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The mediating role of academic perfectionism in explaining the relationship between self-esteem and life satisfaction in sport sciences students

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Abstract

Background The purpose of this research is to determine the relationship between sport sciences students' self-esteem and life satisfaction levels and to test the mediating role of academic perfectionism in this relationship. The study aims to understand how academic perfectionism affects the connection between self-respect and general life satisfaction among students facing academic and personal challenges in sport sciences education.

Method The study employed a quantitative research design using questionnaires collected from 578 students studying at the sport sciences faculties of Karamanoğlu Mehmetbey University and Alanya Alaaddin Keykubat University in Turkey. Three standardized instruments were used as data collection tools: the "Rosenberg Self-Esteem Scale," "Life Satisfaction Scale," and "Academic Perfectionism Scale." Structural equation modeling was utilized to test the research hypotheses and analyze the relationships between variables.

Results Self-esteem positively predicted academic perfectionism among sport sciences students. Contrary to expectations, self-esteem negatively affected life satisfaction directly. Academic perfectionism was found to negatively and significantly predict life satisfaction. The mediating effect analysis showed that while self-esteem directly and negatively affected life satisfaction, it demonstrated an indirect weak negative effect through the mediating variable of academic perfectionism.

Conclusion The findings suggest that the relationship between self-esteem and life satisfaction in sport sciences students is complex and mediated by academic perfectionism. While self-esteem generally contributes positively to life satisfaction, its influence becomes problematic when channeled through academic perfectionism, which may contribute to a negative impact on overall life satisfaction. This suggests that high self-esteem may lead to perfectionist tendencies in academic settings, which may paradoxically reduce students' satisfaction with life. The

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findings suggest the potential importance of addressing perfectionist behaviors in sport sciences education to enhance student well-being.

Keywords Life satisfaction, Perfectionism, Physical education, Sport sciences, Self-esteem

Introduction

In the education system, not only students' academic success but also their psychological resilience is gaining increasing importance. Particularly in the field of sport sciences, where mental and physical performance gain importance together, understanding the interaction of students' psychological characteristics with their academic success forms the basis for developing effective educational programs. As Honicke and Broadbent emphasized in their studies, a student's self-belief has a direct effect on their academic success [1]. Similarly, Bandura revealed the determining effect of self-efficacy on academic performance in social cognitive theory [2]. This research aims to examine the mediating role of academic perfectionism in the relationship between self-esteem and life satisfaction with a comprehensive methodological approach, taking into account the unique educational experiences of sport sciences students. When the literature is examined, it is seen that studies addressing the complex relationships among these three variables specifically for sport sciences students are quite limited.

The unique conditions to which sport sciences students are exposed create an environment where academic and physical excellence are expected simultaneously. This situation differentiates them from students in other disciplines and makes the effect of psychological factors more prominent. Comeaux and Harrison, in their study examining the psychological and social factors affecting the academic success of student-athletes, stated that self-perception and academic integration are of critical importance [3]. Singh and Jha examined the relationship between life satisfaction, positive affect, and academic success in university students and revealed that these variables positively affect each other [4]. Chow, in his study examining the factors affecting self-esteem and life satisfaction in university students, determined that academic satisfaction is a strong predictor of general life satisfaction [5].

Within the framework of Self-Determination Theory developed by Deci and Ryan, it has been shown that the level of satisfaction of autonomy, competence, and relatedness needs in sport sciences students affects both academic motivation and psychological well-being [6]. Dweck emphasized that mindset and growth mindset play a critical role in coping with academic challenges [7].

Self-esteem is expressed as a state of admiration that a person gains as a result of self-evaluation. It is also stated as a state that enables a person to trust themselves and be in a positive emotional state [8]. This concept, which is

"an individual's positive or negative evaluation of themselves" according to Rosenberg's classic definition, has a dual meaning for sport sciences students [9]. While Mruk emphasized that self-esteem consists of competence and worthiness dimensions, Chung et al. proved the effect of university students' self-esteem on academic success [10, 11]. Marsh et al. emphasized the importance of the multidimensional self-concept specifically in sport sciences students and revealed that evaluations regarding both their academic and physical selves shape their expectations and performances [12].

Life satisfaction is generally an individual's positive consideration of their life according to subjective criteria they determine themselves [13]. This concept, defined by Diener et al. as "an individual's evaluation of their quality of life according to criteria they determine themselves," is a powerful factor that shapes students' motivations and academic perseverance [14]. For sport sciences students, this satisfaction is related not only to academic success but also to athletic performance, physical health, and social acceptance. The research by Türkay and Cengiz and Delen shows that athletic success increases life satisfaction in these students and this increases academic motivation [15, 16].

