities.

Conclusion:

To conclude, from the results we have reached in our study, - applied to middle school students (fourth year) in the light of the process of identifying and selecting talented students- that there is a direct relationship between speed characteristics and some of the traits of endurance (endurance, strength endurance, and speed endurance); therefore, the more The student at this stage possesses some indicators of endurance (endurance, strength endurance, and speed endurance) the more possibility of possessing the speed characteristic is greater. As a result, it is easier to identify, select, and predict talent, particularly for sprinting. We also suggest to the teachers and trainers responsible for the process of identifying and selecting talents to rely on the physiological aspect and strengthen it by conducting physiological tests related to the specialization, such as speed,

endurance, and its indicators, and this is because of their connection with each other, especially in the specialty (fast running). We also suggest that researchers focus in the future on this type of study, especially concerning the physical characteristics of sprint races (fast running), and work on other physical characteristics that affect this type of discipline, such as speed endurance, explosive power, flexibility, and agility.

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