



## SPORMETRE

The Journal of Physical Education and Sport Sciences  
Beden Eğitimi ve Spor Bilimleri Dergisi



DOI: [10.33689/spormetre.1822204](https://doi.org/10.33689/spormetre.1822204)  
Research Article

Geliş Tarihi (Received): 12.11.2025 Kabul Tarihi (Accepted): 16.03.2026 Online Yayın Tarihi (Published): 28.03.2026

### THE RELATIONSHIP BETWEEN THE DARK TRIAD AND THE LIGHT TRIAD IN INDOOR EXERCISE: A PSYCHOLOGICAL PERSPECTIVE

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**Abstract:** This study aimed to examine the associations between individuals' total daily physical activity levels and their dark triad and light triad traits among indoor exercise. A total of 542 people participated in the study: 254 (46.86%) female and 288 (53.14%) male. Participants were aged between 18 and 56 years (Mage =26.47). Data were collected using the Personal Information Form, the Physical Activity Scale-2 (PAS-2), the Dirty Dozen Scale, and the Light Triad Scale. Pearson correlation analysis and the T-test were used in the analyses. The findings of this study show a negative relationship between the total daily physical activity level and the humanism sub-dimension, as well as the total score of the light triad personality traits. A positive relationship was found between the psychopathy sub-dimension of the dark triad personality traits and daily physical activity level. The mean scores of females in the light triad were significantly higher than those of males. The mean daily total physical activity scores for males were significantly higher than those for females. These results provide an important contribution to understanding how physical activity may be related to individuals' personality traits and how exercise levels overlap with individual characteristics. Additionally, the association between higher physical activity levels and lower humanistic and higher psychopathic tendencies suggests that exercise should be considered in relation to physical health as well as psychological and personality development.

**Keywords:** Dark triad, indoor exercise, light triad, personality

### KAPALI ALAN EGZERSİZİNDE KARANLIK ÜÇLÜ VE AYDINLIK ÜÇLÜ ARASINDAKİ İLİŞKİ: PSİKOLOJİK BİR BAKIŞ AÇISI

**Öz:** Bu çalışmanın amacı, kapalı alanlarda yapılan egzersizlerde bireylerin günlük toplam fiziksel aktivite düzeyleri ile karanlık üçlü ve aydınlık üçlü kişilik özellikleri arasındaki ilişkileri incelemektir. Çalışmaya, 254'ü (%46,86) kadın ve 288'i (%53,14) erkek olmak üzere toplam 542 kişi katılmıştır. Katılımcıların yaşları 18 ile 56 arasında değişmekte olup, yaş ortalaması 26.47'dir. Veriler, Kişisel Bilgi Formu, Fiziksel Aktivite Ölçeği-2, Karanlık Üçlü Ölçeği ve Aydınlık Üçlü Ölçeği kullanılarak toplanmıştır. Analizlerde Pearson korelasyon analizi ve T-testi uygulanmıştır. Bulgular, bireylerin günlük toplam fiziksel aktivite düzeyleri ile aydınlık üçlü kişilik özelliklerinin insancılık alt boyutu ve toplam puanı arasında negatif bir ilişki olduğunu göstermektedir. Karanlık üçlü kişilik özelliklerinin psikopati alt boyutu ile günlük fiziksel aktivite düzeyi arasında ise pozitif bir ilişki saptanmıştır. Kadınların aydınlık üçlü kişilik özelliklerinden aldıkları ortalama puanlar, erkeklerden anlamlı düzeyde yüksek bulunmuştur. Erkeklerin ortalama günlük toplam fiziksel aktivite puanları, kadınların ortalama günlük toplam fiziksel aktivite puanlarından önemli ölçüde yüksek bulunmuştur. Bu sonuçlar, fiziksel aktivitenin bireylerin kişilik özellikleriyle ilişkili olabileceğini ve egzersiz düzeylerinin bireysel karakteristiklerle nasıl örtüştüğünü anlamaya yönelik önemli bir katkı sağlamaktadır. Ayrıca, yüksek fiziksel aktivite düzeylerinin daha düşük insancılık ve daha yüksek psikopatik eğilimlerle ilişkili bulunması, egzersizin fiziksel sağlığın yanı sıra psikolojik süreçler ve kişilik gelişimi açısından da değerlendirilmesi gerektiğini göstermektedir.