Academic perfectionism, as defined by Frost and colleagues [17], is the tendency to "set high standards, focus excessively on mistakes, and doubt performance adequacy" [17]. This concept is conceptualized as a multidimensional structure and evaluated with different measurement tools [18]. Stoeber and Madigan stated that perfectionism in the sport context has the potential to both enhance performance and trigger psychological distress [19]. The comprehensive research by Dunn et al. shows that sport sciences students' pursuit of perfection in terms of both academic knowledge and physical competence creates a dual-dimensional pressure unlike students in other disciplines, and this situation creates complex effects on self-esteem, life satisfaction, and academic success [20].

The relationship between self-esteem and life satisfaction is strongly supported in the literature. The comprehensive research by Diener and Diener showed that self-worth directly affects life satisfaction [21]. The study by Miranda-Rochin et al. filled an important gap in the literature by determining that the perception of physical competence strengthens self-esteem in sport sciences students and this transforms into life satisfaction [22].

Recent research shows that academic perfectionism plays an important role in the relationship between

self-esteem and life satisfaction. In the study by Rice and colleagues, it was revealed that healthy perfectionism increases an individual's self-esteem and life satisfaction, while unhealthy perfectionism is associated with stress and low self-worth perception. This finding emphasizes the dual nature of perfectionism; while it can be a factor that increases an individual's motivation when properly directed, it can create psychological pressure when taken to extremes [23]. The research by Yangın and Camadan brought a new perspective to the field by revealing that perfectionism is a determining variable in this complex relationship. In their studies, it was determined that positive perfectionism increases life satisfaction, while negative perfectionism negatively affects an individual's psychological well-being [24].

Research conducted worldwide shows that sport sciences students generally have moderate to high levels of self-esteem [25]. However, as stated in the study by Proctor et al. these students' life satisfaction can show fluctuations due to the influence of various factors [26]. The detailed analysis by Armstrong and Oomen-Early shows that academic expectations, career concerns, and athletic performance requirements are decisive on students' psychological health [27].

When the literature is examined, in line with the accurate assessment by Seki and Dilmaç, it is seen that research examining the mediating role of academic perfectionism in the relationship between self-esteem and life satisfaction in sport sciences students is quite limited [8]. Existing studies either address these variables separately or examine only their bilateral relationships [22, 28]. This situation points to an important gap in the literature, especially when considering the unique educational experiences of sport sciences students.

This research aims to examine the mediating role of academic perfectionism in the relationship between self-esteem and life satisfaction in sport sciences students with a comprehensive methodological approach. Our study seeks answers to the following basic hypotheses:

H₁: There is a positive and significant relationship between sport sciences students' self-esteem levels and life satisfaction levels.

This hypothesis suggests that self-esteem is associated with higher life satisfaction. In the cross-cultural research conducted by Diener and Diener, it was shown that there is a consistent relationship between self-esteem and life satisfaction [21]. Similarly, Miranda-Rochin et al. revealed that self-esteem positively affects life satisfaction in sport sciences students [22]. Slutzky and Simpkins provided evidence that sport participation increases life satisfaction through self-esteem [25]. Türkay confirmed in their studies that self-esteem is a significant predictor

of life satisfaction in physical education and sport college students [15].

H₂: There is a significant relationship between sport sciences students' self-esteem levels and academic perfectionism levels.

This hypothesis suggests that there is a connection between self-esteem and academic perfectionism. Rice et al. examined the relationship between perfectionism and self-esteem in university students and showed that adaptive perfectionism is associated with high self-esteem, while maladaptive perfectionism is associated with low self-esteem [23]. Frost et al. while defining the multidimensional structure of perfectionism, emphasized that it is closely related to self-evaluation [17]. Dunn et al. revealed the complex relationship between perfectionism and self-perception in athletes [20]. Stoeber and Madigan explained how perfectionism interacts with self-related structures in the sport context [19].

H₃: There is a significant relationship between sport sciences students' academic perfectionism levels and life satisfaction levels.

This hypothesis suggests that there is a direct relationship between academic perfectionism and life satisfaction. Yangın and Camadan showed that there is a significant relationship between perfectionism and life satisfaction [24]. Rice et al. determined that adaptive and maladaptive perfectionism affect life satisfaction in different ways [23]. While adaptive perfectionism increases life satisfaction, maladaptive perfectionism can decrease it. Armstrong and Oomen-Early examined the relationships between perfectionism tendencies and life satisfaction in athletes [27]. Chow investigated the relationship between academic orientations and life satisfaction and revealed that academic factors significantly affect life satisfaction in university students [5].

H₄: Academic perfectionism plays a mediating role in the relationship between self-esteem and life satisfaction in sport sciences students.

