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# Investigation of the Imagination Status of University Educated Athletes According to Some Parameters

## Üniversite Eğitimi Almış Sporcuların İmgeleme Düzeylerinin Bazı Değişkenlere Göre İncelenmesi

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## Abstract

Imagery is widely recognised in sports psychology as a fundamental cognitive skill that enhances athletic performance, skill acquisition, and motivation. It involves mentally rehearsing movements and scenarios without physical practice. However, the extent to which this ability varies among university-level athletes based on demographic and sport-specific factors remains an important area of investigation. This study aims to compare the imagery states of university-educated competitive athletes according to various parameters, including gender, sports branch, faculty type, competition level, income status, and sports age. The research sample consisted of 356 student-athletes studying at different faculties of Ondokuz Mayıs University who actively participate in sports competitions. Data were collected using the "Sports Imagery Inventory" to evaluate the participants' visualisation levels across different sub-dimensions. Statistical analyses were performed using SPSS. The normality of the data distribution was assessed. Subsequently, Independent Samples t-tests were used for paired comparisons, while One-Way Analysis of Variance (ANOVA) and LSD post hoc tests were employed for multiple-group comparisons. The levels of statistical significance were set at $p<0.05$ and $p<0.001$. The analysis revealed statistically significant differences in the cognitive and motivational sub-dimensions, as well as total scale scores, based on gender ($p<0.05$ and $p<0.001$). Comparisons indicated that athletes in individual sports had significantly different imagery scores than those in team sports. Furthermore, a significant difference was found between students studying at the Faculty of Sports Sciences and those in other faculties ($p<0.05$ and $p<0.001$). National athletes demonstrated significantly higher visualisation scores compared to amateur athletes. Additionally, significant variances in imagery scores were detected according to income status (low to very high) and the sports age variable ($p<0.05$ and $p<0.001$), suggesting that experience and economic factors play a role in imagery capacity. This study concludes that the imagery levels of university student-athletes are significantly influenced by gender, sport branch, academic background (faculty), competition level (national vs amateur), income status, and years of sports experience. Specifically, elite status and formal sports education are associated with superior visualisation skills. To enhance athletes' imagination scores and psychological readiness, it is recommended to encourage early sports participation, increase engagement in national and international competitions, and provide structured sports training that includes mental rehearsal strategies.