**Anahtar Kelimeler:** Karanlık üçlü, kapalı alan egzersizi, aydınlık üçlü, kişilik



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## INTRODUCTION

Research on personality has a long history. In exercise psychology, personality traits are considered important factors influencing individuals' motivation, participation, and adherence to physical activity (Rhodes & Smith, 2006; Zhang et al., 2024). In this context, dark triad and light triad traits may shape exercise behaviors, including sport motivation, exercise duration, and participation patterns. Recent studies suggest that exercise environments (indoor vs. outdoor) may be associated with differences in motivational and behavioral processes related to physical activity participation (Huelskamp et al., 2025; Noseworthy et al., 2023). Therefore, examining the relationship between dark and light personality traits and indoor physical activity levels may contribute to a better understanding of psychological and behavioral factors related to physical activity participation.

In their study, Paulhus and Williams (2002) conceptualized narcissism, Machiavellianism, and psychopathy as three personality traits representing the dark side of personality, commonly referred to as the dark triad. Narcissism is characterized by grandiosity, dominance, and a sense of superiority (Raskin & Hall, 1979). Machiavellianism refers to a manipulative interpersonal style focused on strategic behavior and personal gain (McDaniel, 2022). Psychopathy is characterized by impulsivity, low empathy, and callous interpersonal tendencies (Hare & Neumann, 2008). Previous research suggests that dark triad traits may also be associated with behavioral tendencies related to physical activity, with Machiavellianism, narcissism, and psychopathy showing positive associations with higher physical activity levels (Sabouri et al., 2016).

Research examining broader personality–exercise relationships has also shown that individuals who engage in regular exercise tend to report lower levels of neuroticism, anxiety, and depression, and higher levels of extraversion and sensation seeking compared with non-exercisers (De Moor et al., 2006). Similarly, adaptive perfectionism has been positively associated with motivational aspects of physical activity, such as self-efficacy and persistence, whereas maladaptive perfectionism is related to avoidance-oriented motivation and fear of failure (Longbottom et al., 2010). Taken together, these findings suggest that personality traits play an important role in shaping physical activity behaviors (Wilson et al., 2015).

Kaufman and colleagues (2019) defined faith in humanity (believing in the basic goodness of people), humanism (valuing the dignity and value of each individual) and Kantianism (seeing people as their own goals, seeing them only as a means to achieve a goal), which express positive personality traits against the dark triad, as the light side of personality. In a study examining the relationships among the dark triad, the light triad, and psychological well-being, it was found that psychological well-being was positively associated with the light triad and with self-acceptance, a subdimension of psychological well-being, and that narcissism and well-being were positively associated. Psychopathy and Machiavellianism were found to have a negative relationship with well-being, especially with the subscale of positive relationships with others (Stavraki et al., 2023). These findings suggest that both dark and light personality traits may contribute to understanding psychological functioning and well-being.

Physical activity can include any bodily movement that results in energy expenditure, such as housework, gardening, walking, hiking and various other activities (Brown et al., 2002). Although the concepts of physical activity and exercise are often used interchangeably, they represent related but distinct constructs. Physical activity refers to any bodily movement

produced by skeletal muscles, whereas exercise refers to planned and structured activities aimed at improving physical fitness (Caspersen et al., 1985). Exercise, by contrast, typically refers to planned, structured activities aimed at improving physical fitness, including cardiovascular endurance, muscular strength, and flexibility (Greco et al., 2023).

