Investigation of physical and cognitive performance profiles of 7-8 years old children in terms of talent selection in sports and sports orientation: the case of Kayseri

Investigação dos perfis de desempenho físico e cognitivo de crianças de 7 a 8 anos na seleção de talentos esportivos e orientação esportiva: o caso de Kayseri

Samet Sitti¹
Serdar Adıgüzel²
Yaşar Köroğlu³

Abstract
This study seeks to compare the physical and cognitive performances of 7-8-years-old children in terms of gender based on talent selection in sports and sports orientation as well as to contribute to the coaches studying in the field and the physical education teachers working in the schools in terms of talent selection tests and determination of talented athletes. The sample group consists of 178 boys and 151 girls studying in primary schools in Kayseri. To determine the physical performance of the participants, the eurofit test protocols including standing long jump, 30-m sprint test, sit-reach flexibility test, flamingo balance test, and 30 second sit-up test were applied. On the other hand, to determine the cognitive performance of the participants, visual and auditory reaction times were measured via the Newtest 1000 instrument. The SPSS 22 package program was used to evaluate the data. As a result of the statistical analysis, it was understood with the Kolmogorov-Smirnov test that the data showed

¹ PhD in Sport Sciences, Siirt University Faculty of Sport Sciences, Batman Yolu 10. km Merkez, 56100 Siirt Merkez/Siirt, Türkiye. E-mail: samet_sitti@hotmail.com Orcid: https://orcid.org/0000-0002-8014-915X
² PhD in Sport Sciences, Siirt University Faculty of Sport Sciences, Batman Yolu 10. km Merkez, 56100 Siirt Merkez/Siirt, Türkiye. E-mail: serdaradiguzel@siirt.edu.tr Orcid: https://orcid.org/0000-0002-1371-7460
³ PhD in Sport Sciences, Sivas Cumhuriyet University, Faculty of Sport Sciences, Sivas Cumhuriyet Üniversitesi 58140 Kampüs/Sivas, Türkiye. E-mail: korogluyasar38@gmail.com Orcid: https://orcid.org/0000-0003-4662-3353
normal distribution. The descriptive statistical method and the independent sample t-test were applied to the participants in inter-group comparisons. As a result of the descriptive statistical analyzes, the mean values of the participants' anthropometric characteristics were found as (male, age; 7.30 ± .46 (years), height; 127.39±5.75 (cm), body weight; 28.84±5.93 (kg), BMI; 17.67±2.74) and (female, age; 7.27±.44 (years), height; 125.26±5 .19 (cm), body weight; 27.35±5.43 (kg), BMI; 17.36±2.79). As a result of the analysis, a statistically significant difference was found between the height values of girls and boys in terms of anthropometric characteristics (p<0.01). No significant difference was found in terms of other anthropometric values (p>0.05). In terms of physical performances, a significance at the level of (p<0.01) was found in favour of boys in 30-m sprint test and standing long jump tests, and in favour of girls in flamingo balance test parameters. No significant difference was found in terms of cognitive performance. The results of the study reveal that the physical and cognitive performance data of primary-school 7-8-years-old children show similar developmental characteristics when evaluated in terms of gender.

**Keywords:** Eurofit Test Protocol. Talent Selection. Cognitive Performance.

**Resumo**

Neste estudo pretende-se comparar o desempenho físico e cognitivo de crianças dos 7 aos 8 anos em termos de género na escolha de talentos no desporto e no seu direcionamento para a prática desportiva, e contribuir para o trabalho dos treinadores que atuam na área e na área física. professores de educação que atuam nas escolas nos testes de seleção de habilidades a serem aplicados e na identificação de atletas talentosos. O grupo amostral da nossa pesquisa consiste em 178 meninos e 151 meninas que estudam na escola primária em Kayseri. Entre os protocolos de teste eurofit para determinar o desempenho físico das crianças participantes; foram aplicados salto em distância em pé, teste de velocidade de 30 m, teste de flexibilidade sentar-alcançar, teste de equilíbrio do flamingo e teste de abdominais de 30 segundos. Na determinação do desempenho cognitivo das crianças participantes, as medidas do tempo de reação visual e auditiva foram medidas com o instrumento Newtest 1000. O programa do pacote SPSS 22 foi utilizado para avaliar os dados. Como resultado da análise estatística, compreendeu-se que os dados apresentaram distribuição normal com o teste de Kolmogorov-Smirnov. Nas comparações entre os grupos foram aplicados o método de estatística descritiva e o teste t para amostras independentes. Como resultado das análises estatísticas descritivas, foram obtidos os valores médios das características antropométricas dos participantes (masculino, idade; 7,30 ± 0,46 (anos), altura; 127,39±5,75 (cm), peso corporal; 28,84±5,93...
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Introduction

