
The Mediating Role of Self-Compassion in the Relationship Between Exercise Addiction, Perfectionism, and Athlete Burnout

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Purpose: The present study aimed to investigate the mediating role of self-compassion in the relationship between exercise addiction, perfectionism, and athlete burnout among athletes in Tehran.

Methodology: This study employed a descriptive-correlational design using structural equation modeling. The statistical population consisted of male and female athletes participating in professional and semi-professional sports clubs in Tehran during the 2021–2022 athletic season. Using multistage cluster sampling, 420 athletes were initially selected, of whom 398 questionnaires were completed and analyzed. Data were collected using the Exercise Addiction Inventory, Frost Multidimensional Perfectionism Scale, Self-Compassion Scale, and Athlete Burnout Questionnaire. Descriptive statistics and Pearson correlation coefficients were calculated using SPSS-27, while structural equation modeling and bootstrapping analyses were conducted using AMOS-24 to evaluate direct and indirect relationships among the variables.

Findings: The findings demonstrated that exercise addiction had a significant positive effect on athlete burnout ($\beta = 0.42$, $p < 0.001$) and a significant negative effect on self-compassion ($\beta = -0.46$, $p < 0.001$). Perfectionism also positively predicted athlete burnout ($\beta = 0.35$, $p < 0.001$) and negatively predicted self-compassion ($\beta = -0.39$, $p < 0.001$). Self-compassion significantly and negatively predicted athlete burnout ($\beta = -0.51$, $p < 0.001$). Furthermore, bootstrapping analyses confirmed the mediating role of self-compassion in the relationship between exercise addiction and athlete burnout (Indirect Effect = 0.27, $p < 0.001$), as well as between perfectionism and athlete burnout (Indirect Effect = 0.22, $p < 0.001$). The structural model demonstrated satisfactory fit indices (CFI = 0.95, TLI = 0.94, RMSEA = 0.057), indicating an acceptable fit between the proposed model and the observed data.

Conclusion: The findings suggest that exercise addiction and perfectionism increase the likelihood of athlete burnout both directly and indirectly through reductions in self-compassion. Self-compassion appears to function as an important protective psychological resource that buffers athletes against emotional exhaustion and maladaptive self-evaluative processes. Therefore, interventions designed to enhance self-compassion may contribute to reducing burnout symptoms and improving psychological well-being among athletes exposed to high competitive pressures and perfectionistic tendencies.

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1. Introduction

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Athletic participation has long been associated with numerous physical, psychological, and social benefits, including improved physical health, emotional regulation, resilience, self-esteem, and psychological well-being. However, alongside these positive outcomes, increasing evidence suggests that competitive sport environments may also expose athletes to substantial psychological pressures that place them at risk for maladaptive behavioral and emotional outcomes. Elite and semi-professional athletes frequently encounter high expectations regarding performance, body image, achievement, and continuous improvement, all of which may contribute to chronic stress and emotional exhaustion (Beckmann & Nixdorf, 2020; Walton et al., 2021). In modern sport culture, dedication and intensive training are often celebrated as indicators of commitment and discipline, yet excessive involvement in exercise can gradually develop into compulsive and addictive patterns that negatively affect athletes' mental health and overall functioning.

Exercise addiction has emerged as an important psychological concern within sport psychology and behavioral health research. Exercise addiction refers to a compulsive pattern of physical activity characterized by loss of control, withdrawal symptoms, tolerance, mood modification, and continued engagement despite physical or psychological harm. Athletes experiencing exercise addiction frequently prioritize training over social relationships, academic responsibilities, and recovery needs, leading to substantial psychological and physiological consequences (Hernández et al., 2021). Although regular exercise is generally beneficial, compulsive exercise behavior may become maladaptive when athletes experience an uncontrollable need to train excessively in order to maintain self-worth, reduce anxiety, or avoid feelings of guilt. Research has shown that exercise addiction is associated with heightened psychological distress, anxiety, emotional dysregulation, perfectionistic tendencies, and burnout symptoms among athletes and physically active individuals (Hernández et al., 2021; Vicent et al., 2021).

One of the most influential psychological constructs associated with maladaptive sport involvement is perfectionism. Perfectionism is commonly defined as the tendency to establish excessively high personal standards accompanied by overly critical self-evaluations and concerns regarding mistakes and external evaluation. Within sport settings, perfectionism has received extensive attention because competitive athletes often operate in environments that reinforce flawless performance and constant achievement (Hill et al., 2020). Although certain dimensions of perfectionism may promote discipline and motivation, maladaptive perfectionism is consistently associated with emotional exhaustion, fear of failure, chronic dissatisfaction, anxiety, and impaired psychological well-being (Hill, 2021). Athletes with elevated perfectionistic concerns often perceive mistakes as catastrophic and evaluate their self-worth primarily through athletic success, which increases vulnerability to stress-related outcomes and maladaptive coping strategies.