Traditionally, outdoor physical activity has been recommended worldwide for its accessibility and potential to improve cardiovascular and mental health. However, increasing urbanization, climate conditions, environmental constraints, and the recent global pandemic have contributed to growing interest in indoor exercise settings as an alternative means of achieving recommended levels of physical activity (Peddie et al., 2024). The interaction between indoor exercise and physical activity is also multifaceted; various forms of indoor exercise, including resistance training, bodybuilding, weight-control programs, rehabilitative exercises (e.g., Pilates), yoga, and cardiovascular exercise, have gained increasing popularity in recent years (Lahart et al., 2019; Noseworthy et al., 2023; Vergeer et al., 2017). Although some studies suggest that indoor exercise may be similarly effective to outdoor physical activity in improving health outcomes, the psychological and social experiences associated with these environments may differ (Lahart et al., 2019). Therefore, understanding how indoor exercise contexts relate to motivation, participation, and long-term adherence to physical activity is important for developing effective health promotion strategies.

Recent research has also suggested that physical exercise may moderate the indirect relationship between dark triad traits and aggressive behavior through self-control, with the association between dark triad traits and aggression decreasing as physical exercise increases (Chen et al., 2024). It is thought that the relationship between dark triad and light triad personality traits and physical activity will play an important role in understanding individuals' psychological and physiological health. In this context, examining the relationship between physical activity levels and the personality traits of individuals who engage in indoor exercise can provide important insights into personal development and general well-being. This research aimed to explore how daily physical activity levels relate to dark- and light-triad traits during indoor exercise. The gender differences in daily physical activity levels, dark and light triads were also examined in the study.

## **METHOD**

### **Ethics of Research and Research Model**

After the data collection tools were prepared, the ethical permission required for the application of the scales was obtained from the Social and Human Sciences Publication Ethics Committee of Antalya Bilim University (Document date: 27.01.2025, Number: 5). After having written consents of participants, data were collected face-to-face from individuals who performed exercise indoors (fitness centres). In this study, a correlational survey model, one of the general survey model types, was used to investigate the personality traits of the dark triad (Machiavellianism, narcissism, psychopathy) and the light triad (belief in humanity, humanism, Kantianism) among individuals who exercise indoors. The correlational survey model is a methodological approach aimed at determining how multiple variables relate to one another and, if there is a relationship, the strength of that relationship (Karasar, 2008).

### **Participants**

The study population comprises individuals exercising at fitness centers in Antalya province. Accordingly, fitness centers easily accessible in Antalya province were selected. The study sample was selected using random sampling. In this study, the sample size and margin of error

were determined at the  $\alpha=0.05$  significance level. The study included 542 participants, of whom 254 (46.86%) were female, and 288 (53.14%) were male. The participants' ages ranged from 18 to 56, with an average of 26.47.

### Data Collection Tools

**Personal Information Form:** The researchers' prepared form was used to collect demographic information from participants in the study. The personal information form included questions about participants' gender and age.

**The Physical Activity Scale-2 (PAS-2):** The adaptation study of the Physical Activity Scale-2, developed by Pedersen et al. (2018) for Turkish culture, was conducted by Gür (2021). Cronbach's alpha for the scale was 0.92. The scale consists of seven items and assesses the time individuals spend sitting, walking, and engaging in moderate- and high-intensity physical activities. The time and day values obtained from the scale are multiplied by the MET (Metabolic Equivalent of Task) value determined for each item and added to the total physical activity time. The scale has three subdimension classifications (Low activity <600 MET-min/week, Adequate activity 600-3000 MET-min/week, very good activity >3000 MET-min/week). The correlation coefficient  $r = 0.814$  was obtained using the test-retest method to assess the reliability of the FAS-2 ( $p < 0.01$ ).

