ANATOLIA SPORT RESEARCH

ISSN: 2757-6485

2026 & 7 (2)

# Exploring the Dark Side: Differential Associations Between Dark Triad Traits and Athlete Burnout in University Student-Athletes

## "Karanlık Tarafı Keşfetmek: Karanlık Üçlü Kişilik Özellikleri ve Öğrenci Sporcular Üzerindeki Tükenmişlik Etkileri"

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**ORGINAL ARTICLE**

**History**
Received: 8 April 2026
Accepted: 10 August 2026
Published: 30 August 2026

**DOI:** http://dx.doi.org/10.29228/anatoliasr.131

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**Author Contributions**
Author contributed to the conception and design of the study.

**Funding**
This study received no specific financial support.

**Competing Interests**
The authors declare that they have no conflicts of interest.

**Transparency**
The authors confirm that the manuscript is an honest, accurate, and transparent account of the study being reported; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.

**Ethical**
This study follows all ethical practices during writing.

**Citation**
Ozcan, V. (2026). Exploring the Dark Side: Differential Associations Between Dark Triad Traits and Athlete Burnout in University Student-Athletes. Anatolia Sport Research. 7(2): 273-284.

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**ABSTRACT**

**Aim:** This study aimed to examine the associations between Dark Triad personality traits (Machiavellianism, psychopathy, and narcissism) and athlete burnout among university student-athletes within a non-Western sport context.
**Material and Method:** This study employed a quantitative cross-sectional correlational research design. The sample comprised 289 university student-athletes (29.4% female, 70.6% male; mean age = 21.75 years, SD = 2.19). Participants completed the Dirty Dozen Scale and the Athlete Burnout Questionnaire. Data were analyzed using multiple linear regression and relative importance analysis to examine the unique contributions of each Dark Triad trait to athlete burnout.
**Results:** The overall model explained 24.5% of the variance in athlete burnout. Machiavellianism emerged as the strongest predictor, followed by psychopathy, while narcissism did not show a significant unique association when controlling for shared variance among traits.
**Conclusion:** The findings indicate that Dark Triad traits are differentially associated with athlete burnout. In particular, manipulative and emotionally detached personality characteristics appear to increase vulnerability to burnout, highlighting the importance of personality-informed monitoring and intervention strategies in sport settings. Accordingly, coaches, sport psychologists, and university sport programs should consider incorporating routine psychological screening and targeted mental skills interventions to facilitate the early identification and prevention of athlete burnout.

**Keywords:** Athlete Burnout, Dark Triad, Machiavellianism, Narcissism, Sport Psychology, Psychopathy.

**ÖZET**

**Amaç:** Bu çalışmanın amacı, üniversite öğrenci sporcularında Karanlık Üçlü kişilik özellikleri (Makyavelizm, psikopati ve narsisizm) ile sporcu tükenmişliği arasındaki ilişkileri incelemektir.
**Materyal ve Metod:** Bu çalışma kesitsel ilişkisel araştırma deseni kullanılarak yürütülmüştür. Araştırma, 289 üniversite öğrenci sporcu (%29.4 kadın, %70.6 erkek; Ort. yaş = 21.75 ± 2.19 yıl) ile gerçekleştirilmiştir. Katılımcılara Karanlık Üçlü Ölçeği (Dirty Dozen) ve Sporcu Tükenmişlik Ölçeği uygulanmıştır. Veriler, çoklu doğrusal regresyon analizi ve göreli önem analizi kullanılarak analiz edilmiştir.
**Bulgular:** Kurulan model sporcu tükenmişliğindeki varyansın %24.5'ini açıklamıştır. Makyavelizm en güçlü yordayıcı olarak belirlenmiş, bunu psikopati izlemiş, narsisizmin ise diğer değişkenler kontrol edildiğinde anlamlı bir özgün katkı sunmadığı görülmüştür.
**Sonuç:** Bulgular, Karanlık Üçlü kişilik özelliklerinin sporcu tükenmişliği ile farklı düzeylerde ilişkili olduğunu göstermektedir. Özellikle manipülatif ve duygusal açıdan mesafeli kişilik özellikleri tükenmişlik riskini artırmaktadır. Bu durum, spor ortamlarında kişilik temelli izleme ve müdahale stratejilerinin önemini ortaya koymaktadır. Bu doğrultuda, antrenörlerin, spor psikologlarının ve üniversite spor programlarının tükenmişlik riskinin erken belirlenmesi ve önlenmesine yönelik düzenli psikolojik değerlendirme ve hedefe yönelik psikolojik beceri eğitimlerini uygulamaya dâhil etmeleri önerilmektedir.