Research examining perfectionism in sport has demonstrated that perfectionistic concerns are closely linked to unhealthy exercise patterns and psychological maladjustment. Athletes who possess rigid standards and intense fears of underperformance may engage in compulsive exercise behaviors in an attempt to maintain perceived competence and avoid criticism (Vicent et al., 2021). Similarly, Hernández et al. found that perfectionism patterns were significantly associated with exercise addiction tendencies among athletes involved in high-intensity sports (Hernández et al., 2021). These findings suggest that perfectionistic athletes may become trapped in cycles of overtraining and self-imposed pressure that increase emotional vulnerability and psychological fatigue.

A major psychological consequence of prolonged exposure to excessive training demands and perfectionistic pressure is athlete burnout. Athlete burnout is a multidimensional syndrome characterized by emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation. Burnout develops gradually when athletes experience chronic stress without sufficient psychological recovery or adaptive coping resources. Burnout has become a significant issue in competitive sport due to its detrimental effects on motivation, athletic performance, emotional health, and long-term sport participation (Olsson et al., 2021; Walker, 2021). Athletes experiencing burnout frequently report feelings of emotional depletion,

decreased satisfaction with sport involvement, reduced confidence, and diminished enthusiasm toward training and competition.

Previous studies have identified perfectionism as one of the strongest psychological predictors of burnout among athletes. Olsson et al. demonstrated that athlete and coach perfectionism significantly predicted athlete burnout over time, emphasizing the role of socially imposed performance expectations in the development of emotional exhaustion (Olsson et al., 2021). Similarly, Hill argued that perfectionistic tendencies may reach “tipping points” at which performance striving transforms into maladaptive psychological functioning and chronic distress (Hill, 2021). Beyond sport contexts, perfectionism has also been associated with burnout in academic, medical, and professional populations, suggesting that perfectionistic cognition contributes broadly to emotional exhaustion and psychological impairment (Holden & Jeanfreau, 2021; Ijaz & Khalid, 2020; Světlák et al., 2021).

Despite the growing recognition of burnout and exercise addiction in athletic populations, recent literature has increasingly emphasized the importance of protective psychological resources that may buffer athletes against maladaptive outcomes. One such construct is self-compassion. Self-compassion, conceptualized by Neff, involves treating oneself with kindness and understanding during times of failure or distress, recognizing one’s experiences as part of common humanity, and maintaining balanced awareness of negative emotions rather than over-identifying with them. Self-compassion has attracted considerable attention in sport psychology because athletes often engage in harsh self-criticism and excessive self-judgment following mistakes or performance setbacks (Mosewich et al., 2011).

Research indicates that self-compassion plays a critical role in promoting emotional resilience, adaptive coping, and psychological well-being among athletes. Mosewich et al. identified self-compassion as a valuable psychological resource for young women athletes, demonstrating that athletes with higher self-compassion reported lower self-criticism and greater emotional adjustment (Mosewich et al., 2011). Similarly, Ferguson et al. found that self-compassion was positively associated with eudaimonic well-being and psychological flourishing among female athletes (Ferguson et al., 2014). These findings suggest that self-compassion may help athletes respond to competitive stressors in healthier and more adaptive ways.

Several studies have further demonstrated the beneficial effects of self-compassion on sport performance perceptions and emotional functioning. Adam et al. reported that women athletes with greater self-compassion experienced more positive perceptions of sport performance and better psychological well-being around important competitive events (Adam et al., 2021). Killham et al. also found that self-compassion was negatively associated with self-criticism and positively related to perceived sport performance (Killham et al., 2018). These findings are particularly important because athletes often operate in evaluative environments where mistakes and failures can intensify self-critical thinking patterns.

The protective role of self-compassion has also been observed in relation to stress, anxiety, and repetitive negative thinking. Casali et al. demonstrated that self-compassion significantly reduced competition anxiety among athletes and weakened the impact of repetitive negative thinking on psychological distress (Casali et al., 2021). Likewise, Tıngaz and Çakmak reported that self-compassion and mindfulness positively contributed to athletic performance among student-athletes by improving emotional regulation and concentration (Tıngaz & Çakmak, 2021). These findings support the idea that self-compassion facilitates adaptive psychological functioning by reducing maladaptive emotional responses to pressure and failure.