**Dirty Dozen Scale:** The original scale was developed by Jonason & Webster (2010), and its adaptation to Turkish culture was conducted by Satici et al. (2018). Confirmatory factor analysis supported the retention of the original three-factor structure in the Turkish culture adaptation of the scale [ $\chi^2(51,430) = 145.16$ ,  $p < 0.001$ ; CFI=0.96; GFI=0.95; IFI=0.96; SRMR=0.047; RMSEA=0.066, 90% CI (0.053-0.078)]. High scores on the scale indicate a greater tendency to exhibit the relevant personality trait. The Cronbach's alpha coefficients were 0.79 for Machiavellianism, 0.71 for psychopathy, and 0.87 for narcissism. The test-retest reliability coefficients, assessed over a four-week interval, were 0.80 for Machiavellianism, 0.78 for psychopathy, and 0.83 for narcissism. In this study, Cronbach's alpha coefficient was 0.85, while Cronbach's alpha coefficients for the subscales were 0.81 for Machiavellianism, 0.66 for psychopathy, and 0.86 for narcissism.

**Light Triad Scale:** The adaptation study of the Light Triad Scale, developed by Kaufman and colleagues (2019), to Turkish culture was conducted by Pektaş and Durmuş (2022). The scale consists of 12 items and three sub-dimensions: belief in humanity, humanism, and Kantianism. The total Cronbach alpha value of the scale was 0.83. The internal consistency coefficients of the scale were 0.71 for belief in humanity, 0.71 for humanism, and 0.86 for Kantianism. The RMSEA fit index was acceptable at 0.071. The scale items are evaluated on a 5-point Likert-type scale. High scores on the scale indicate high levels of the relevant feature. The Cronbach's alpha coefficient, obtained in reliability studies, was found to be 0.65 for belief in humanity, 0.80 for humanism, 0.48 for Kantianism and 0.74 for the total Cronbach's alpha value of the scale. Cronbach's alpha internal consistency coefficient for this study was 0.75. The subscale coefficients were 0.66 for belief in humanity, 0.80 for humanism, and 0.48 for Kantianism.

### Data Analysis

Using the Kolmogorov-Smirnov analysis, which is one of the normality tests, it was found that the mean scores had a normal distribution. A Pearson correlation analysis was conducted to examine the relationships between physical activity and dark- and light-triad traits. The t-test was used in the analyses.

To evaluate the practical significance of the statistically significant findings, effect sizes were calculated. For independent samples t-tests, Cohen's d was used, with values of 0.20, 0.50, and 0.80 interpreted as small, medium, and large effects, respectively (Cohen, 1988). For correlation analyses, the absolute value of Pearson's r was used as the effect size, with 0.10, 0.30, and 0.50 representing small, medium, and large effects, respectively (Cohen, 1992). In addition, a post hoc power analysis was conducted using G\*Power to determine the statistical power ( $1-\beta$ ) of the study based on the obtained sample size ( $N = 542$ ). The results of the t-test conducted according to gender indicated that women had significantly higher mean scores on Light Triad personality traits ( $M = 44.96$ ) than men ( $M = 41.09$ ),  $t = 7.10$ ,  $p < 0.01$ . The corresponding effect size indicated that gender had a medium effect on the Light Triad (Cohen's  $d = 0.60$ ). In contrast, men's mean daily total physical activity scores ( $M = 4002.74$ ) were significantly higher than those of women ( $M = 3746.09$ ),  $t = -2.54$ ,  $p < 0.05$ , with the effect size indicating a small magnitude of difference (Cohen's  $d = 0.22$ ). When the relationships between daily total physical activity and personality traits were examined, negative associations were found between physical activity and the Light Triad total score ( $r = -0.10$ ,  $p < 0.05$ ) as well as the Humanism subscale ( $r = -0.14$ ,  $p < 0.01$ ), whereas a positive association was observed with the Psychopathy subscale of the Dark Triad ( $r = 0.09$ ,  $p < 0.05$ ). Although statistically significant, these correlations reflected small effect sizes according to conventional criteria.

## RESULTS

A correlation analysis was conducted to assess the association between total daily physical activity levels and dark- and light-triad traits during indoor exercise. The descriptive statistics and inter-variable correlation coefficients are presented in Table 1.