**Keywords** Sports, Team sports, Individual sports, Imagination, Nationality, Education, Income status.

## Öz

İmgeleme (imagery), spor psikolojisi alanında atletik performansı artıran, beceri öğrenimini destekleyen ve motivasyonu güçlendiren temel bilişsel becerilerden biri olarak kabul edilmektedir. İmgeleme, sporcuların fiziksel uygulama gerçekleştirmeksizin hareketleri, stratejileri ve yarışma senaryolarını zihinsel olarak canlandırmalarını ifade eder. Bu süreç, performansın geliştirilmesi ve psikolojik hazırlığın güçlendirilmesi açısından önemli bir araç olarak değerlendirilmektedir. Bununla birlikte, üniversite düzeyinde spor yapan bireylerde imgeleme becerilerinin demografik ve sporla ilişkili çeşitli değişkenlere göre nasıl farklılaştığı önemli bir araştırma konusudur. Bu bağlamda, araştırmanın amacı üniversite eğitimi alan rekabetçi sporcuların imgeleme düzeylerini cinsiyet, spor branşı, fakülte türü, yarışma düzeyi, gelir durumu ve spor yaşı gibi çeşitli değişkenler açısından incelemektir. Araştırmanın örneklemini, Ondokuz Mayıs Üniversitesi'nin farklı fakültelerinde öğrenim gören ve aktif olarak spor müsabakalarına katılan 356 öğrenci sporcu oluşturmuştur. Araştırmada veri toplama aracı olarak sporcuların farklı alt boyutlardaki imgeleme düzeylerini değerlendirmek amacıyla "Spor İmgeleme Envanteri (Sports Imagery Inventory)" kullanılmıştır. Elde edilen verilerin istatistiksel analizleri SPSS istatistik paket programı aracılığıyla gerçekleştirilmiştir. Öncelikle veri dağılımının normalliği incelenmiş, ardından ikili grup karşılaştırmalarında Bağımsız Örneklemler t-testi, çoklu grup karşılaştırmalarında ise Tek Yönlü Varyans Analizi (ANOVA) uygulanmıştır. Anlamlı farklılıkların belirlenmesi amacıyla LSD post-hoc testi kullanılmıştır. İstatistiksel anlamlılık düzeyi $p<0.05$ ve $p<0.001$ olarak kabul edilmiştir. Araştırma bulguları, cinsiyet değişkenine göre sporcuların imgeleme ölçeğinin bilişsel ve motivasyonel alt boyutlarında ve toplam puanlarında istatistiksel olarak anlamlı farklılıklar bulunduğunu göstermiştir ($p<0.05$; $p<0.001$). Spor branşına göre yapılan karşılaştırmalarda, bireysel sporlarla uğraşan sporcuların imgeleme düzeylerinin takım sporlarıyla uğraşan sporculara kıyasla anlamlı düzeyde farklılık gösterdiği belirlenmiştir. Fakülte türü açısından değerlendirildiğinde, Spor Bilimleri Fakültesi öğrencileri ile diğer fakültelerde öğrenim gören öğrenciler arasında imgeleme puanları bakımından anlamlı farklılıklar tespit edilmiştir ($p<0.05$; $p<0.001$). Yarışma düzeyi bakımından yapılan analizlerde, milli sporcuların amatör sporculara göre daha yüksek imgeleme puanlarına sahip olduğu belirlenmiştir. Ayrıca gelir düzeyi (düşükten çok yükseğe) ve spor yaşı değişkenlerine göre de imgeleme düzeylerinde istatistiksel olarak anlamlı farklılıklar saptanmıştır ($p<0.05$; $p<0.001$). Bu bulgular, spor deneyimi ve sosyoekonomik faktörlerin imgeleme becerileri üzerinde etkili olabileceğini göstermektedir. Araştırma sonuçları, üniversite öğrencisi sporcuların imgeleme düzeylerinin cinsiyet, spor branşı, akademik alan (fakülte), yarışma düzeyi (milli veya amatör), gelir durumu ve spor deneyimi süresi gibi değişkenlerden anlamlı şekilde etkilendiğini ortaya koymaktadır. Özellikle elit sporcu statüsüne sahip olmak ve formal spor eğitimi almak, daha yüksek imgeleme becerileri ile ilişkilidir. Sporcuların imgeleme becerilerini ve psikolojik hazırlık düzeylerini geliştirmek amacıyla erken yaşlarda spora yönlendirme, ulusal ve uluslararası müsabakalara katılımın artırılması ve zihinsel canlandırma tekniklerini içeren sistematik spor eğitim programlarının uygulanması önerilmektedir.

**Anahtar Kelimeler:** Spor, Takım Sporları, Bireysel Sporlar, İmgeleme, Millî Sporculuk Durumu, Eğitim, Gelir Durumu.

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## Introduction

Imagination is the ability to imagine or visualise things one wants. Visualisation is the process of learning a new movement or perfecting an already known movement by simply imagining (visualising) in a planned and intense way, without any actual practice. Many of the world's best athletes use visualisation to help them perform at their best. In fact, as with any physical skill, such as running or serving in tennis, Imagination improves with practice (Munroe-Chandler et al., 2022). It is considered an innate ability and process to find through elements derived from sensory states of the shared world, partially or entirely within personal domains. Imagination is defined as the experience of imitating real life. Imagination is an experience in which real experiences are imitated. We may realise that we see what we imagine, feel movements while visualising, or experience images of sounds, tastes and smells without actually experiencing them. Visualisation includes not only visualising the situation in the mind but also experiencing it with all the senses (seeing, smelling, hearing, touching, tasting) (Hall, 2001). Visualisation is often used to recreate and recall lived experiences. The brain can also visualise events that have not yet occurred. Even if the imagined state and situation do not occur strongly in the mind, the place of the images that do not occur can be filled by Imagination with pieces from similar experience schemes created in memory. Researchers have found that children as young as 7 use imagery in sports to learn and develop new skills and strategies, manage their emotions, increase their self-confidence, and improve their performance (Kaan et al., 2023; Munroe-Chandler et al., 2007). Scientists conducting research in the field of sports accept that visualisation studies are among the most effective and beneficial for athlete performance (Bayrak & Nacar, 2020).