**Anahtar Kelimeler:** Karanlık Üçlü, Makyavelizm, Narsisizm, Psikopati, Spor Psikolojisi, Sporcu Tükenmişliği,.

## INTRODUCTION

The Dark Triad traits—comprising narcissism, Machiavellianism, and psychopathy—refer to a cluster of socially aversive personality traits characterized by interpersonal antagonism, manipulativeness, callousness, and low empathy (Paulhus & Williams, 2002). Narcissism involves grandiosity, a pervasive need for admiration, and self-enhancement tendencies; Machiavellianism reflects strategic calculation, cynical worldviews, and instrumental manipulation; and psychopathy is marked by emotional shallowness, impulsivity, and antisocial tendencies (Christie & Geis, 2013; Cleckley, 1951; Morf & Rhodewalt, 2001). Accumulated evidence across occupational, clinical, and academic contexts indicates that Dark Triad traits are reliably associated with maladaptive behaviors, impaired interpersonal functioning, and elevated psychological strain (Furnham et al., 2013; Muris et al., 2017).

Although the Dark Triad traits have been extensively examined in organizational and academic settings, its role in sport contexts remains comparatively underexplored. Competitive sport environments emphasize performance evaluation, social comparison, and goal attainment—conditions that may inadvertently activate or reinforce dark personality features such as narcissistic striving or Machiavellian strategizing (Jonason et al., 2010; Liang et al., 2024; Papageorgiou et al., 2019). Meta-analytic and theoretical work further suggests that Dark Triad traits become particularly salient in high-pressure, performance-driven contexts, where they function as stable dispositional risk factors for counterproductive psychological and behavioral outcomes (Furnham et al., 2013; Vize et al., 2020).

Importantly, cultural context may shape both the expression and consequences of Dark Triad traits. Much of the existing literature is based on Western, individualistic samples, leaving non-Western sport settings comparatively underrepresented (Muris et al., 2017; Jonason & Webster, 2010). University student-athletes may encounter distinctive institutional and sociocultural pressures, including the need to balance academic and sport-related demands alongside uncertainty regarding future career opportunities. Recent evidence from Türkiye indicates that employment-related anxiety is positively associated with burnout among sport sciences students (Yücekaya & Ateş, 2024), underscoring the relevance of examining burnout within this cultural and educational context. Within more collectivist cultural norms, emotional expression and psychological help-seeking may be less normative, potentially amplifying the psychological costs associated with socially aversive personality traits. Despite these considerations, the intersection of Dark Triad traits and athlete burnout in non-Western university sport contexts remains theoretically underdeveloped and empirically unexplored.

Burnout in sport is typically conceptualized as a multidimensional syndrome encompassing emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation (Maslach & Jackson, 1981; Raedeke & Smith, 2001). Prolonged exposure to chronic stressors in the absence of adequate recovery and psychosocial resources increases vulnerability to athlete burnout (Schaufeli & Enzmann, 1998; Eklund & DeFreese, 2015). Recent research suggests that Dark Triad traits may relate to burnout in trait-specific ways. Narcissistic individuals, whose self-worth is often contingent on external validation, may experience distress when performance expectations are unmet (Prusik & Szulawski, 2019; Rana et al., 2022). Machiavellian tendencies may foster interpersonal tension, emotional disengagement, and cynicism, thereby increasing susceptibility to sport devaluation and exhaustion (O'Boyle et al., 2012; Jonason & Webster, 2010). Psychopathy, associated with impulsivity and emotional dysregulation, may undermine adaptive coping and persistence under sustained stress (Hare, 2003; Gao & Raine, 2010).

Emerging lines of inquiry have proposed potential mechanisms that link Dark Triad traits to burnout, including maladaptive perfectionism, impaired emotional regulation, and disrupted social relationships (Flett & Hewitt, 2002; Madigan et al., 2015; Papageorgiou et al., 2019). In achievement-oriented sport climates, socially aversive traits may erode key protective factors such as team cohesion, coach–athlete trust, and perceived social support, thereby heightening vulnerability to burnout (Freeman & Rees, 2009; Zeigler-Hill & Marcus, 2016). However, empirical integration of dark personality frameworks with burnout models in sport psychology remains limited, particularly with respect to disentangling the unique contributions of overlapping Dark Triad traits.