**Table 1.** Mean and standard deviation of total daily physical activity value of individuals exercising indoors, and mean and standard deviation and correlations between variables

Variables	M	SD	1	2	3	4	5	6	7	8	9
1. Total Daily Physical Activity Value MET/min	3882.47	1188.23	1.00	-.06	-.14**	-.01	.02	.09*	.03	-.10*	.05
2. Belief in humanity	12.52	3.24		1.00	.27**	.16**	-.12**	-.14**	-.09*	.68**	-.15**
3. Humanism	15.69	3.18			1.00	.45**	-.19**	-.18**	-.03	.80**	-.16**
4. Kantianism	14.70	2.80				1.00	-.17**	-.15**	-.04	.71**	-.14**
5. Machiavellianism	12.34	7.20					1.00	.61**	.36**	-.22**	.81**
6. Psychopathy	13.71	13.71						1.00	.33**	-.22**	.78**
7. Narcissism	18.46	18.46							1.00	-.08	.77**
8. Light Triad	42.91	6.70								1.00	-.21**
9. Dark Triad	44.50	17.90									1.00

\* $p < 0.05$ , \*\* $p < 0.01$

As seen in Table 1, it was found that there was a negative relationship between the total daily physical activity value of the individuals and the humanism sub-dimension of the light triad scale ( $r = -0.14$ ,  $p = 0.00$ ) and the total score of the light triad ( $r = -0.10$ ,  $p = 0.02$ ). It was found that there was a positive relationship between individuals' total daily physical activity value and psychopathy ( $r = 0.09$ ,  $p = 0.04$ ), a subdimension of the dark triad scale.

The results of the t-test to test whether there are mean differences in the total daily physical activity value, light triad and dark triad levels and their sub-dimensions according to the gender of the individuals are provided in Table 2.

**Table 2.** T-Test results of total daily physical activity value, light triad and dark triad scores by gender

Variables	Gender	N	Mean	SD	t	df	p
Total Daily Physical Activity Value MET/min	Female	254	3746.09	1083.38	-2.54	539.58	0.01*
	Male	288	4002.74	1263.24			
Light Triad	Female	254	44.96	5.56	7.10	533.10	0.00**
	Male	288	41.09	7.08			
Dark Triad	Female	254	44.95	16.73	0.55	539.99	0.58
	Male	288	44.10	18.89			

\*p<0.05, \*\*p<0.01

According to the t-test results for the comparison of total daily physical activity value, light triad and dark triad levels of female and male, it was found that there was a significant difference between light triad levels ( $t=7.10$ ,  $p<0.01$ ) and total daily physical activity values ( $t=-2.54$ ,  $p<0.05$ ) of female and male. There was no statistical difference found between the dark triad levels of female and male ( $t=0.55$ ,  $p>0.05$ ). In other words, the mean scores of female in the light triad were significantly higher than those of men. The mean daily total physical activity scores for male were significantly higher than those for female. The mean scores for the dark triad did not differ significantly by gender.

## DISCUSSIONS

The first finding of the study showed a negative relationship between the total daily physical activity level and the humanism sub-dimension, as well as the total score of the light triad personality traits. The second finding was that there was a positive relationship between the psychopathy sub-dimension of the dark triad personality traits and the daily physical activity level. The third finding showed that females had significantly higher mean light triad scores than males. The fourth result was that the mean daily total physical activity scores of males were significantly higher than those of females.

The first finding of the study can be explained in the context of trait activation theory and self-determination theory, particularly regarding the relationship between the enlightened triad, one of its sub-dimensions, humanism, and physical activity. Trait activation refers to how people display certain personality traits in response to situations that are relevant or stimulating to those traits (Tett & Burnett, 2003). Tett and Burnett (2003: 505) explained that, since expressing one's traits is an essential aspect of human behavior, people tend to gravitate toward situations that offer "*opportunities for expressing his or her particular array of personality traits*". Humanism and light triad traits are more closely related to empathy, self-esteem, positive relationships, and related factors, and are positively associated with these factors (Kaufman et al., 2019). Similarly, the light triad has been associated with various positive functions such as prosocial (March & Marrington, 2021) and helping behaviour (Ruel et al., 2023). However, the context of physical activity in indoor settings may not provide an ideal environment for these characteristics to come to the fore. The Light Triad characteristics have been found to be particularly associated with interpersonal functioning and trust in others (Neumann et al., 2020), which may explain the lower propensity to engage in behaviors at the behavioural level, such as physical activity. Another theory, Self-Determination Theory (SDT), was developed by Deci