As well as being crucial and necessary for adults to maintain a healthy life, physical activity also plays an important role for children to develop physically, mentally, and socially and to maintain a healthy state. For this reason, it is essential that children should be acquainted with sports from an early age (Murathl, 2013). Discovering the talents of children and guiding them to do sports at an early age is essential for maintaining a healthy life and plays a very effective role in the possibility of being a successful athlete (Tutkun, 2007; Dilber & Doğru, 2018). Besides, in terms of growth, development, and being a performance athlete, it is known that it is necessary to discover gifted children at an early age and help them be interested in sports (Tutkun, 2002). To be able to test, measure, and evaluate the physical fitness of children aged 6-12 at primary and secondary school level, Eurofit test protocols were adopted by the Committee of Ministers in the Council of Europe with the decision dated May 19, 1987, and numbered 87 and the countries that are members of this council were informed about the use of and taking the necessary measures related to the implementation of the European Test of Physical Eurofit. Since Turkey is among these countries and calls for the implementation of this decision, Eurofit test batteries were launched (Uzuncan, 1991). To accomplish in all sports branches, the first goal is achieved once the physical, physiological, and psychological characteristics of the athlete are determined (Heimer et al., 1988; Sallis and Patrick, 1994). Following the discovery of talent, sports orientation is also highly crucial to

continue and improve the relevant talent. Karl (2001) reports the benefits of the research on the branch-oriented practices of the talent selection practices as well as the provision of education, emphasizing that coaches or physical education teachers contribute to the increase in the working capacity of the athlete based on the ability of the athlete and the increase in the competition among the athletes together with the number of competitive athletes and that such athletes possess higher levels of self-confidence compared to athletes who are not determined by scientific methods. Each sports branch includes the simultaneous conversion of different physical and motoric characteristics into performance, and the different characteristics of the athletes are thus revealed (Pekel, 2007).

A metaphor is defined as expressing an experience or concept with another better-known experience or concept (Lakoff and Johnson, 2005). In other words, Spandler et al. (2014) defined metaphor as a method of expressing something with another term. Therefore, metaphors can be considered as a tool used to determine individuals' perceptions about a concept or subject in different ways (Aydin, 2011; Ozyildirim ve Sari, 2018).

Reaction time is defined as the time between the sudden presentation of a stimulus to the body and the first response of the body to that stimulus (Akgün, 1986). The reaction time occurs when the stimulus reaches the muscles through the central system after it is transmitted to and perceived by the person. It has been revealed that the age, gender, and living standards of the person affect the reaction time. Accordingly, the type of stimulus transmitted to the person, acquaintance with the stimulus, fatigue, stimulant substance use, and the physical capacity of the person are also factors that affect the reaction time. The reaction time, which can range between 0.5-0.6 seconds at early ages, diminishes at the age of 30 up to 0.1-0.2 seconds in adulthood (Maidikov et al., 1986; Ricci, 1970).

Reaction time is among the factors that affect and determine performance in all sports branches. For this reason, there are a great number of studies in the literature that focus on how to shorten the reaction time with exercises (Bicer and Aysan, 2008; Colakhodzic et al. 2010).

This study seeks to compare the physical and cognitive performances of 7-8-years-old children in terms of gender based on talent selection in sports and sports orientation as well as to contribute to the coaches studying in the field and the physical education teachers working in the schools in terms of talent selection tests and determination of talented athletes.
Methodology

2.1 Data Collection Tools

Once the age, height, body weight, and body mass index, which are the anthropometric characteristics of the participants, were identified, the Eurofit test protocols used in talent selections including standing long jump, 30-m speed test, sit-reach flexibility test, flamingo balance test, and 30-second sit-up test were applied. While determining the cognitive performance of the participating children, visual and auditory reaction times were measured via the Newtest 1000 instrument.

2.2 Age, Height, Body Weight, and Body Mass Index Measurements

The ages of the participants were determined based on their identities and recorded by year. Height measurements were determined using a tape measure. Measurements were taken while the participants were barefoot. Body weights were also determined by barefoot, with very little clothing, and by measuring with a scale with a sensitivity indicator of 0.1 degrees. While determining the body mass index values of the participants, the Body Mass Index was calculated and recorded through the formula of \( \text{BMI} = \frac{\text{Body Weight}}{\text{Height (m)}^2} \) (Tamer, 2000; Zorba, 1999; Doğru, 2019).