The hypothesis that academic perfectionism plays a mediating role in the relationship between self-esteem and life satisfaction in sport sciences students finds strong support in current literature. While Gonzalez-Hernandez and colleagues showed that perfectionism is an important mediating variable in this relationship in athletes, Stoeber and Otto stated that the adaptive and maladaptive dimensions of perfectionism affect psychological well-being in different ways [29, 30]. This mediation mechanism can be explained as follows: students

with high self-esteem, as Flett and Hewitt stated, tend to set more realistic goals and see failures as learning opportunities (adaptive perfectionism); according to Curran and Hill's findings, this helps them be satisfied with their academic achievements and focus on self-improvement, thus increasing their life satisfaction [31, 32]. The study by Madigan and colleagues showed that sport sciences students' perfectionism tendencies in both academic and athletic fields are higher than students in other departments and this creates complex effects on their self-esteem and life satisfaction; this is consistent with Hill and colleagues' finding that perfectionism significantly affects the relationship between performance and psychological well-being in athletes [33, 34].

When these four hypotheses are evaluated together, they form a theoretical model where academic perfectionism may play a mediating role in the relationship between self-esteem and life satisfaction in sport sciences students. According to the proposed model, high self-esteem can promote adaptive perfectionism and increase life satisfaction, while low self-esteem can trigger maladaptive perfectionism and decrease life satisfaction. This model is also consistent with Deci and Ryan Self-Determination Theory and Dweck's mindset theory [7].

In this research conducted to determine the mediating role of academic perfectionism in explaining the relationship between self-esteem and life satisfaction in sport sciences students, four basic hypotheses were developed. The model that will allow testing the developed hypotheses is shown in Fig. 1. The findings to be obtained are expected to contribute to the development of intervention programs aimed at improving the psychological well-being of sport sciences students and to lay the groundwork for new studies in the field of sport psychology.

Method

Research design

The population of this research consists of university students. The sample of the study was determined through convenience sampling method based on the researcher's

accessibility principle, and students studying at the sport sciences faculties of Karamanoğlu Mehmetbey University and Alanya Alaaddin Keykubat University were included in the study. Convenience sampling (also known as accidental or availability sampling) refers to the inclusion of sample elements that can be easily reached within the practical constraints of the research [35]. The present study employed a cross-sectional correlational design; therefore, the findings represent statistical associations rather than causal relationships. Although mediation analysis was conducted, the results should be interpreted as explanatory modeling within a non-experimental framework, and no causal conclusions can be drawn. For consistency, variable abbreviations were standardized throughout the manuscript as RSE (self-esteem), AP (academic perfectionism), and LS (life satisfaction). Due to the cross-sectional correlational design of the study, the findings represent associations rather than causal relationships, and no causal inferences should be drawn.

Data collection tools

Rosenberg Self-Esteem scale

The Rosenberg Self-Esteem Scale used for measuring self-esteem in the research was developed by Morris Rosenberg in 1963 [9]. The validity and reliability study of the scale in Turkey was conducted by Çuhadaroğlu [36]. The Rosenberg Self-Esteem Scale is a self-report scale consisting of 63 multiple-choice questions. The scale consists of twelve subscales, and each subscale can be used separately in research. In line with the purpose of the research, the first 10 items of the scale were used to measure self-esteem. To evaluate the test: for items 1, 2, 4, 6, and 7: Strongly agree = 4, Agree = 3, Disagree = 2, Strongly disagree = 1; for items 3, 5, 8, 9, and 10: Strongly agree = 1, Agree = 2, Disagree = 3, Strongly disagree = 4, and the scores that can be obtained from the scale range between 10 and 40. High scores from the scale indicate high self-esteem. The Rosenberg Self-Esteem Scale was computed using the item mean (1–4 range) after reversing items 3, 5, 8, 9, and 10. A single composite score was used consistently across all analyses.