In the sports science literature, visualisation types are grouped under five main headings. These; "cognitive specific imagery", which involves applying specific skills perfectly and directly affects the development of a skill; "cognitive global imagery," which involves the successful implementation of performance-related plans; "motivational specific imagery," which involves visualising specific performance goals being achieved; "motivational general mastery", in which athletes imagine how they can cope with competition-specific technical and tactical problems when faced with these problems; and finally, "motivational general arousal", which describes the emotions that accompany important competitions and is also used to control the athlete's level of anxiety and arousal while preparing for the competition. It is stated (Hal et al., 1998; Miçoğulları et al., 2009) that Imagination is generally a strong, dominant and active emotion. It may include all sensations, or only one or a few. For this reason, Imagination plays a significant role in a person's real life. Imagery is also called visualisation or mental rehearsal. Visualisation means using all your senses (e.g., sight, touch, hearing, taste, smell) to rehearse your exercise in your mind. Visualisation helps you get the most out of your workouts. Top athletes use imagery extensively to enhance their strengths and help eliminate their weaknesses. Not only does imagery help athletes manage anxiety during competitions, but it also helps them stay confident, focused, and mentally strong. Athletes who have reached the highest levels of their sports have used images to improve their skills throughout their careers. Visualisation is also a tool that can help athletes see what they want to achieve in their sport. Athletes can also use images to help them set daily goals and stay motivated during tough training sessions. Injuries will inevitably occur during athletes' careers, leading to missed training. In these cases, athletes can use imagery to help them maintain their abilities and cope with injuries during rehabilitation. Imaging may even help accelerate the healing process (Kaan vd., 2023; Doğan, 2019).

Imagery works by triggering the same parts of the brain that are activated when you actually perform the task. For example, when athletes imagine themselves taking a penalty shot in ice hockey, the brain regions that are activated when they physically slide towards the goal and release the puck are also active during the imagined shot (Jeannerod, 1994). With visualisation, both physical and mental skill development can be achieved. In this way, motor corrections, such as improving and demonstrating the learned skills and correcting relevant errors, can be provided; psychological adjustments, such as control of emotions, development of concentration, and self-confidence, can also be achieved (Kızıldağ, 2007). Thanks to visualisation, you can experience changes in many of your bodily functions that are generally thought to be unachievable through conscious effort. It is seen that visualisation, a cognitive method, is more effective than doing no work at all, but less effective than physical work. Imagination is part of our thought system. We can

use our images to see ourselves at our best and perform well. We can also use visualisation to recreate a past successful performance by recalling what we saw or thought. In other words, we can remember and recreate past events in our brain, or we can see events that have never happened in our minds (Weingberg & Gould, 1995). When athletes have good visualisation, they can train faster and with fewer errors than those who have poor visualisation (Munroe-Chandler et al., 2012). Not only is imagery beneficial for individual athletes, but it can also help boost the confidence of the entire team. This is known as collective efficacy and occurs when every player on the team believes they can succeed together. A youth girls' soccer team improved its collective efficacy in both training and competition by using images for 10 minutes every day for 13 weeks (Munroe-Chandler et al., 2022). When athletes use imagery, their self-confidence also increases (Erdoğan & Erhan, 2019).

This study aims to investigate the imagery states of university-educated athletes across several variables.

## Materials and Methods

### Research Model

This study had an experimental design. In the study, causal comparison method was used.

### Research Design

This study utilized a quantitative research design using a cross-sectional survey model. The primary data collection tool was the Sports Imagery Inventory. The original version of the inventory was developed by Hall (Hall, 1998). While the original inventory consisted of five subscales and 30 questions, the Turkish version consists of 21 questions. The validity and reliability study of the inventory for the Turkish population was conducted by Kızıldağ and Tiryaki (Kızıldağ, 2012). According to this structure, the statements are evaluated on a 7-point Likert scale.

The scale assesses four sub-dimensions derived from the original five:

- Cognitive Imagery: Items 1, 2, 4, 5, 7, 9, 13, 14, and 15.
- Motivational Specific Imagery: Items 3, 6, 8, 10, and 20.
- Motivational General Arousal: Items 11, 12, 17, and 19.
- Motivational General Mastery: Items 16, 18, and 21.

A high score on the scale indicates a high perception of imagery (Yamak et al., 2018). In this study, Cronbach's alpha internal consistency values were determined as 0.81 for the cognitive imagery sub-dimension, 0.82 for the motivational specific sub-dimension, 0.72 for the motivational general arousal sub-dimension, and 0.62 for the motivational general mastery sub-dimension.

### Participants

The study sample consisted of 356 student-athletes from different faculties of Ondokuz Mayıs University and various departments of the Yaşar Doğu Faculty of Sport Sciences. The study was conducted in accordance with the Declaration of Helsinki. Ethical approval for the study, titled "Comparison of the Imagination Styles of Team and Individual Athletes Receiving Sports Training," was obtained from the Ondokuz Mayıs University Social and Human Sciences Research Ethics Committee (Date: 29.03.2023, Decision Number: 2023-804).