Importantly, self-compassion has increasingly been conceptualized as a protective factor against burnout. Walker demonstrated that self-compassion mediated the relationship between dispositional mindfulness and athlete burnout among adolescent squash players, indicating that compassionate self-attitudes reduce emotional exhaustion and sport devaluation (Walker, 2021). In broader contexts beyond sport, self-compassion has also been linked to reduced burnout and psychological distress among physicians, students, and mental health professionals (Holden & Jeanfreau, 2021; Světlák et al., 2021; Wong, 2020). These

findings suggest that self-compassion may function as an emotional resilience mechanism capable of protecting individuals exposed to chronic performance-related stress.

Intervention-based research further supports the psychological benefits of self-compassion. Mosewich et al. demonstrated that self-compassion interventions significantly improved emotional coping and reduced self-critical responses among women athletes (Mosewich et al., 2013). Similarly, Woodfin et al. found that brief self-compassion interventions reduced perfectionism, anxiety, depression, and body image concerns (Woodfin et al., 2021). Such findings indicate that self-compassion is not merely a stable personality trait but also a trainable psychological skill that may enhance athletes' emotional adjustment and resilience.

Another important dimension of self-compassion research concerns its relationship with identity, grit, and long-term adaptation in sport settings. Mosewich et al. reported that self-compassion was positively associated with adaptive athletic identity and domain-specific grit among intercollegiate athletes (Mosewich et al., 2021). These findings suggest that self-compassion may help athletes maintain persistence and commitment while simultaneously protecting them from the destructive effects of self-criticism and emotional exhaustion.

Although previous studies have separately examined the associations among exercise addiction, perfectionism, self-compassion, and burnout, relatively limited research has investigated the mediating role of self-compassion in explaining how maladaptive behavioral and cognitive tendencies contribute to burnout in athletes. Existing evidence suggests that athletes with high perfectionistic concerns and compulsive exercise patterns are vulnerable to emotional exhaustion because they often evaluate themselves harshly and struggle to regulate distress effectively (Hernández et al., 2021; Hill et al., 2020). Self-compassion may therefore represent an important mechanism through which perfectionism and exercise addiction influence burnout outcomes.

Furthermore, studies conducted in athletic populations have highlighted the importance of psychological protective factors for maintaining mental well-being and general health among athletes. Ziarat et al. demonstrated that self-compassion mediated the relationship between stress, body image, and psychological well-being among women athletes in Tehran (Ziarat et al., 2021). These findings are particularly relevant because athletes in competitive environments frequently encounter pressures related not only to performance but also to physical appearance, social evaluation, and identity formation.

Taken together, the existing literature suggests that exercise addiction and perfectionism are significant psychological risk factors for athlete burnout, whereas self-compassion may serve as a critical protective mechanism that buffers athletes against emotional exhaustion and maladaptive self-evaluative processes. However, despite the increasing attention given to these constructs individually, there remains insufficient integrative research examining their simultaneous relationships within a comprehensive structural framework, particularly among athletes in non-Western cultural contexts. Therefore, the present study aimed to investigate the mediating role of self-compassion in the relationship between exercise addiction, perfectionism, and athlete burnout among athletes in Tehran.

2. Methodology

This study was conducted using a descriptive-correlational design based on structural equation modeling to investigate the mediating role of self-compassion in the relationship between exercise addiction, perfectionism, and athlete burnout among athletes in Tehran. The statistical population consisted of male and female athletes who were actively engaged in professional and semi-professional sports clubs and fitness centers in Tehran during the 2021–2022 athletic season. Participants were selected using a multistage cluster sampling method from various sports clubs, bodybuilding centers, and university athletic associations located in different districts of Tehran. Considering the complexity of structural equation modeling and the number of latent variables and observed indicators included in the proposed model, a sample size of 420 athletes was determined to be appropriate. After excluding incomplete and distorted questionnaires, data from 398 participants were included in the final analysis. Inclusion criteria included

being between 18 and 35 years of age, having at least two years of continuous athletic experience, participating in organized exercise at least three times per week, and willingness to participate in the study. Athletes who reported a history of severe psychiatric disorders or incomplete questionnaire responses were excluded from the final analysis. Ethical principles including confidentiality of information, voluntary participation, informed consent, and the right to withdraw from the study at any stage were fully observed throughout the research process.