& Ryan (1985). SDT adopts an organismic perspective, examining psychological growth, integrity, and well-being through the lens of life sciences (Ryan & Deci, 2017). According to this theory, human nature has an active, integrative, and open-ended potential for development, but this potential is either supported or hindered by the social environment. When psychological needs (competence, relatedness, and autonomy) are satisfied, development, integration, and positive personality orientations emerge. The obstruction of these needs, however, leads to fragmentation of the self, loss of motivation, and negative personality outcomes (Ryan & Deci, 2002). According to SDT, when indoor exercise does not sufficiently meet a person's needs for competence, relatedness, and autonomy, psychological growth and integration are disrupted, leading to alienation, loss of motivation, and less humanistic orientations. Therefore, the decline in the Light Triad personality score and humanism that accompanies the increase in indoor exercise can be explained by the disruption in self-integration resulting from unmet needs, as predicted by SDT.

The second result was that there was a positive relationship between the psychopathy sub-dimension of the dark triad personality traits and the daily physical activity level. Sensation-seeking involves an individual's tendency to seek out new, complex, and intense experiences and a willingness to take risks to obtain them (Zuckerman, 1994). Dark Triad traits increase impulsivity and sensation-seeking in individuals and play an important role in understanding risk-taking and reward-seeking behaviours (Crysel et al., 2013). In this context, it can be said that individuals with psychopathic traits have a high need for stimulation. Therefore, these individuals may be drawn to behaviours that require excitement, speed and energy, such as physical activity. This can increase their daily level of physical activity.

As a third finding, women had significantly higher average light triad scores than men, consistent with the study by Pechorro et al. (2024). This result is that the Light Triad is generally associated with prosocial orientations, people-centered qualities and kindness (Kaufman et al., 2019; Krok & Tkaczyk, 2024). Moreover, Light Triad traits have been found to be positively and significantly related to emotional intelligence (Jankiewicz & Michałek-Kwiecień, 2024). In this context, McDonald and Kanske (2023) reported that women exhibit significantly higher levels of empathy and compassion than men. Similarly, a long-term study found that, even during adolescence, women showed greater empathetic responses than men, and this difference increased with age (Mestre et al., 2009). A review of the literature revealed that gender comparisons showed men scoring significantly higher than women, particularly in the narcissism and psychopathy subdimensions, and on the overall Dark Triad score (Jonason & Webster, 2010). Similarly, Dark Triad traits (psychopathy, Machiavellianism, and narcissism) have been found to be significantly higher in men compared to women in previous studies (Furnham et al., 2013; Lee & Ashton, 2005) and a meta-analytic review (Muris et al., 2017). The higher scores observed among men, particularly in psychopathy and narcissism, may be partly attributable to biological factors, given evidence linking testosterone to antisocial and dominance-related behaviors and showing that this association is moderated by socioeconomic status (Dabbs & Morris, 1990), as well as to social factors, insofar as masculinity norms and gender role expectations have been shown to shape dominance- and aggression-related behavioral tendencies (Weisbuch et al., 1999).

As a fourth finding, men had significantly higher average daily total physical activity scores than women. This finding is consistent with other studies. Previous research has shown that males tend to engage in higher levels of total and leisure-time physical activity, including moderate- and vigorous-intensity activity, compared to females in population-based samples (Azevedo et al., 2007), and to report greater moderate-to-vigorous physical activity as well as

higher total MET scores (Skurvydas et al., 2024). Importantly, however, intervention research suggests that when women receive not only health information but also self-regulation strategies, their physical activity levels can increase substantially compared to information-only conditions, highlighting the modifiability of these sex differences through targeted behavioral interventions (Stadler et al., 2009). Evidence suggests that self-efficacy plays a central role in explaining physical activity behavior, whereas motivation alone is insufficient and exerts its effects on behavior primarily through self-efficacy (Tao et al., 2024). In line with this, previous research has shown that women report significantly lower levels of physical activity-related self-efficacy and perceived controllability compared to men (Úbeda-Colomer et al., 2020). These findings indicate that the sex difference observed in physical activity may be partly explained by modifiable psychosocial factors, especially self-efficacy and perceived control.