### Statistical Analysis

The IBM SPSS 25.0 statistical package program was used to analyze the data obtained in this research. The normality of the data distribution was assessed using the Kolmogorov-Smirnov test. Based on the distribution results, Independent Samples T-

test, One-way Analysis of Variance (ANOVA), and LSD post-hoc tests were used for statistical procedures. The level of statistical significance was accepted as $p < 0.05$.

## Results

**Table 1.** Some anthropometric characteristics and sports ages by gender

| | Sex | n | Mean | SD | t |
|---|---|---|---|---|---|
| Age (Years) | Male | 189 | 21.78 | 5.50 | 0.21 |
| | Female | 167 | 21.27 | 5.32 | |
| Height (cm) | Male | 189 | 176.13 | 4.43 | 22.70** |
| | Female | 167 | 163.34 | 4.62 | |
| Body weight (kg) | Male | 189 | 74.91 | 5.14 | 21.10** |
| | Female | 167 | 57.56 | 5.91 | |
| Sports Age (Years) | Male | 189 | 9.12 | 4.43 | 2.87* |
| | Female | 167 | 7.92 | 3.85 | |

*p <0.05, **p < 0.001. SD: Standard Deviation. No statistically significant difference was detected between the ages of athletes studying at the university according to gender (p> 0.05).

**Table 2.** Comparison of University Students' imagination scores according to gender

| | Sex | n | Mean | SD | t |
|---|---|---|---|---|---|
| Cognitive Imagery | Male | 189 | 48.31 | 5.93 | 3.67** |
| | Female | 167 | 45.04 | 6.71 | |
| Motivational Specific imagery | Male | 189 | 27.33 | 5.89 | 3.12* |
| | Female | 167 | 25.42 | 4.54 | |
| Motivational General arousal | Male | 189 | 19.44 | 4.97 | 1.51 |
| | Female | 167 | 18.62 | 4.64 | |
| Motivational General Mastery | Male | 189 | 16.64 | 4.10 | 1.013 |
| | Female | 167 | 17.31 | 4.16 | |
| Total scale | Male | 189 | 111.67 | 15.17 | 3.02* |
| | Female | 167 | 106.39 | 14.51 | |

*p <0.05, **p < 0.001. SD: Standard Deviation. A statistically significant difference was found in the Cognitive Imagery, Motivational Specific Imagery sub-dimensions, and Total Scale scores of university students according to gender (p <0.05 and p <0.001).

**Table 3.** Comparison of visualization scores of university students according to their sports branch

| | Branch Of Sports | N | Mean | SD | t |
|---|---|---|---|---|---|
| Cognitive Imagery | Team Sports | 187 | 46.00 | 6.50 | 17.32** |
| | Individual Sports | 169 | 51.00 | 6.09 | |
| | Total | 356 | 46.83 | 6.62 | |
| Motivational Specific imagery | Team Sports | 187 | 26.02 | 5.14 | 12.05** |
| | Individual Sports | 169 | 28.70 | 5.73 | |
| | Total | 356 | 26.46 | 5.31 | |
| Motivational General arousal | Team Sports | 187 | 17.99 | 5.17 | 5.03* |
| | Individual Sports | 169 | 20.25 | 5.92 | |
| | Total | 356 | 19.04 | 4.50 | |
| Motivational General Mastery | Team Sports | 187 | 16.36 | 3.25 | 4.72* |
| | Individual Sports | 169 | 18.16 | 2.66 | |
| | Total | 356 | 16.93 | 3.17 | |
| Total Score | Team Sports | 187 | 107.82 | 15.91 | 12.27** |
| | Individual Sports | 169 | 116.67 | 15.69 | |
| | Total | 356 | 109.27 | 16.28 | |

*p < 0.05, **p < 0.001. SD: Standard Deviation. The difference between the visualization scores of university students according to their sports branch (team sports and individual sports) is statistically significant (p<0.05 and p<0.001).