Exercise addiction was assessed using the Exercise Addiction Inventory developed by Terry, Szabo, and Griffiths in 2004. This scale is a standardized self-report instrument designed to evaluate symptoms and behavioral manifestations associated with excessive and compulsive exercise engagement. The questionnaire consists of 6 items measuring dimensions such as salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse associated with exercise behavior. Items are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater levels of exercise addiction tendencies. The total score ranges from 6 to 30. Previous studies have demonstrated satisfactory psychometric properties for the scale, including acceptable internal consistency, convergent validity, and construct validity among athletic and non-athletic populations. Cronbach's alpha coefficients reported in previous studies have generally exceeded 0.80, confirming the reliability of the instrument for psychological and sport-related research contexts.

Perfectionism was measured using the Multidimensional Perfectionism Scale developed by Frost, Marten, Lahart, and Rosenblate in 1990. This instrument consists of 35 items and evaluates several dimensions of perfectionism including concern over mistakes, personal standards, parental expectations, parental criticism, doubts about actions, and organization. Responses are scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate stronger perfectionistic tendencies and maladaptive perfectionism characteristics. The questionnaire has been extensively used in sport psychology and clinical research and has demonstrated strong psychometric properties across diverse populations. Previous investigations have confirmed the validity of the instrument through factor analysis and criterion validity assessments. Reliability indices reported for the total scale and subscales have been satisfactory, with Cronbach's alpha coefficients ranging from 0.77 to 0.93 in various studies.

Self-compassion was evaluated using the Self-Compassion Scale developed by Neff in 2003. This questionnaire contains 26 items assessing six components including self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. Participants respond to each item using a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). Negative subscales are reverse scored before calculating the total score, and higher overall scores represent greater levels of self-compassion. The Self-Compassion Scale is one of the most widely used instruments for assessing compassionate self-attitudes and emotional regulation capacities. Previous studies conducted in both clinical and athletic populations have confirmed the scale's construct validity, convergent validity, and reliability. Reported Cronbach's alpha coefficients for the total scale have typically ranged between 0.85 and 0.92, indicating strong internal consistency and measurement stability.

Athlete burnout was measured using the Athlete Burnout Questionnaire developed by Raedeke and Smith in 2001. This instrument includes 15 items distributed across three subscales consisting of emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation. Items are rated on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). Higher scores indicate greater levels of athlete burnout and psychological exhaustion associated with prolonged athletic participation. The Athlete Burnout Questionnaire has been extensively validated in sport psychology research and has demonstrated appropriate factorial structure and criterion-related validity among competitive athletes. Previous studies have reported satisfactory reliability coefficients for the overall scale and its subdimensions, with Cronbach's alpha values generally exceeding 0.80. The questionnaire has been widely utilized in studies investigating psychological well-being, stress, and motivational processes in athletic populations.

Data collection was conducted after obtaining the necessary permissions from sports clubs and athletic organizations in Tehran. Participants completed the questionnaires individually in quiet environments before or after training sessions under the supervision of the researcher. Before administration, participants received detailed explanations regarding the objectives of the study and instructions for completing the questionnaires. The average completion time for all instruments was approximately 25 to 30 minutes. Collected data were analyzed using SPSS version 27 and AMOS version 24. Descriptive statistics including mean, standard deviation, skewness, and kurtosis were first calculated to examine the distribution characteristics of the variables. Pearson correlation coefficients were used to assess the relationships among exercise addiction, perfectionism, self-compassion, and athlete burnout. Structural equation modeling was then employed to test the hypothesized mediating role of self-compassion in the relationship between predictor and outcome variables. Model fit was evaluated using several fit indices including the chi-square to degrees of freedom ratio, Comparative Fit Index, Tucker–Lewis Index, Goodness-of-Fit Index, and Root Mean Square Error of Approximation. Bootstrapping procedures with 5000 resamples were also utilized to examine the significance of indirect effects and mediation pathways.

3. Findings

The present study was conducted on 398 athletes from various sports clubs and athletic centers in Tehran. The demographic findings indicated that 231 participants (58.04%) were male and 167 participants (41.96%) were female. The mean age of participants was 24.87 years ($SD = 4.61$), with an age range between 18 and 35 years. Regarding educational level, 92 participants (23.12%) held a diploma degree, 214 participants (53.77%) had bachelor's degrees, and 92 participants (23.12%) possessed postgraduate qualifications. In terms of athletic experience, the average duration of continuous athletic participation was 6.74 years ($SD = 3.28$). Additionally, 46.98% of the participants were involved in individual sports such as bodybuilding, martial arts, and athletics, while 53.02% participated in team sports including football, volleyball, basketball, and handball. Descriptive examination also demonstrated that the majority of participants engaged in exercise activities between four and six sessions per week, indicating a relatively high level of athletic involvement among the sampled athletes.