2.3 Standing long jump test

The participant stood in front of the line drawn on the ground and was told to jump forward after expressing that s/he was ready. The distance between the participant's first point in front of the line and the place behind the heel until the place where s/he jumped was measured and determined. The participant repeated the test twice and the best result was recorded (Altinkok, 2006).

2.4 30-m Speed Test

After the designated 30-m track is set, the participant takes a high starting position on the ground just in front of the start point. As soon as the participant feels ready, s/he starts by running through the photocell and tries to complete the 30-meter track as soon as possible. As
soon as the participant crosses the 30-meter line, the photocell stops and the score is recorded in seconds (Günay et al., 2019).

2.5 Sit-and-Reach Flexibility Test

The participant was asked to sit on the front of the test box with his/her feet extended perpendicular to the box. In this position, the participant was asked to extend the body part to reach the furthest, push the ruler on the box to the last point with his/her hands, and wait for 1-2 seconds. After the test was repeated twice, the best score was recorded in centimetres (Tamer, 2000).

2.6 Flamingo Balance Test

In the study, the flamingo balance test was applied and recorded to determine the scores of balance characteristics. The values of the participants were calculated by determining how many times they fell on a beam of 50 cm in length, 4 cm in height, and 3 cm in width, with one foot in 1 minute. The test was applied twice for each participant and the best score was recorded (Zahner, 2006).

2.7 Sit-up Test

The participant lay on his/her back on the gymnastics mat and had his/her hands locked on the back of his/her neck. S/he bent the knees by (90°) with the soles of the feet adhered to the mat. A helper was used to ensure that the participant's feet remained stable on the ground. The sit-up was performed for 30 seconds and the score for the number of sit-ups performed at the end of 30 seconds was recorded (Tamer, 2000).

2.8 Reaction Time Measurement

To determine the measurements of the visual and auditory reaction time of the participants, the results of the measurement were determined by applying the Newtest 1000 instrument in an environment without noise and with sufficient light. The right and left hands were measured separately in the light stimulus, and the dominant hands of the participants were used in the auditory reaction measurement. Each participant was provided with 10 trials
against sound and light stimuli. The first 5 trials were accepted as exercises and the average of the last 5 measurements was determined as the participant's reaction time score and recorded (Tamer, 2000).

### 2.9 Statistical Analysis

Evaluation of the data was determined using the SPSS 22 package program. For descriptive analyses, the number of participants, their mean values, and standard deviations were determined. Independent sample t-test was used because the data showed normal distribution.

### Findings

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group</th>
<th>n</th>
<th>min</th>
<th>max</th>
<th>Mean ± SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>Male</td>
<td>178</td>
<td>7</td>
<td>8</td>
<td>7.30 ± .46</td>
<td>.634</td>
<td>.527</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>151</td>
<td>7</td>
<td>8</td>
<td>7.27 ± .44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height (cm)</td>
<td>Male</td>
<td>178</td>
<td>114</td>
<td>142</td>
<td>127.39 ± 5.75</td>
<td>3.497*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>151</td>
<td>112</td>
<td>138</td>
<td>125.26 ± 5.19</td>
<td></td>
<td></td>
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<tr>
<td>Body Weight</td>
<td>Male</td>
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<td>19</td>
<td>46</td>
<td>28.84 ± 5.93</td>
<td>2.360</td>
<td>.019</td>
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<tr>
<td></td>
<td>Female</td>
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<td>19</td>
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<td>27.35 ± 5.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>Male</td>
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<td>13</td>
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<td>17.67 ± 2.74</td>
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<td>.312</td>
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<tr>
<td></td>
<td>Female</td>
<td>151</td>
<td>13</td>
<td>27</td>
<td>17.36 ± 2.79</td>
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</tbody>
</table>

Table 1 highlights that the male age is 7.30 ± .46 (years), the height is 127.39 ± 5.75 (cm), the body weight is 28.84 ± 5.93 (kg), and the BMI is 17.67 ± 2.74 (kg/m²).

Table 2 highlights that the female age is 7.27 ± .44 (year), the height is 125.26 ± 5.19 (cm), the body weight is 27.35 ± 5.43 (kg), and the BMI is 17.36 ± 2.79 (kg/m²).