**Table 4.** Comparison of imagination scores of university students according to their faculty status

| | Faculty type | N | Mean | SD | t |
|---|---|---|---|---|---|
| Cognitive Imagery | Faculties that do not Sports Education | 161 | 44.98 | 6.10 | 17.02** |
| | Sports Science Faculty | 195 | 52.02 | 6.39 | |
| | Total | 356 | 46.83 | 6.30 | |
| Motivational Specific imagery | Faculties that do not Sports Education | 161 | 26.02 | 5.41 | 12.03** |
| | Sports Science Faculty | 195 | 29.21 | 5.44 | |
| | Total | 356 | 26.46 | 5.30 | |
| Motivational General arousal | Faculties that do not Sports Education | 161 | 17.89 | 5.17 | 5.67* |
| | Sports Science Faculty | 195 | 20.35 | 5.34 | |
| | Total | 356 | 19.04 | 4.90 | |
| Motivational General Mastery | Faculties that do not Sports Education | 161 | 16.32 | 4.32 | 4.73* |
| | Sports Science Faculty | 195 | 18.20 | 3.33 | |
| | Total | 356 | 16.93 | 4.102 | |
| Total Score | Faculties that do not Sports Education | 161 | 107.42 | 15.26 | 12.39** |
| | Sports Science Faculty | 195 | 117.08 | 15.29 | |
| | Total | 356 | 109.27 | 16.34 | |

*p <0.05, **p < 0.001. SD: Standard Deviation. The difference between the imagination scores of university students according to whether they studied outside the Faculty of Sports or studied at the Faculty of Sports was found to be statistically significant (p <0.05 and p <0.001).

**Table 5.** Comparison of students' imagination scores as National and Amateur competitors

| | Competitor status | N | Mean | SD | t |
|---|---|---|---|---|---|
| Cognitive Imagery | amateur competitor | 191 | 44.02 | 6.50 | 16.18** |
| | National athlete | 105 | 52.98 | 6.29 | |
| | Total | 356 | 46.83 | 6.30 | |
| Motivational Specific imagery | amateur competitor | 191 | 26.21 | 5.11 | 12.07** |
| | National athlete | 105 | 29.02 | 5.74 | |
| | Total | 356 | 26.46 | 5.20 | |
| Motivational General arousal | amateur competitor | 191 | 17.35 | 5.17 | 5.92* |
| | National athlete | 105 | 20.89 | 5.94 | |
| | Total | 356 | 19.04 | 4.30 | |
| Motivational General Mastery | amateur competitor | 191 | 16. 20 | 4.22 | 4.73* |
| | National athlete | 105 | 18. 32 | 3.63 | |
| | Total | 356 | 16.93 | 4.12 | |
| Total Score | amateur competitor | 191 | 107. 08 | 15.36 | 12.24** |
| | National athlete | 105 | 117. 42 | 15.24 | |
| | Total | 356 | 109.27 | 16.31 | |

*p <0.05, **p < 0.001. SD: Standard Deviation. The difference between the visualization scores of students according to their competition status (Amateur vs. National) was found to be statistically significant (p <0.05 and p <0.001).

**Table 6.** Comparison of University Students' imagination scores according to their income level

| | Income status | n | Mean | SD | F/LSD |
|---|---|---|---|---|---|
| Cognitive Imagery | Low (1) | 118 | 45.97 | 7.72 | 1.01 |
| | Medium (2) | 127 | 47.29 | 6.95 | |
| | High (3) | 79 | 47.80 | 7.81 | |
| | Very high (4) | 32 | 47.83 | 7.23 | |
| | Total | 356 | 46.83 | 7.60 | |
| Motivational Special imagery | Low (1) | 118 | 26.50 | 5.51 | 6.79** 3.4>1.2 |
| | Medium (2) | 127 | 24.59 | 5.18 | |
| | High (3) | 79 | 27.76 | 4.66 | |
| | Very high (4) | 32 | 27.86 | 5.60 | |
| | Total | 356 | 26.46 | 5.30 | |
| Motivational General arousal | Low (1) | 118 | 19.87 | 3.71 | 14.59** 2<1.3.4 |
| | Medium (2) | 127 | 16.48 | 4.69 | |
| | High (3) | 79 | 19.64 | 4.20 | |
| | Very high (4) | 32 | 19.66 | 4.27 | |
| | Total | 356 | 19.04 | 4.30 | |
| Motivational General Mastery | Low (1) | 118 | 16.30 | 2.99 | 5.72* 1<2.3.4 |
| | Medium (2) | 127 | 17.51 | 4.04 | |
| | High (3) | 79 | 17.50 | 2.37 | |
| | Very high (4) | 32 | 17.58 | 3.18 | |
| | Total | 356 | 45.97 | 7.72 | |
| Total Score | Low (1) | 118 | 108.64 | 15.06 | 3.51* 3.4>1.2 |
| | Medium (2) | 127 | 105.88 | 15.04 | |
| | High (3) | 79 | 112.70 | 16.20 | |
| | Very high (4) | 32 | 112.73 | 15.79 | |
| | Total | 356 | 109.07 | 15.12 | |

*p <0.05, **p < 0.001. SD: Standard Deviation. (1) Low, (2) Medium, (3) High, (4) Very High Income. The difference between the imagination scores of university students according to low, medium, high, and very high-income status was found to be statistically significant (p <0.05 and p < 0.001).