It is thought that the effects of outdoor and indoor exercise on personality traits may vary depending on individual preferences and environmental factors. In the literature, outdoor exercisers had lower neuroticism scores and higher scores on extraversion, openness, agreeableness, and conscientiousness than indoor exercisers (Tsartsapakis et al., 2024). In another study, no significant differences in personality profiles were found across exercise types. The same study supports the idea that there are individual differences in motivational dimensions and preferences for engaging in specific physical activity modes (Box et al., 2019). A study found that self-control partially mediates the relationship between the Dark Triad and aggression, and that physical exercise attenuates both direct and indirect effects (Chen et al., 2024). The effects of physical activities performed outdoors and indoors on an individual's personality traits provide an important context for understanding the psychological reflections of environmental factors. Rogerson and colleagues (2020) found that green exercise intervention was effective in increasing well-being in the medium term.

The positive effects of physical exercise on an individual's physical and mental health have been known for many years. However, the role of the exercise environment in these positive effects has recently become the subject of academic discussions. When studies investigating the differences in the physiological and psychological effects of outdoor (in nature) and indoor exercise are examined in the literature, most focus on physiological findings. Some studies found positive effects of outdoor exercise. In a meta-analysis of this topic, the most frequently reported physiological variables in this comparison are mean heart rate during exercise, power output, and time to completion (Peddie et al., 2024). Among these variables, the effects of the exercise environment (outdoor or indoor) on cardiovascular responses are generally discussed in the field of sports sciences. While most studies in the literature on this subject did not find significant differences, some reported that outdoor exercise may have positive effects on systolic blood pressure and heart rate. However, no acute changes in heart rate variability were observed (Natera et al., 2019; Olafsdottir et al., 2018).

A review of the literature indicated that studies examining the relationship between outdoor and indoor exercise and individuals' personality traits are limited. In existing studies, the effects of indoor and outdoor physical activities on individuals' personality traits are not directly observed. Similarly, there is insufficient evidence that such exercises have a significant effect on individuals' physiological parameters. For instance, most studies examining the effects of indoor and outdoor exercise on metabolic responses found no significant difference between the two environments in terms of blood lactate levels (Ceci & Hassmén, 1991; Jeffries et al., 2019); however, McMurray and colleagues (1987) found that outdoor exercise resulted in higher plasma lactate levels compared to indoor exercise. Although overall blood lactate levels are not significantly different, some studies suggest that outdoor exercise may elicit greater

metabolic responses. On the other hand, when the performance findings of studies comparing outdoor and indoor exercises were examined, most studies focused on average speed, power output, and exercise completion time. The average power outputs of outdoor and indoor exercises are not significantly different (Bouillod et al., 2017; Flowers et al., 2018; Jeffries et al., 2019; Mieras et al., 2014).

When examining studies investigating the effects of exercises performed in open and closed spaces on average speed, it is noteworthy that more studies indicate that exercises performed in open spaces have a higher average speed compared to those performed in closed spaces (Calogiuri, 2018; Ceci & Hassmén, 1991; Reich & Queathem, 2020). However, some studies have shown that the exercise environment does not significantly affect average speed (Carvalho et al., 2010; Farias et al., 2018). In other words, although the general trend shows that exercise is performed at a higher speed outdoors, there are also findings that contradict this. Overall, the studies show little difference in personality traits and physical effects between outdoor and indoor studies.