From a methodological perspective, research on personality and burnout has increasingly emphasized the importance of multivariate approaches that account for shared variance among predictors (Antonakis et al., 2010; Hair et al., 2019). Given the substantial overlap among Dark Triad traits, reliance on bivariate associations may obscure trait-specific effects. Accordingly, analytic strategies that combine multiple regression with relative importance techniques offer a parsimonious and interpretable means of clarifying the unique and shared contributions of each trait (Field, 2013; Tabachnick & Fidell, 2019).

In response to these theoretical and methodological gaps, the present study examines the associations between narcissism, Machiavellianism, psychopathy, and athlete burnout among university student-athletes within a non-Western sport context. By adopting a multivariate composite-score approach supplemented by relative importance analysis, the study aims to clarify the unique and shared contributions of Dark Triad traits to burnout in competitive sport environments.

The central research question guiding this study is: To what extent do Dark Triad personality traits—Machiavellianism, psychopathy, and narcissism—uniquely and jointly predict athlete burnout among university-level student-athletes?

Given the substantial conceptual and empirical overlap among Dark Triad traits, the study adopts a multivariate approach to clarify their unique and relative contributions to athlete burnout. Based on existing theory and prior empirical findings, the following hypotheses were tested:

H1: Machiavellianism will be positively associated with athlete burnout.

H2: Psychopathy will be positively associated with athlete burnout.

H3: Narcissism will show a weaker or non-significant unique association with athlete burnout when controlling for Machiavellianism and psychopathy.

## MATERIAL AND METHOD

### Ethical Approval

This study was conducted with the approval of the Scientific Research and Publication Ethics Committee of Artvin Çoruh University (Approval No. E-18457941-050.99-152625, dated 11 October 2024). Participation was voluntary, and participants' anonymity and confidentiality were protected throughout the study. All procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki (World Medical Association, 2013). Written informed consent was obtained from all participants prior to data collection.

### Research Design

The present study employed a quantitative cross-sectional correlational research design to examine the associations between Dark Triad personality traits (Machiavellianism, psychopathy, and narcissism) and athlete burnout among university student-athletes. A correlational design was considered appropriate because the primary aim was to investigate naturally occurring relationships among variables without manipulating any conditions or implementing an intervention. Given the cross-sectional nature of the study, all variables were measured at a single point in time, and the findings are interpreted within a predictive and associative framework rather than as evidence of causal relationships (Antonakis et al., 2010; Spector, 2019).

### Participants and Procedure

The raw dataset comprised responses from 353 university student-athletes recruited from universities across Türkiye via an online survey. Data were collected following ethical approval during the 2024–2025 academic year while participants were actively engaged in university training and official sport activities. Prior to participation, all individuals were informed about the voluntary nature of the study, assured of anonymity and confidentiality, and provided written informed consent. All procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki (World Medical Association, 2013).

The target population comprised university students in Türkiye who were actively participating in organized competitive sport. Because no comprehensive national registry of university student-athletes is available, the exact size of the target population could not be determined. Therefore, a non-probability purposive sampling strategy was adopted to recruit participants who possessed characteristics directly relevant to the research objectives (Patton, 2002). To be eligible for participation, individuals were required to (a) be enrolled as university students, (b) have at least one year of continuous training and competitive experience, and (c) be actively participating in official university-level sport competitions during the data collection period. These eligibility criteria ensured that all participants had sufficient exposure to organized competitive sport to provide meaningful responses regarding Dark Triad personality traits and athlete burnout.

Responses were screened through a multi-stage data screening procedure. Initially, 51 participants were excluded because they did not provide sufficient responses on one or both study instruments, preventing reliable computation of composite scores. This resulted in an initial eligible sample of 302 participants. The remaining cases were subsequently examined for missing data, response consistency, distributional assumptions, and multivariate outliers. Following this screening, 13 additional cases were excluded because complete composite scores could not be calculated due to incomplete questionnaire responses. Consequently, the final analytic sample consisted of 289 university student-athletes.

The final sample included 85 female athletes (29.4%) and 204 male athletes (70.6%), with a mean age of 21.75 years (SD = 2.19; range = 16–35 years). Of the participants, 233 (80.6%) competed in team sports and 56 (19.4%) competed in individual sports. The most frequently represented sports were football, basketball, volleyball, wrestling, and athletics.