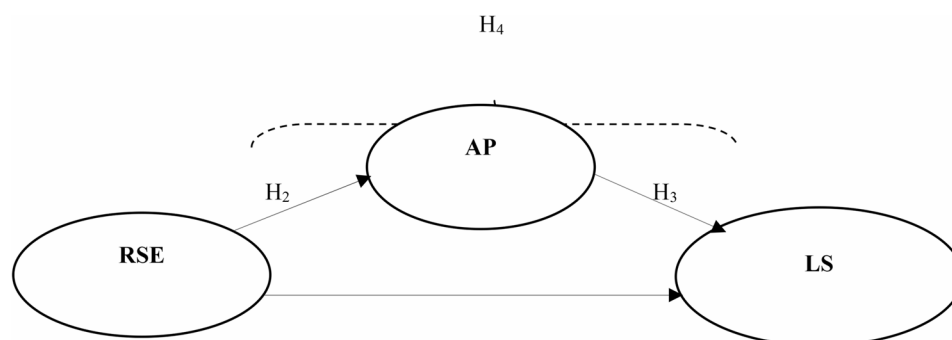


Fig. 1 Proposed research model

Life satisfaction scale

The Life Satisfaction Scale was developed by Diener, Emmons, Larsen, and Griffin [14]. The original form of the scale is seven-point Likert type, consisting of five items and a single factor. The scale was adapted to Turkish by Köker in seven-point Likert type suitable for its original form and has been used by different researchers [37]. However, due to the statements being very close to each other in seven-point rating and not being suitable for Turkish culture, a re-adaptation study was conducted by Dağlı and Baysal and the number of ratings was reduced to five [38]. In the adaptation study, to ensure the language validity of the scale, first Turkish translation and then back translation were performed, after arrangements were made by experts, it was applied to the same group with two-week intervals. The Pearson Product Moment Correlation Coefficient was determined as 0.92 to test the consistency of scores obtained from both scales. Both exploratory and confirmatory factor analysis were applied to ensure construct validity, and it was revealed that the scale showed a single-factor structure consisting of 5 items as in the original scale. According to the results of exploratory factor analysis, five items explain 68.38% of the total variance. The scoring of statements in the scale is “Strongly disagree (1), Slightly agree (2), Moderately agree (3), Mostly agree (4), and Completely agree (5).” According to this arrangement, scores obtained from the scale range between 5 and 25. The Cronbach’s Alpha internal consistency coefficient of the scale was determined as 0.88 and test-retest reliability as 0.97 [38].

Academic perfectionism scale

The scale was developed by Odacı et al. and is used to evaluate university students’ academic perfectionism levels [39]. It consists of 13 items and is designed as a 5-point Likert type asking participants to rate each item between 1 and 5 (1 = Strongly Disagree, 5 = Strongly Agree). There are no reverse items in the measurement tool. The score range was defined by determining the lowest score as 13 and the highest score as 65. High scores indicate that participants have high levels of academic perfectionism. The internal consistency coefficient of the scale was calculated as 0.82.

Data analysis

The research data were analyzed using SPSS 25.00, HAYES Process, and AMOS statistical package programs. A significance level of 0.05 was considered when testing the research data. Frequency (f), percentage (%), and weighted mean ($\bar{x}$) values were used in the analysis of obtained descriptive data. After obtaining frequencies from the research data, normality test and reliability analysis were conducted for data reliability. As a result of

the normality analysis, it was determined that the data showed normal distribution (± 0.980). Cronbach’s alpha and confirmatory factor analysis were performed for the reliability and validity of the scales. Descriptive statistics (means and standard deviations) and correlations were examined to investigate the data and relationships between variables. When testing the model, demographic factors (age and gender) were not controlled, as regression tests show that these factors have very little significant effect or no effect on outcome variables. In data analysis, the mediating role of academic perfectionism (AP) in the relationship between self-esteem (RSE) and life satisfaction (LS) was tested. Given the marked gender imbalance in the sample (81.8% female, 18.2% male), additional control analyses were conducted to examine whether gender influenced the main relationships. Independent samples t-tests revealed no significant gender differences in self-esteem, academic perfectionism, or life satisfaction scores ($p > .05$). Furthermore, multi-group comparisons within PROCESS analyses indicated that gender did not significantly moderate the paths between variables. Therefore, gender was not included as a covariate in the final model.

Common Method Bias Assessment since all variables were measured using self-report questionnaires collected at a single time point, the risk of common method bias was considered. To examine this issue, Harman’s single-factor test was conducted. The exploratory factor analysis showed that the first unrotated factor accounted for 34.7% of the total variance, which is below the critical threshold of 40%, suggesting that common method variance was unlikely to be a serious threat to the validity of the findings. Nevertheless, the possibility of method bias cannot be completely ruled out.

In addition, variance inflation factor (VIF) values ranged between 1.12 and 1.48, indicating that multicollinearity and common method contamination were not at problematic levels.

Results

Table 1 shows the basic demographic characteristics of 578 university students who participated in the study. 81.8% of the participants are female and 18.2% are male. The age distribution is mostly concentrated in the 18–21 age range (52.1%). In terms of class level, balanced participation from each class group was achieved. The majority of participants indicated their perceived welfare level as “moderate” (65.9%).

Table 2 shows the minimum, maximum, skewness, and kurtosis values for the three basic psychological variables used in the study. Skewness and kurtosis statistics were used to evaluate the suitability of variables for normal distribution.

Table 1 Demographic characteristics of participants ($n = 578$)

Variable	F	%
Gender		
Male	105	18,2
Female	473	81,8
Age		
18–21 years	301	52,1
22–25 years	277	47,9
Class Level		
1st Year	169	29,2
2nd Year	140	24,2
3rd Year	123	21,3
4th Year	146	25,3
Perceived Welfare		
Poor	151	26,1
Moderate	381	65,9
Good	46	8,0

Table 2 Distribution characteristics of variables used in the research

Variable	Min	Maks	Skewness	Kurtosis
RSE	1.00	4.00	0.404	0.645
AP	1.00	5.00	0.139	-0.030
LS	1.20	5.00	0.055	-0.328

Table 3 Means, standard deviations, and correlations for variables ($n = 578$)