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Table 3: Comparison of the anthropometric characteristics of the participants
Source: the authors

Table 3 highlights that no significant difference was observed between the age, year, and BMI characteristics of the participants in terms of anthropometric characteristics (p>0.05). However, a significant difference at p<0.001 level was found between boys and girls in terms of height parameters.

Table 4: Comparison of participants’ Eurofit test and reaction time data
Source: the authors

Table 4 highlights that considering physical performances, according to the results of the independent sample t-test analysis, a significance was found in favour of boys in the 30 m sprint test and standing long jump tests, and in favour of girls in the flamingo balance test parameters (p<0.001). Considering their cognitive performances, no significant difference was found between the visual and auditory reaction times among boys and girls (p>0.05).

Discussion and Conclusion

This study was designed to make a comparison of the physical and cognitive performances of children aged 7-8 in terms of gender in talent selection and sport orientation as well as to assist coaches and physical education teachers in talent selection tests and identification of gifted athletes.
The findings of the study revealed that the mean values of anthropometric characteristics were calculated as (male age; 7.30±.46 (years), height; 127.39±5.75 (cm), body weight; 28.84±5.93 (kg), BMI; 17.67±2.74), and female age; 7.27±.44(years), height; 125.26±5.19 (cm), body weight; 27.35±5.43 (kg), BMI; 17.36±2.79). Güler (2009), found the average height and body weight of 6-9-years-old girls and boys as 124 cm and 25.8 kg, 133 cm and 28.55 kg, respectively. The mean values of height and body weights determined in that study were found to be in parallel with the findings of the present study. Çelik et al. (2013), evaluated the physical and motoric characteristics of children in the 7-9 age group, reporting that although no significant difference was found between the heights, body weights, and body mass index measurements of boys and girls in the 7-year-old group, there was a significant difference in the measurements in the 8-9-years-old children. It has been observed that the growth rate of children starts to slow down around the age of 7, and their height increases faster than their body weight, giving them a slimmer physical appearance. This slim physical appearance is accompanied by a rapid increase due to the muscle tissue that increases the range of motion. In addition to the significance of the height values in the present study, they showed similar characteristics with no significant difference in other parameters.

Ayan and Mülazimoğlu (2009), calculated the average values of the standing long jump as 108.14±18.86 cm in their study conducted with 1995 male volunteer children aged 8-10 years. In this study, on the other hand, the standing long jump mean values of male students were found to be 94.83 ± 24.36, while the mean values of girls were 81.70 ± 23.25. Demirel et al. (2016), conducted a study with 25 children aged 5-6 years, concluding that there was no significant difference in terms of flexibility values, 30-second sit-up test results, 10x5 meters shuttle run test scores, and vertical jump test results. The results overlap with the results of the physical performance determining tests in this study. The relevant result reveals that girls and boys in similar age groups have similar developmental characteristics.

Hasan (2008), conducted a study with 80 male and 80 female students aged 08-11 to conclude that there was no significant difference in male students’ ages, body mass index values, disc touch test scores, claw strength test results, and 10x5 shuttle run test results. However, there was no significant difference in the age, height, standing long jump test scores, claw strength test results, and 10x5 shuttle run test results of female students. Erikoğlu et al. (2009), evaluated physical performance parameters with Eurofit tests according to age groups in their research with 203 girls and boys in the 7-12 age groups. As a result, they reported that girls and boys show close and similar developmental characteristics up to the age of 10. However, from the age of 10, boys develop more than girls in some developmental
characteristics parameters. In this study, the determination of significance in some measurements according to the physical parameter results is thought to be related to the similar developmental characteristics of children in this age group.

Saraç (2012), studied 12-15-year-old boys, concluding that no significant difference was found between the reaction time (Right hand, msecond) and reaction time (Left hand, msecond). In this study, no significant difference was found between the right and left hand reaction times, and it is supported since it is along the same lines as the present study.

As a result, it is observed that the results of the present study show parallelism with the results of the studies in the literature shown above. As a result of this study, a statistically significant difference was found between the height values of girls and boys in terms of the anthropometric characteristics of the participants (p<0.01). No significant difference was found in terms of other anthropometric values (p>0.05). In terms of physical performances, a significance was found in favour of boys in the 30-m sprint test and standing long jump tests, and in favour of girls in flamingo balance test parameters (p<0.001). There was no significant difference between reaction times in terms of cognitive performance (p>0.05). These results reveal that the physical and cognitive performance data of primary school children aged 7-8 show similar developmental characteristics when evaluated in terms of gender.

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