Table 1. Descriptive Statistics and Correlations Among Research Variables

Variables	Mean	SD	Skewness	Kurtosis	1	2	3	4
1. Exercise Addiction	22.48	4.93	-0.41	-0.28	1			
2. Perfectionism	103.72	16.85	-0.37	0.14	0.54**	1		
3. Self-Compassion	77.65	13.24	-0.22	-0.19	-0.48**	-0.51**	1	
4. Athlete Burnout	43.91	9.76	0.31	-0.11	0.61**	0.58**	-0.63**	1

** $p < 0.01$

The findings presented in Table 1 indicate that all study variables had acceptable distribution characteristics, as skewness and kurtosis values were within the acceptable range of ± 2 , confirming the assumption of normality for subsequent parametric analyses. The mean scores demonstrated relatively elevated levels of exercise addiction and perfectionism among athletes, while the mean score for self-compassion reflected a moderate psychological coping capacity within the sample. Correlation analysis revealed that exercise addiction had a significant positive relationship with perfectionism ($r = 0.54$, $p < 0.01$) and athlete burnout ($r = 0.61$, $p < 0.01$), suggesting that athletes with compulsive exercise tendencies were more likely to experience perfectionistic characteristics and burnout symptoms. Moreover, perfectionism was positively associated with athlete burnout ($r = 0.58$, $p < 0.01$), indicating that rigid personal standards and excessive concern over performance errors contribute substantially to emotional and physical exhaustion in athletes. In contrast, self-compassion demonstrated significant negative correlations with exercise addiction ($r = -0.48$, $p < 0.01$), perfectionism ($r = -0.51$, $p < 0.01$), and athlete burnout ($r = -0.63$, $p < 0.01$), suggesting that athletes with greater self-compassion experience lower psychological distress, reduced

maladaptive perfectionism, and lower levels of burnout. These findings provided preliminary support for the proposed mediating role of self-compassion in the structural model.

Table 2. Results of Structural Equation Modeling for Direct Effects

Pathways	B	SE	β	CR	p
Exercise Addiction → Self-Compassion	-0.53	0.07	-0.46	-7.57	0.001
Perfectionism → Self-Compassion	-0.41	0.06	-0.39	-6.83	0.001
Exercise Addiction → Athlete Burnout	0.49	0.08	0.42	6.91	0.001
Perfectionism → Athlete Burnout	0.37	0.07	0.35	5.88	0.001
Self-Compassion → Athlete Burnout	-0.58	0.09	-0.51	-8.14	0.001

The results of the structural equation modeling presented in Table 2 demonstrated that all direct pathways in the proposed model were statistically significant. Exercise addiction significantly and negatively predicted self-compassion ($\beta = -0.46$, $p < 0.001$), indicating that athletes exhibiting compulsive exercise behaviors reported lower levels of kindness toward themselves, emotional balance, and adaptive self-awareness. Similarly, perfectionism negatively predicted self-compassion ($\beta = -0.39$, $p < 0.001$), suggesting that perfectionistic athletes tend to engage in harsh self-criticism and experience difficulties in emotional self-regulation. Furthermore, exercise addiction had a significant positive effect on athlete burnout ($\beta = 0.42$, $p < 0.001$), while perfectionism also positively predicted burnout ($\beta = 0.35$, $p < 0.001$). These findings indicate that excessive exercise engagement and maladaptive perfectionistic standards substantially increase the likelihood of emotional exhaustion, sport devaluation, and reduced athletic accomplishment. In addition, self-compassion showed a strong negative direct effect on athlete burnout ($\beta = -0.51$, $p < 0.001$), revealing that athletes with higher levels of compassionate self-attitudes experience significantly lower burnout symptoms. Overall, the findings confirmed the hypothesized direct relationships among the variables and provided empirical support for the proposed conceptual framework.