### Sample Size Considerations

The planned sample size was determined based on an a priori statistical power analysis rather than the size of the target population. An a priori statistical power analysis was conducted using G*Power 3.1 (Faul et al., 2009) for a multiple linear regression model with three predictors. Assuming a medium

effect size ($f^2 = .15$), an alpha level of .05, and statistical power ($1 - \beta$) of .95, the required minimum sample size was 119 participants. The final analytic sample of 289 participants substantially exceeded this requirement, indicating adequate statistical power to detect medium-sized effects and providing stable parameter estimates for the planned regression analyses.

**Common Method Bias and Design Considerations**

Because all data were collected using self-report measures within a cross-sectional design, the potential influence of common method bias (CMB) cannot be fully ruled out (Podsakoff et al., 2003, 2012). To mitigate this risk, several procedural remedies were implemented. Participants were assured of anonymity and confidentiality, encouraged to respond honestly, and informed that there were no right or wrong answers. Additionally, although both instruments used Likert-type response formats, they measured conceptually distinct constructs and were administered with procedural safeguards designed to reduce evaluation apprehension and response bias.

**Statistical Assumption Checks**

Prior to the primary analyses, the assumptions underlying multiple linear regression were evaluated. Cases were screened for missing data, response consistency, and multivariate outliers. The distributions of all study variables demonstrated acceptable univariate normality, with skewness and kurtosis values falling within the recommended range of ±2 (George & Mallery, 2010). Multicollinearity diagnostics further indicated no evidence of problematic predictor overlap, as all variance inflation factor (VIF) values were below recommended threshold levels (Hair et al., 2019).

**Data Tools**

Dark Triad Traits: Dark Triad personality traits—Machiavellianism, psychopathy, and narcissism—were assessed using the Dirty Dozen Scale (Jonason & Webster, 2010). The scale consists of 12 items, with four items measuring each trait. Participants responded using a 5-point Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree." The Turkish adaptation of the Dirty Dozen was conducted by Satıcı et al. (2018), who demonstrated satisfactory psychometric properties, including support for the three-factor structure and acceptable internal consistency coefficients ($\alpha = .79$ for Machiavellianism, $\alpha = .71$ for psychopathy, and $\alpha = .87$ for narcissism). In the present study, the scale also demonstrated excellent internal consistency, with Cronbach's $\alpha$ coefficients of .88 for Machiavellianism, .88 for psychopathy, and .91 for narcissism (overall $\alpha = .93$). Composite mean scores were computed separately for Machiavellianism, psychopathy, and narcissism, with higher scores indicating higher levels of each trait.

Athlete Burnout: Athlete burnout was measured using the Athlete Burnout Questionnaire (ABQ) developed by Raedeke and Smith (2001) and adapted into Turkish by Kelecek et al. (2016). The Turkish version of the ABQ consists of 13 items rated on a 5-point Likert scale (1 = "almost never," 5 = "almost always") and assesses athlete burnout across three dimensions: Emotional/Physical Exhaustion, Reduced Sense of Accomplishment, and Sport Devaluation. Kelecek et al. (2016) reported satisfactory psychometric properties for the Turkish version of the scale, supporting its three-factor structure and construct validity. In the present study, the overall internal consistency of the ABQ was excellent (Cronbach's $\alpha = .90$). Although the original multidimensional structure of the ABQ has been supported in previous research, reliability analyses in the present sample indicated lower internal consistency for the Reduced Sense of Accomplishment subscale ($\alpha = .58$), whereas the remaining subscales demonstrated acceptable reliability. Consistent with recommendations favoring parsimonious

measurement under such conditions (Tabachnick & Fidell, 2019), the present study focused on total athlete burnout, computed as the mean score across all 13 items. Higher scores indicate greater overall athlete burnout.

### Statistical Analyses

All statistical analyses were conducted using R. Descriptive statistics (means, standard deviations, skewness, and kurtosis), reliability coefficients (Cronbach's α), and Pearson correlation coefficients were calculated for all study variables.

Prior to inferential analyses, assumptions underlying multiple linear regression were evaluated. Cases were screened for missing data, response consistency, and multivariate outliers. Skewness and kurtosis values for all study variables are presented in Table 1 and fell within the recommended range of ±2, indicating acceptable univariate normality (George & Mallery, 2010). In addition, variance inflation factor (VIF) values were below the recommended threshold, indicating no evidence of problematic multicollinearity among predictors (Hair et al., 2019).