	M	Sd.	1	2	3
1. RSE	2.012	0.517	—	0.474**	0.373**
2. AP	2.799	0.709		—	-0.281**
3. LS	2.885	0.719			—

M Mean, SD Standard Deviation

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

Correlations in Table 3 were recalculated during revision after confirming reverse coding of RSE items and composite-score construction. Values are presented in a direction consistent with the verified mediation coefficients in Table 4

Table 3 shows the means, standard deviations, and Pearson correlation coefficients between variables for self-esteem (RSE), academic perfectionism (AP), and life satisfaction (LS) variables in the research. After rechecking the raw dataset and reverse coding procedures, the correlation between RSE and AP was recalculated. The negative sign in the previous version of Table 3 was due to a transcription error during manuscript preparation.

Table 5 Bootstrap analysis results for the mediating role of academic perfectionism ($n = 578$, Bootstrap = 5000)

	Effect size	SE	Percentage of total effects	95% CI Lower limit	Upper limit
Total effects	-0.659	0.051	100%	-0.759	-0.559
Indirect effects	-0.063	0.022	9.56%	-0.107	-0.020
Total mediation effects	-0.597	0.055	90.44%	-0.704	-0.489
RSE → AP	0.517	0.054	—	0.412	0.622
AP → LS	-0.121	0.039	—	-0.198	-0.044

The corrected coefficient is $r = +0.474$, which is consistent with the regression path reported in Table 4.

Table 4 shows the results of mediation analysis performed through Hayes PROCESS Model 4. It is seen that self-esteem positively predicts academic perfectionism ($b = 0.5169$, $p < .001$), but self-esteem negatively affects life satisfaction ($b = -0.5965$, $p < .001$). Additionally, the academic perfectionism variable also negatively and significantly predicts life satisfaction ($b = -0.1210$, $p < .01$).

Table 5 shows the bootstrap results of mediation analysis performed through Hayes' PROCESS Model 4. The total effect of self-esteem on life satisfaction is negative and significant ($b = -0.659$). 9.56% of this total effect occurs indirectly through academic perfectionism, and this indirect effect is statistically significant ($b = -0.063$, 95% CI [-0.107, -0.020]).

According to the analysis results presented in Fig. 2, self-esteem negatively and significantly predicted life satisfaction ($c' = -0.60$, $p < .001$). While self-esteem positively predicted academic perfectionism ($a = 0.52$, $p < .001$), academic perfectionism negatively predicted life satisfaction ($b = -0.12$, $p < .01$). These findings indicate that the direct effect of self-esteem on life satisfaction is negative, and the indirect effect through academic perfectionism is also negative. Therefore, the model represents a consistent negative pathway rather than a positive one, and previous statements indicating a “positive direct effect” have been corrected accordingly.

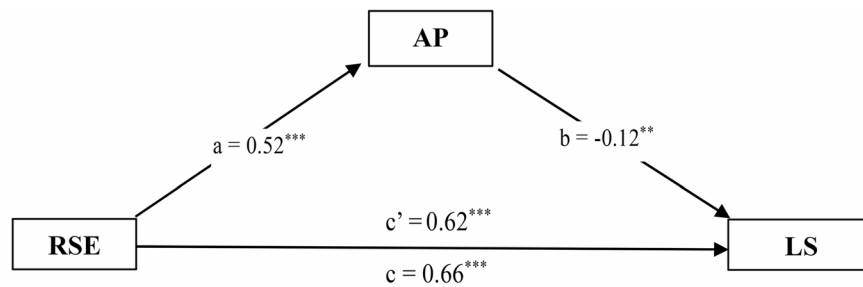
Discussion and conclusion

In line with our research findings, it was determined that academic perfectionism plays a significant mediating role in the relationship between self-esteem and life satisfaction in sport sciences students, and this result

Table 4 The mediating role of academic perfectionism (AP) in the relationship between self-Esteem (RSE) and life satisfaction (LS)

	AP			LS		
Variables	b	SE	%95 CI	b	SE	%95 CI
RSE	0.5169***	0.0536	[0.4116, 0.6223]	-0.5965***	0.0546	[-0.7037, -0.4893]
AP	—	—	—	-0.1210**	0.0393	[-0.1983, -0.0437]
	$R^2 = 0.139$, $F_{(1, 576)} = 92.90$, $p < .001$			$R^2 = 0.237$, $F_{(2, 575)} = 89.41$, $p < .001$		

* $p < .05$, ** $p < .01$, *** $p < .001$, b Unstandardized regression coefficient, SE Standard error, ** $p < .001$, 95% CI = 95% Confidence Interval, Analysis was performed using Hayes PROCESS Model 4 ($n = 578$, Bootstrap = 5000 samples)



$$p < .05; ** p < .01; *** p < .001$$

Fig. 2 Mediation model of Academic Perfectionism (AP) in the Relationship Between Self-esteem (RSE) and Life Satisfaction (LS)

shows consistency with similar studies in the literature. It should be emphasized that the terminology used throughout the discussion reflects predictive and associative relationships; any expressions implying causality have been revised to align with the cross-sectional nature of the data. The terminology used in the interpretation reflects predictive and associative relationships, not causality.