**Table 7.** Comparison of University Students' imagination scores according to sports age variable

| | Sports age | N | Mean | SD | F/LSD |
|---|---|---|---|---|---|
| Cognitive Imagery | 1-4 years (1) | 145 | 44.95 | 2.78 | 5,32* 1<2,3 |
| | 5-12 years (2) | 130 | 47.45 | 2.76 | |
| | 13 and up (3) | 81 | 48.65 | 2.75 | |
| Motivational Special imagery | 1-4 years (1) | 145 | 25.48 | 2.15 | 5,74* 1,2<3 |
| | 5-12 years (2) | 130 | 25.61 | 2.13 | |
| | 13 and up (3) | 81 | 27.76 | 2.88 | |
| Motivational General arousal | 1-4 years (1) | 145 | 16.58 | 2.85 | 6,91* 1<2,3 |
| | 5-12 years (2) | 130 | 19.54 | 2.77 | |
| | 13 and up (3) | 81 | 19.87 | 2.69 | |
| Motivational General Mastery | 1-4 years (1) | 145 | 15.17 | 2.88 | 12,78** 1<2,3 2<3 |
| | 5-12 years (2) | 130 | 17.06 | 2.87 | |
| | 13 and up (3) | 81 | 19.08 | 2.76 | |

*p <0.05, **p < 0.001. SD: Standard Deviation. (1) 1-4 years, (2) 5-12 years, (3) 13 years and up. A statistically significant difference was detected between the imagination scores of university students according to the sports age variable (p <0.05 and p <0.001).

## Discussion

In this study, the difference in average age between university students by gender was found to be insignificant ($p > 0.05$). In contrast, significant differences were observed in height, body weight, and sports background ($p < 0.05$ and $p < 0.001$).

The motivational general mastery subscale covers higher-level motivational skills for athletes. It is stated that athletes who use the motivational general mastery subscale more have more mastery-related skills. Athletes with high motivational general mastery scores have more self-confidence (Kızıldağ, 2012). When imagery is used together with physical exercise, it is effective for peak performance (Hal, 1998). Weinberg et al. stated that gender and sport are two important factors in the use and effectiveness of imagery (Weinberg et al.). Ağaoğlu et al. found a significant difference in the total score of the "motivation-specific" dimension and in image scores by gender. However, they did not find a significant difference in the other sub-dimensions (Ağaoğlu et al., 2020). In Nardemir and Yancı's study, no statistically significant differences were found between participants' gender and imagination sub-dimensions (Nardemir & Yancı, 2021). In Erdem's study, no statistically significant difference was found in the imagination sub-dimensions by gender (Erdem, 2020). In Doğan's study, which compared the visualisation styles of male and female team athletes, no difference between genders was detected. [8]. In their study, Kaan et al. found that although there was a significant difference in mastery when comparing imagery scores by gender, differences in other subscales and the total scale were insignificant (Kaan et al., 2023). In this study, when comparing imagery scores by gender, it was determined that there was a statistically significant difference between the cognitive and motivational subscale scores and the total scale scores ($p<0.05$ and $p<0.001$). The difference between the motivational arousal and mastery subscales was not significant ($p>0.05$). It was observed that male students' visualisation scores were higher than those of female students. Apart from some gender-specific differences, this situation can also be attributed to the fact that men are older in sports and are more competitive. According to this study, male athletes use cognitive imagery better than female athletes.

Cognitive imagery is used to practice specific skills accurately (Paivio, 1985). One study found that young gymnasts who used Cognitive Imagery increased their memory span regarding their gymnastics performance and thus executed their performances more accurately (Ille & Cadopi, 1999). Weinberg et al. stated that individual and team athletes use different types of imagery (Weinberg, 2003). In Erdem's study, no statistically significant difference was found in any sub-dimension of imagery across sport branches (Erdem, 2020). According to some studies, imagery is higher in branches described as team sports (Munroe-Chandler, 2007; Carron & Chelladurai, 1981; Moritz et al., 1996; White, 1998). In this study, the difference in visualisation scores between athletes competing in team and individual sports is statistically significant ($p<0.05$ and $p<0.001$). Athletes who play individual sports have better imagination than those who play team sports. Accordingly, we can say that those interested in individual sports attach more importance to motivational dimensions. This may be due to various factors, such as competition levels, ages, and the individual and team goals of the athletes participating in the study.