To examine the unique associations between Dark Triad traits and athlete burnout, a multiple linear regression analysis was conducted, with Machiavellianism, psychopathy, and narcissism entered simultaneously as predictors of total athlete burnout. Given the substantial intercorrelations among the Dark Triad traits, a relative importance analysis using the lmg metric was additionally performed to decompose the model $R^2$ into the proportional contribution of each predictor (Field, 2013).

All analyses were interpreted within a predictive and associative framework, and no causal inferences were drawn because of the cross-sectional design (Antonakis et al., 2010; Spector, 2019).

## RESULTS

### Descriptive Statistics and Correlations

Descriptive statistics and Pearson correlation coefficients for all study variables are presented in Table 1. All three Dark Triad traits were positively correlated with total athlete burnout. Among the Dark Triad traits, the strongest intercorrelation was observed between Machiavellianism and psychopathy. In relation to burnout, Machiavellianism showed the strongest bivariate association, followed by psychopathy and narcissism.

***Table 1.*** *Descriptive Statistics, Normality Indices, and Pearson Correlations among Dark Triad Traits and Athlete Burnout.*

| Variable | x̄ | Sd | Skewness | Kurtosis | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|
| 1. Machiavellianism | 3.74 | 0.78 | -0.38 | -0.24 | — | | | |
| 2. Psychopathy | 3.70 | 0.81 | -0.31 | -0.41 | .69*** | — | | |
| 3. Narcissism | 4.48 | 0.76 | -0.89 | 0.78 | .55*** | .49*** | — | |
| 4. Athlete Burnout (Total) | 2.70 | 0.74 | 0.21 | 0.56 | .64*** | .57*** | .32*** | — |

Note. N = 289. Values below the diagonal represent Pearson correlation coefficients. M = mean; SD = standard deviation. Skewness and kurtosis values for all study variables were within the recommended range of ±2 (George & Mallery, 2010).
***p < .001.

### Multiple Regression Analysis

A multiple linear regression analysis was conducted to examine the unique contributions of Machiavellianism, psychopathy, and narcissism to athlete burnout. The overall model was statistically

significant and explained 24.5% of the variance in athlete burnout ($R^2$ = .245, Adjusted $R^2$ = .238, F(3, 285) = 30.90, p < .001).

As shown in Table 2, Machiavellianism emerged as the strongest predictor of burnout, followed by psychopathy. Narcissism did not show a significant unique association with burnout when controlling for the other Dark Triad traits.

***Table 2***. *Multiple Regression Predicting Athlete Burnout from Dark Triad Traits.*

| Predictor | *B* | *SE* | β | *t* | *p* | VIF |
|---|---|---|---|---|---|---|
| Machiavellianism | 0.127 | 0.032 | .333 | 4.01 | < .001 | 2.61 |
| Psychopathy | 0.067 | 0.032 | .180 | 2.09 | .038 | 2.79 |
| Narcissism | 0.006 | 0.022 | .010 | 0.25 | .805 | 1.45 |
| Intercept | 1.951 | 0.102 | — | 19.05 | < .001 | — |

**Note.** $N$ = 289. $R^2$ = .245, Adjusted $R^2$ = .238, $F(3, 285) = 30.90$, $p < .001$. $B$ = unstandardized regression coefficient; $SE$ = standard error; β = standardized regression coefficient; VIF = variance inflation factor.

### Relative Importance of Dark Triad Traits

To further clarify the contribution of each Dark Triad trait in the presence of intercorrelated predictors, a relative importance analysis was conducted using the lmg metric. As presented in Table 3, Machiavellianism accounted for the largest proportion of explained variance in athlete burnout (54.6%), followed by psychopathy (39.1%), whereas narcissism contributed only minimally (6.3%). These findings reinforce the regression results by demonstrating that Machiavellianism was the most influential predictor of burnout both uniquely and in terms of its overall contribution to the model.

***Table 3.*** *Relative Importance (lmg) of Dark Triad Traits in Predicting Athlete Burnout.*

| Predictor | lmg | Explained Variance (%) |
|---|---|---|
| Machiavellianism | 0.134 | 54.6 |
| Psychopathy | 0.096 | 39.1 |
| Narcissism | 0.015 | 6.3 |
| Total | 0.245 | 100 |

Note. N = 289. Relative importance was estimated using the lmg metric. Percentages represent the proportion of the model $R^2$ ($R^2$ = .245) attributable to each predictor.