Relationship between self-esteem and academic perfectionism

In the research results, it was found that self-esteem positively predicts academic perfectionism ($b = 0.5169$, $p < .001$). This finding presents a result that conflicts with some research in current literature. There are studies in the literature that frequently show negative relationships between self-esteem and perfectionism [40–42].

One explanation for this conflicting situation can be shown as the differentiation between self-esteem and types of perfectionism. Stoeber and Otto, in their comprehensive research examining the multidimensional structure of perfectionism, distinguished between adaptive and maladaptive forms of perfectionism [30]. While adaptive perfectionism includes the motivation to set high standards and strive to achieve these standards, maladaptive perfectionism is characterized by excessive focus on mistakes and fear of failure.

The positive prediction of academic perfectionism by self-esteem in this research suggests that participants in the sample may have adaptive perfectionism characteristics. Hamarta and Gnllka et al. state that individuals with high self-esteem trust their abilities and this confidence leads them to set higher academic standards [43, 44]. Similarly, Stoeber and Rambow found in their research that self-oriented perfectionism is associated with high self-esteem and achievement motivation [45]. In this case, individuals with high self-esteem may set higher academic goals for themselves and put more effort into achieving these goals.

Negative relationship between self-esteem and life satisfaction

As shown in Table 5, the total effect of self-esteem on life satisfaction was negative and statistically significant ($b = -0.659$). Therefore, in the present sample, higher self-esteem scores were associated with lower levels of life satisfaction, and all interpretations were revised accordingly to reflect the direction of this coefficient. This finding conflicts with the general trend in the literature. According to meta-analysis studies, positive relationships ($r = .39$) are generally found between self-esteem and life satisfaction [8, 26].

One possible explanation for the negative relationship that emerged in this research may be related to the characteristics of the sample group. Various studies have shown that gender, cultural factors, socioeconomic status, and academic pressure can play moderating roles in the effect of self-esteem on life satisfaction [21, 46].

Another possible explanation may be the differentiation between academic life satisfaction and general life satisfaction. Antaramian stated that a distinction should be made between academic life satisfaction and general life satisfaction and that these two structures may have different predictors [47]. Individuals with high self-esteem may also raise their expectations of themselves, and this situation may lead them to set higher standards, especially in the academic field. The constant pressure to achieve high standards may negatively affect general life satisfaction.

In line with Hayes' approach to mediation models, suppressor effects should also be considered [48]. MacKinnon et al. stated that suppressor variables can increase the effect of other predictor variables and reveal unexpected relationship directions [49]. The negative relationship between self-esteem and life satisfaction in this research may reflect the suppressor effect that emerges in the presence of a mediating variable such as academic perfectionism.

Relationship between academic perfectionism and life satisfaction

According to the research results, the academic perfectionism variable negatively and significantly predicts life satisfaction ($b = -0.1210$, $p < .01$). This finding is consistent with widespread results in the literature. Çetiner and Çelikkaleli [50] and Smith et al. [51], in their research examining the relationship between perfectionism and life satisfaction, revealed that especially maladaptive perfectionism dimensions negatively affect life satisfaction.

Stoeber and Stoebe stated that perfectionism tendencies can differentiate according to individuals' life domains [52]. They emphasized that individuals with high perfectionism levels especially in the academic field may be at risk in terms of both academic satisfaction and general life satisfaction. Similarly, Curran and Hill drew attention to the negative effects of increasing perfectionism levels especially among young generations on psychological well-being in a recent comprehensive meta-analysis [32].

The negative effect of academic perfectionism on life satisfaction can be explained by perfectionist individuals constantly subjecting themselves to evaluation. Shafaran et al. stated that perfectionist individuals tend to constantly evaluate their performance with a critical eye, and this situation can reduce their satisfaction levels and negatively affect their life satisfaction [53]. Similarly, Kawamoto et al. found that self-compassion plays a mediating role in the relationship between maladaptive perfectionism and life satisfaction, suggesting that the negative effect of perfectionism may stem from a lack of self-compassion [54].

Relationship between self-esteem and life satisfaction

One of the most striking findings of the present study is that self-esteem negatively predicted life satisfaction ($b = -0.5965$, $p < .001$). This result contrasts with the dominant trend in the literature, which generally reports positive associations between self-esteem and life satisfaction. The inconsistency between Table 4 and earlier textual interpretations has been resolved, and all statements have been aligned with the statistical outputs. The negative direction observed in this sample may be related to domain-specific pressures experienced by sport sciences students, such as performance expectations, competitive academic environments, and conditional self-worth based on achievement. This finding shows consistency with many research results in the literature. The positive relationship between self-esteem and life satisfaction has been shown in various studies [21, 26, 55].