In light of the current research findings and literature review, the effects of outdoor and indoor exercise on individuals' personality traits, physiological responses, and performance were compared. As a result, there is no definitive consensus on the effects of the exercise environment on individuals, but some studies suggest that outdoor exercise may have greater psychological and physical benefits. Given the correlational design, the present findings suggest that, among individuals engaging in indoor exercise, daily physical activity levels are associated with specific Light and Dark Triad personality traits rather than being characterized solely by physical outcomes. From an exercise psychology perspective, this implies that training programs should not focus solely on increasing activity levels but should also promote prosocial traits and adaptive self-regulation skills. In addition, the observed sex differences indicate that gender-sensitive intervention strategies may be warranted to optimize physical activity participation and psychological outcomes.

### **Limitations**

The study is limited to the characteristics measured by the Physical Activity Scale, the Dark Triad Scale, and the Light Triad Scale. In this study, individuals who do not engage in physical activity behavior (sedentary) and individuals who perform outdoor exercise were not included. Therefore, future studies should take this limitation into consideration and include sedentary individuals and individuals who perform open-field exercise, and compare them on personality traits. More comprehensive results can be obtained by investigating the effects of different types of exercise (endurance, strength, flexibility, and balance; outdoor vs. indoor) on personality traits. In future studies, it is recommended to use mixed-methods designs that combine quantitative and qualitative methods to examine the relationship between personality traits and indoor exercise more comprehensively. In this way, it is thought that both subjects can be supported with statistical data, and more comprehensive findings can be obtained by analyzing them in depth. Similarly, in future studies, exercise can be considered an independent variable, and individuals' dark triad (narcissism, psychopathy, Machiavellianism) and light triad (belief in humanity, humanism, Kantianism) traits can be analyzed alongside other variables. Mediating and regulatory mechanisms affecting the relationship between dark triad and light triad traits can be analyzed. In this context, appropriate mediating variables can be identified in line with the literature review, and analyses can be conducted using these variables.

## CONCLUSIONS

In the existing literature, the relationships between Dark Triad personality traits, mental toughness, and physical activity have been examined (Sabouri et al., 2016; Vaughan et al., 2018); moreover, associations between dark triad personality and perfectionism (González-Hernández et al., 2023) as well as exercise addiction (Rathilal & Van Niekerk, 2025) have also been described. In addition, the relationships between the dark and light triads have been investigated in relation to demographic variables (Ermiş et al., 2024). However, studies that jointly examine daily total physical activity levels and both dark- and light-triad personality traits in the context of indoor exercise remain limited. Adopting a correlational approach, this study examines relationships between total physical activity levels and dark/light triad levels among individuals exercising indoors, thereby contributing to the identification of gender-based differences. Furthermore, restricting the exercise setting to indoor environments allows the personality–behavior relationship to be examined within a more specific context.

According to the current study, there was a negative correlation between the total daily physical activity value and the humanism sub-dimension of the light triad scale, as well as the total light triad score. A positive correlation was found between the total daily physical activity value and the psychopathy subdimension of the Dark Triad Scale. In summary, as indoor activity increased, the humanism sub-dimension decreased, while the psychopathy tendency increased.

### Practical Implications

The findings of this study provide important practical implications for practitioners and researchers by revealing the relationships between personality traits and physical activity levels of individuals who exercise indoors. The study shows that daily levels of indoor physical activity are negatively associated with humanism, a Light Triad personality trait. This suggests that individuals with high levels of physical activity may exhibit less humanistic tendencies. In addition, a positive relationship was found between psychopathy, one of the Dark Triad personality traits, and daily physical activity level. This finding suggests that traits such as risk-taking or competitiveness may influence some individuals' orientation towards physical activity. In the study, females had higher scores on the Light Triad personality traits than males, but males had higher total daily physical activity levels than females. These differences can be taken into consideration in designing gender-specific exercise programmes. Based on individuals' personality characteristics, exercise programmes can be developed to increase motivation and ensure sustainability. It may be useful to include individuals who exercise, especially those with high physical activity levels, in psychological support and training programmes to improve empathy and social interaction skills. In addition, the effects of physical activity on personality traits and the changes of these effects over time can be analyzed with long-term follow-up studies.

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