### Conceptual Model

The hypothesized associations between Dark Triad personality traits (Machiavellianism, psychopathy, and narcissism) and athlete burnout (total score) are illustrated in Figure 1. The model reflects a regression-based framework in which each Dark Triad trait is specified as a direct predictor of burnout. The conceptual model was designed to guide the examination of the unique and relative contributions of overlapping personality traits to athlete burnout in competitive sport contexts.

Consistent with the analytic strategy adopted in the present study, the model does not assume latent variables or causal pathways but instead represents direct predictive associations among observed composite scores.

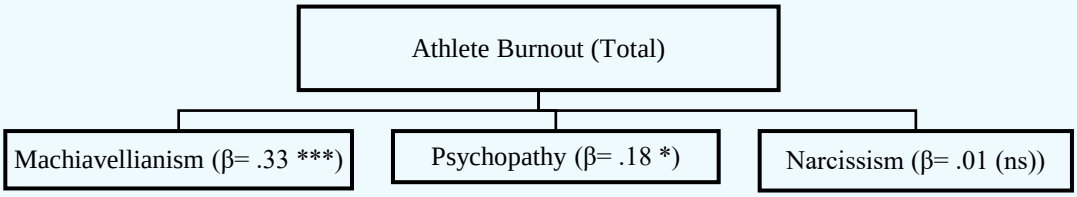


***Figure 1.*** *Conceptual Model Depicting the Associations between Dark Triad Traits and Athlete Burnout.*

## DISCUSSION AND CONCLUSION

The present study examined the associations between Dark Triad personality traits and athlete burnout among university student-athletes, adopting a composite-score regression approach supplemented by relative importance analysis. The findings revealed a clear and differentiated pattern. Machiavellianism emerged as the strongest predictor of athlete burnout, psychopathy contributed to a lesser but still meaningful extent, and narcissism did not demonstrate a significant unique association once shared variance among traits was taken into account.

Among the Dark Triad traits, Machiavellianism accounted for the largest proportion of explained variance in athlete burnout. This result aligns with theoretical perspectives describing Machiavellianism as a personality orientation characterized by strategic manipulation, emotional detachment, and an instrumental approach to interpersonal relationships (Christie & Geis, 2013; Paulhus & Williams, 2002). In sport settings, such characteristics may undermine trust, cooperation, and perceived social support, thereby weakening psychological resources that typically buffer athletes against chronic stress and burnout (Freeman & Rees, 2009; Gustafsson et al., 2008).

Athletes high in Machiavellianism may rely on emotionally detached coping strategies that facilitate short-term goal pursuit but become maladaptive under sustained performance pressure. Over time, this pattern may foster cynicism, disengagement, and emotional exhaustion, which are core components of athlete burnout (Raedeke & Smith, 2001; Schaufeli & Enzmann, 1998). Similar associations have been documented in organizational contexts, where Machiavellian traits predict emotional exhaustion and reduced commitment in high-demand environments (O'Boyle et al., 2012). The present findings extend this evidence to the university sport context and identify Machiavellianism as a particularly salient vulnerability factor for burnout.

Psychopathy also showed a significant, albeit weaker, association with athlete burnout. Traits such as impulsivity, reduced empathy, and emotional shallowness may impair athletes' capacity for affect regulation and adaptive stress responses (Hare, 2003; Gao & Raine, 2010). Although certain psychopathic tendencies may appear advantageous in short-term performance situations, prolonged exposure to competitive demands without adequate recovery or support may ultimately increase susceptibility to emotional and physical exhaustion.

In contrast, narcissism did not uniquely predict athlete burnout once the overlap with Machiavellianism and psychopathy was controlled. Although narcissism showed a positive zero-order correlation with athlete burnout, it did not retain a significant unique effect in the multivariate model, suggesting that its apparent association with burnout may largely reflect variance shared with Machiavellianism and psychopathy. This finding supports arguments that narcissism may function differently from other dark traits in achievement-oriented contexts (Morf & Rhodewalt, 2001; Roberts et al., 2010). Narcissistic traits such as confidence, dominance, and achievement striving may initially serve as psychological resources in competitive sport environments. However, the absence of a unique effect in the present study suggests that previously observed associations between narcissism and burnout may largely reflect shared variance with more maladaptive dark traits, particularly Machiavellianism and psychopathy (Muris et al., 2017). This underscores the importance of multivariate approaches when examining the Dark Triad, as bivariate analyses alone may overestimate the role of narcissism in burnout processes.