Emotions such as seeing athletes win and being congratulated for their good performance, or the pride of winning, increase motivation (Paivio, 1985). It has been observed that students with high physical activity levels exhibit better attention performance (İmamoğlu et al., 2018; Aslan et al., 2020). Martin and Hall also determined that golfers who had just started using this type of imagery were better at adhering to training programs than the other group that did not use imagery (Martin & Hall, 1995).

The "Motivational General Arousal" subscale assesses athletes' arousal levels. Athletes who use this type of imagery try to keep their arousal levels under control. In this context, a person can learn ways to cope emotionally.

Additionally, this type of imagery is used to control the level of arousal and anxiety while preparing for a competition (White & Hardy, 1998). Motivational General arousal imagery helps the athlete to be physically ready for a competition. He becomes able to control his emotions through visualisation and can turn seemingly negative emotions into positive ones (Kızıldağ & Tiryaki, 2012). Ramezani, in his study of amateur and professional volleyball players, observed that athletes' self-confidence and individual movement levels increased with visualisation during training and found that efficiency increased noticeably in both groups (Ramezani & Hoseyni, 2009). In this study, the difference in students' imagination scores between amateur and national athletes was found to be statistically significant ($p<0.05$ and $p<0.001$). National athletes have better imagination scores. Athletes may be advised to compete in competitions organised by national and international sports organisations to increase their visualisation scores.

In Nardemir and Yancı's study, no statistically significant difference was found between the school where participants and students were educated and the imagination power sub-dimensions (Nardemir & Yancı, 2021). Studies indicate that receiving sports training positively affects optimal performance and mood, and increases athletes' maturity levels (Yamaner et al., 2018, 2020). In this study, the difference in imagination scores between university students studying at a sports faculty and those studying at a non-sports faculty is statistically significant ($p<0.05$ and $p<0.001$). The better visualisation scores of student athletes studying at the faculty of sports may also be due to the sports training they receive.

In this study, when comparing visualisation scores by income level (low, medium, high, and very high), there is a statistically significant difference in the subscales, except the cognitive dimension and the total scale score ($p<0.05$ and $p<0.001$, respectively).

In some studies, the imagery scores of those with more sports experience were found to be higher (Li-Wei et al., 1992; Yamak et al., 2018; Munroe-Chandler, 2007). When imagery scores are examined by age, some studies do not find a statistically significant difference in imagery (Nardemir & Yancı, 2021; Seleciler, 2019). In their studies on female athletes, Bayrak and Nacar did not find any semantic differences between the sub-dimensions of the sports imagery inventory and the years of participation variable (Bayrak & Nacar, 2020). On the other hand, in Tekin's study, when athletes were compared by age, a significant difference was found in the motivation-specific imagery sub-dimension. In contrast, the average scores for the cognitive imagery, motivational general arousal, and motivational general mastery sub-dimensions did not differ significantly by age (Tekin, 2018). In his study, Erdem determined a statistically significant difference in the cognitive imagery and motivational general arousal dimensions according to the sport age variable (Erdem, 2020). Kaan et al. found that imagination levels increase with age (Kaan et al., 2023). In the Doğan study, they reported that high-performing athletes used visualisation styles more often (Doğan, 2019). In this study, it was determined that there was a statistically significant difference between the visualisation scores according to the sport age variable ($p<0.05$ and $p<0.001$). Cognitive imagery, motivational specific imagery, motivational general arousal, and motivational general mastery scores of students whose sports age is between 1-4 years are lower than those of students whose sports age is 5-12 years and over 13 years. It can be said that as the sports age increases, the visualisation scores increase.

### Limitations of the Study

This study has some limitations that should be considered. First, the research is limited to university students in a specific region, which may restrict the generalizability of the findings to all athlete populations. Second, the cross-sectional design provides a snapshot of imagery skills but does not allow for causal inferences regarding how imagery develops over time. Finally, the study relied on self-reported data, which can be subject to social desirability bias.

### Future Research Directions

Based on the findings, future research could employ longitudinal designs to track the development of imagery skills from amateur to professional levels. Comparative studies involving athletes from different cultures or countries would also be beneficial to understand cross-cultural variations. Additionally, experimental studies examining the effect of specific imagery training programs on the performance of individual versus team athletes would contribute significantly to the field.