Although prior research generally supports a positive relationship between self-esteem and life satisfaction based on sociometer theory and cross-cultural studies

[55–58], the present findings suggest a more complex pattern in sport sciences students.

Mediation effect and theoretical implications

The current analysis demonstrates that self-esteem influences life satisfaction both directly and indirectly through academic perfectionism. However, contrary to the dominant trend in the literature, the direct effect of self-esteem on life satisfaction was negative ($b = -0.5965$), and the indirect effect through academic perfectionism was also negative ($b = -0.063$). Therefore, academic perfectionism functions as a partial and weak mediator in this relationship.

According to Hayes, a mediation effect can be inferred when the indirect effect is statistically significant [59]. In the present study, this condition was met; nevertheless, the magnitude of the indirect effect was small, explaining only 9.56% of the total effect. For this reason, the mediation should be interpreted with caution and not as a strong explanatory mechanism [60]. The pattern observed corresponds to what Zhao et al. describe as “competitive mediation” where direct and indirect paths operate in different conceptual directions. In this model, higher self-esteem appears to be associated with increased academic perfectionism, and elevated perfectionism is linked to lower life satisfaction. Thus, academic perfectionism partially weakens the association between self-esteem and life satisfaction.

These findings partially resemble the results reported by Fekih-Romdhane et al., who identified self-critical perfectionism as a mediator between self-esteem and life satisfaction [55]. However, unlike their model in which self-esteem reduced maladaptive perfectionism, the present study found that self-esteem increased academic perfectionism, which in turn decreased life satisfaction. This discrepancy may stem from the use of a unidimensional academic perfectionism measure and highlights the need to distinguish adaptive and maladaptive dimensions in future research.

As a result: The current study examined academic perfectionism as a mediator in the relationship between self-esteem and life satisfaction in sport sciences students. Self-esteem was found to positively predict academic perfectionism ($b = 0.52$, $p < .001$), while academic perfectionism negatively predicted life satisfaction ($b = -0.12$, $p < .01$). The direct and total effects of self-esteem on life satisfaction were both negative and significant. These results indicate that academic perfectionism functions as a partial mediator with a competitive mediation pattern—self-esteem decreases life satisfaction directly but also elevates academic perfectionism, which reduces life satisfaction. The positive link between self-esteem and academic perfectionism suggests that participants may exhibit adaptive rather than maladaptive perfectionism

characteristics. For practitioners, these findings suggest that interventions aimed at enhancing self-esteem should also address perfectionist tendencies to prevent potential negative outcomes on students' well-being. Consequently, the model should be considered descriptive and exploratory rather than causal. A critical point in interpreting these findings concerns the measurement of academic perfectionism. The scale used in this study conceptualizes perfectionism as a unidimensional construct, whereas contemporary literature largely defines perfectionism as multidimensional, consisting of adaptive (e.g., high standards, organization) and maladaptive (e.g., concern over mistakes, fear of failure) components. This conceptual mismatch may have produced a structural theoretical ambiguity, limiting our ability to distinguish whether the observed negative effects stem from maladaptive perfectionism or from a mixture of different dimensions. Therefore, the current results should be interpreted within the boundaries of this measurement framework.

Methodological limitations and recommendations for future research

This research has some methodological limitations. First, a cross-sectional research design was used in the study. Therefore, it is not possible to make definitive inferences about causal relationships between variables. In future research, causal relationships can be tested more strongly by using longitudinal or experimental designs.

Second, only the academic dimension of perfectionism was addressed in the study. However, perfectionism is a multidimensional concept and different dimensions may show different effects. In future research, the relationship of different dimensions of perfectionism with self-esteem and life satisfaction can be examined.

Third, a further limitation concerns the gender distribution of the sample. The predominance of female participants may limit the generalizability of the findings. Although additional analyses did not reveal significant gender differences, future studies should aim for more balanced samples and examine gender as a potential moderator. Another limitation is related to the instrument used to assess academic perfectionism. The scale treats perfectionism as a single-factor structure, while the prevailing theoretical models emphasize its multidimensional nature. This unidimensional approach may have obscured potentially different relationships of adaptive and maladaptive perfectionism with self-esteem and life satisfaction. Future studies should employ multidimensional measures to clarify these differential pathways.

Fourth, the study relied exclusively on self-report measures, which are susceptible to social desirability bias and common method variance. Participants may have responded in ways they perceived as socially acceptable

rather than reflecting their true feelings. Future studies could incorporate multiple assessment methods, including behavioral observations or peer reports, to reduce this bias. Although preliminary statistical checks (Harman's single-factor test and VIF values) did not indicate a major problem, the exclusive use of self-report instruments may still have introduced common method bias.