The present study examined the associations between Dark Triad personality traits and athlete burnout among university student-athletes, adopting a multivariate composite-score approach

supplemented by relative importance analysis. The findings demonstrated that Dark Triad traits are differentially related to burnout outcomes. Specifically, Machiavellianism emerged as the strongest predictor of athlete burnout, psychopathy contributed to a lesser but meaningful extent, and narcissism did not exhibit a unique association when shared variance among traits was controlled.

These results suggest that emotionally detached and manipulative personality characteristics may heighten vulnerability to chronic exhaustion and disengagement in competitive sport environments. While narcissistic traits may initially confer motivational advantages, their role in burnout appears limited once more maladaptive dark traits are accounted for.

By focusing on an understudied non-Western athletic population, the present study contributes to a more nuanced understanding of personality-driven risk factors for burnout in sport. The findings highlight the importance of distinguishing between overlapping dark traits and underscore the value of parsimonious analytic approaches when examining complex personality–well-being relationships. Future research adopting longitudinal and multi-method designs will be critical for advancing theory and informing evidence-based interventions aimed at promoting athlete mental health and sustainable performance.

**Limitations**

Several limitations should be acknowledged. First, the cross-sectional design precludes causal inference. Although the observed associations are robust, the temporal ordering of Dark Triad traits and athlete burnout cannot be established. Longitudinal and time-lagged designs are needed to clarify how Dark Triad traits contribute to the development and maintenance of burnout over time (Antonakis et al., 2010; Spector, 2019).

Second, the exclusive reliance on self-report measures introduces the possibility of response-related biases, including social desirability and common method bias. While procedural safeguards were implemented to reduce these risks, future research would benefit from incorporating multi-informant data, behavioral indicators, or objective performance measures (Podsakoff et al., 2012, 2024).

Third, the present study focused on total athlete burnout rather than examining burnout subdimensions separately. This decision was guided by psychometric considerations and the need for a parsimonious analytic strategy but may have obscured more nuanced trait-dimension relationships. Future studies with larger samples and stronger subscale reliability should explore dimension-specific pathways.

Fourth, although both female and male student-athletes were included, the sample was predominantly male (70.6%). This gender imbalance may limit the generalizability of the findings across male and female athlete populations. Future research should aim to recruit more gender-balanced samples and examine whether the observed associations differ according to sex.

Finally, the sample consisted of university student-athletes from Türkiye, providing valuable insight into an understudied non-Western sport context. However, the findings may not generalize to elite, recreational, or youth sport populations, nor to athletic systems operating under different cultural, institutional, or organizational conditions. Future research employing cross-cultural and multi-level designs is therefore warranted to examine the robustness of these associations across diverse sport contexts.

### Practical Implications

The present findings offer several implications for applied sport psychology. First, they indicate that Machiavellianism represents a particularly salient risk factor for athlete burnout. Accordingly, coaches, sport psychologists, and athlete support staff may benefit from incorporating personality-informed psychological screening and regular well-being monitoring into routine athlete support practices, with particular attention to Machiavellian tendencies rather than treating the Dark Triad as a unitary construct.

Second, burnout prevention programs should prioritize the development of adaptive interpersonal and emotional skills, particularly for athletes displaying elevated Machiavellian or psychopathic traits. Structured mental skills training, psychoeducational workshops, individualized psychological support, and interventions targeting emotion regulation, impulse control, and constructive communication may help mitigate the long-term psychological costs associated with socially aversive personality characteristics (Clough et al., 2002; Gould et al., 2002).

Third, the findings highlight the importance of supportive coaching climates and strong team cohesion. Coaches can foster psychologically supportive environments by providing regular constructive feedback, encouraging open communication, and promoting team norms based on trust, transparency, and mutual respect. Such environments may buffer the detrimental effects of emotionally detached or manipulative interpersonal styles (Freeman & Rees, 2009; Zeigler-Hill & Marcus, 2016).

From an organizational perspective, universities and sport organizations may benefit from integrating personality-informed approaches into athlete development and mental health programs. Periodic psychological screening, early identification of athletes at elevated burnout risk, and timely referral to sport psychology services may facilitate more targeted preventive interventions. Collectively, these strategies may contribute not only to reducing athlete burnout but also to promoting long-term psychological well-being, resilience, and sustainable sport participation.

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