## Conclusion

The results of this study demonstrate that imagery levels among university athletes are significantly influenced by gender, sport branch (individual vs team), academic background, competitive level (national vs amateur), income status, and years of sports experience. Specifically, male athletes, individual sports athletes, national-level competitors, and those with formal sports education exhibit superior visualisation skills. To enhance athletes' imagination scores and psychological readiness, it is recommended that they begin participation in sports at an early age, engage in diverse national and international competitions, and receive structured sports training that includes mental rehearsal strategies.

## Kısaltmalar / Abbreviations

| | |
|---|---|
| SD | Standart sapma (Standard deviation) |
| X | Ortalama (Mean) |
| SPSS | Sosyal bilimler için istatistik paketi (Statistical package for the social sciences) |
| p value | Anlamlılık değeri (Significant value) |
| t value | T değeri (T value) |
| N | Katılımcı sayısı (Number of participant) |
| Min | Minimum (Minimum) |
| Max | Maksimum (Maximum) |
| BMI | Vüvut kütle indeksi (Body mass index) |
| Kg | Kilogram (Kilogram) |

## Beyanlar / Declarations

### Etik Onay ve Katılım Onayı / Ethics approval and consent to participate

Bu çalışmanın hazırlanma ve yazım sürecinde "Yükseköğretim Kurumları Bilimsel Araştırma ve Yayın Etiği Yönergesi" kapsamında bilimsel, etik ve alıntı kurallarına uyulmuş olup; toplanan veriler üzerinde herhangi bir tahrifat yapılmamış ve bu çalışma herhangi başka bir akademik yayın ortamına değerlendirme için gönderilmemiştir. Makale ile ilgili doğabilecek her türlü ihlallerde sorumluluk yazara aittir. Üniversite Eğitimi Almış Sporcuların İmgeleme Düzeylerinin Bazı Değişkenlere Göre İncelenmesi" başlıklı çalışma için etik kurul onayı, Ondokuz Mayıs University Social and Human Sciences Research Ethics Committee'nden alınmıştır (Tarih: 29.03.2023, Karar No: 2023-804).

During the preparation and writing of this study, scientific, ethical and citation rules were followed in accordance with the 'Higher Education Institutions Scientific Research and Publication Ethics Guidelines'; no alterations were made to the collected data, and this study has not been submitted for evaluation to any other academic publication medium. The author is solely responsible for any violations that may arise in connection with this article. The study was conducted in accordance with the Declaration of Helsinki. Ethical approval for

the study, titled " Investigation of the Imagination Status of University Educated Athletes According to Some Parameters" was obtained from the Ondokuz Mayıs University Social and Human Sciences Research Ethics Committee (Date: 29.03.2023, Decision Number: 2023-804).

## Veri Ve Materyal Erişilebilirliği / Availability of data and material

Bu çalışmanın bulgularını destekleyen veriler, makul talepler üzerine sorumlu yazardan temin edilebilir. Veri seti yalnızca akademik amaçlar için erişilebilir olacak ve verilerin herhangi bir kullanımı, orijinal çalışmayı referans gösterecek ve katılımcıların gizliliğini koruyacaktır.

The data that support the findings of this study are available from the corresponding author upon reasonable request. The dataset will be accessible only for academic purposes, and any use of the data will recognize the original study and maintain the confdentiality of the participants.

## Çıkar Çatışması / Competing interests

Yazarlar, bu makalede sunulan çalışmayı etkileyebilecek herhangi bir çıkar çatışması veya kişisel ilişkiye sahip olmadıklarını beyan etmektedirler.

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Yazar Katkıları / Authors' Contribution Statement

Çalışmanın Çalışmanın tasarımı ve planlanması: S.Gön., O.İ.; Veri toplama, analizi ve yorumlanması: S.Gön., O.İ.; Makalenin yazımı: S.Gön., O.İ.; Veri düzenleme, yöntem belirleme, yazım – özgün taslak, yazım – gözden geçirme ve düzenleme: S.Gön., O.İ. Tüm yazarlar (S.Gön., O.İ., K.Y., S.Güz., Z.Ç.) makalenin önemli noktalarını eleştirel olarak gözden geçirmiş ve makalenin son halini onaylamıştır.

Design and planning of the study: S.Gön., O.İ.; Data collection, analysis and interpretation: S.Gön., O.İ.; Manuscript preparation: S.Gön., O.İ.; Data organization, methodology development, writing – original draft, writing – review and editing: S.Gön., O.İ. All authors (S.Gön., O.İ., K.Y., S.Güz., Z.Ç.) critically reviewed the manuscript and approved the final version.

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## Publishers' Note