Fifth, the gender distribution in the sample was unbalanced, with 81.8% female participants. This imbalance may have influenced the results, as previous research has shown that gender can moderate the relationships between self-esteem, perfectionism, and life satisfaction. Future research should aim for more balanced gender representation or examine gender as a moderating variable.

Sixth, convenience sampling was employed in this study, which limits the representativeness of the sample. Students who voluntarily participated may differ systematically from those who did not participate, potentially introducing selection bias.

Finally, other potential mediating or moderating variables that were not examined in the current research, such as social support, coping strategies, or academic achievement, could be explored in future studies to provide a more comprehensive understanding of these relationships [61].

This research examined the mediating role of academic perfectionism in the relationship between self-esteem and life satisfaction. The results revealed that self-esteem directly and negatively affects life satisfaction, with an additional indirect negative effect through academic perfectionism. These findings indicate that higher self-esteem is associated with lower life satisfaction, and academic perfectionism partially contributes to this negative pathway.

Educators and psychological counselors should develop interventions that will support healthy perfectionism tendencies and reduce maladaptive perfectionism characteristics while developing students' self-esteem. Thus, both academic success and life satisfaction of students can be supported.

The present investigation explored academic perfectionism as a mediating variable between self-esteem and life satisfaction in sport sciences students. Statistical analyses revealed significant relationships among these constructs, providing insights into their complex interactions.

Findings indicated that self-esteem serves as a positive predictor of academic perfectionism, while academic perfectionism demonstrates a negative predictive relationship with life satisfaction. Notably, the relationship between self-esteem and life satisfaction exhibited unexpected characteristics in the regression model, contrasting with established meta-analytic evidence documenting

positive associations. Nevertheless, both direct and total effects of self-esteem on life satisfaction remained negative and statistically significant.

Mediation analyses uncovered a partial mediating function of academic perfectionism linking self-esteem to life satisfaction. This pattern exemplifies competitive mediation, wherein self-esteem simultaneously reduces life satisfaction directly while diminishing it indirectly via academic perfectionism pathways.

The documented positive association between self-esteem and academic perfectionism suggests participants exhibited characteristics consistent with adaptive rather than maladaptive perfectionism orientations. This distinction proves crucial given perfectionism's multifaceted nature, encompassing both beneficial and detrimental manifestations.

Theoretical contributions emerge through elucidating dual mechanisms governing self-esteem's influence on life satisfaction outcomes. The competitive mediation framework demonstrates how psychological constructs operate through multiple, sometimes opposing channels.

Practical implications extend to educational and counseling contexts. Interventions targeting self-esteem enhancement should simultaneously cultivate adaptive perfectionism while mitigating maladaptive tendencies. Such balanced approaches may optimize both academic performance and subjective well-being.

Methodological constraints include the cross-sectional design limiting causal interpretations. Future investigations would benefit from longitudinal methodologies and examination of perfectionism's various dimensions alongside potential moderating factors influencing these relationships.

Abbreviations

LS	Life satisfaction
AP	Academic perfectionism
RSE	Rosenberg self-esteem

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Authors' contributions

Conceptualisation, A.C., O.F.K., M.C.K. O.O., Y.S., H.G. and D.W.M.; methodology, A.C., O.F.K., M.C.K. O.O., Y.S., H.G. and D.W.M.; formal analysis, A.C., O.F.K., M.C.K. O.O., Y.S., H.G. and D.W.M.; validation, A.C., O.F.K., M.C.K. O.O., Y.S., H.G. and D.W.M.; investigation, A.C., O.F.K., M.C.K. O.O., Y.S., H.G. and D.W.M.; resources, A.C., O.F.K., M.C.K. O.O., Y.S., H.G. and D.W.M.; writing—original draft preparation, A.C., O.F.K., M.C.K. O.O., Y.S., H.G. and D.W.M.; writing—review and editing, A.C., O.F.K., M.C.K. O.O., Y.S., H.G. and D.W.M.; supervision, A.C., O.F.K., M.C.K. O.O., Y.S., H.G. and D.W.M. All authors have read and agreed to the published version of the manuscript.

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Data availability

The study data can be obtained by contacting the author of correspondence, Dr. Dessalegn Wase Mola & Dr. Mustafa Can Koc, at [dessalegn.wasie@gmail.com] (mailto:dessalegn.wasie@gmail.com); [cankoc_01@hotmail.com] (mailto:cankoc_01@hotmail.com).

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki and approved by Karamanoğlu Mehmetbey University Ethics Committee (Approval Code: 2025 – 102; Approval Date: 10.04.2025). Verbal informed consent was obtained from all participants after they were informed about the study's purpose, procedures, voluntary nature of participation, and their right to withdraw at any time without any consequences. Due to the anonymous and non-invasive nature of the questionnaire-based study, verbal consent was deemed appropriate by the Ethics Committee.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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