Table 3. Indirect Effects of Exercise Addiction and Perfectionism on Athlete Burnout Through Self-Compassion Using Bootstrapping

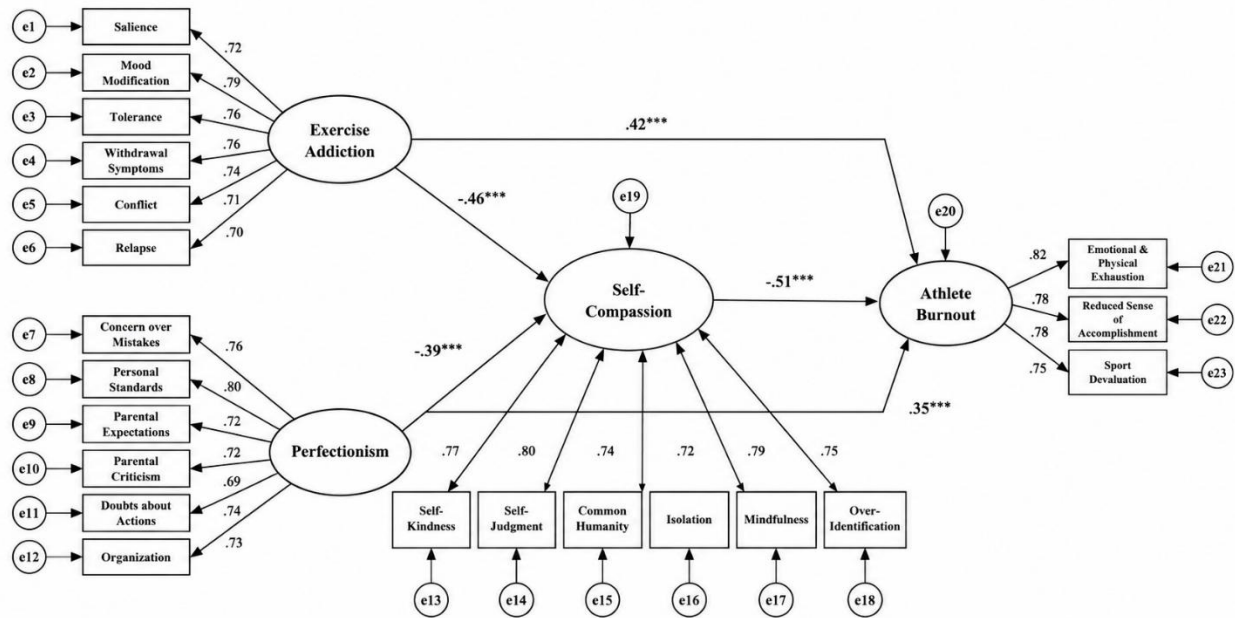
Indirect Pathways	Indirect Effect	Boot SE	Lower CI	Upper CI	p
Exercise Addiction → Self-Compassion → Athlete Burnout	0.27	0.05	0.18	0.38	0.001
Perfectionism → Self-Compassion → Athlete Burnout	0.22	0.04	0.14	0.31	0.001

The bootstrapping analysis results reported in Table 3 demonstrated that self-compassion significantly mediated the relationships between exercise addiction, perfectionism, and athlete burnout. The indirect effect of exercise addiction on athlete burnout through self-compassion was statistically significant (Indirect Effect = 0.27, $p < 0.001$), as the confidence interval did not include zero. This finding indicates that compulsive exercise behaviors contribute to athlete burnout not only directly but also indirectly by reducing self-compassion capacities. Similarly, the indirect pathway between perfectionism and athlete burnout through self-compassion was also significant (Indirect Effect = 0.22, $p < 0.001$), suggesting that perfectionistic tendencies increase burnout partly through diminishing athletes' compassionate and accepting attitudes toward themselves. The mediating role of self-compassion highlights its importance as a psychological protective factor capable of reducing the detrimental impact of maladaptive behavioral and cognitive tendencies on athlete well-being. These findings emphasize that self-compassion may function as an important emotional regulation mechanism that buffers athletes against psychological exhaustion and sport-related distress.

Table 4. Fit Indices of the Proposed Structural Model

Fit Indices	Obtained Value	Acceptable Value
χ^2/df	2.31	< 3
GFI	0.93	> 0.90
AGFI	0.91	> 0.90
CFI	0.95	> 0.90
TLI	0.94	> 0.90
RMSEA	0.057	< 0.08

The findings presented in Table 4 indicate that the proposed structural model demonstrated a satisfactory fit with the observed data. The chi-square to degrees of freedom ratio ($\chi^2/df = 2.31$) was below the recommended threshold of 3, indicating acceptable model parsimony. Furthermore, the goodness-of-fit indices including GFI, AGFI, CFI, and TLI all exceeded 0.90, confirming strong model adequacy and consistency between the hypothesized model and empirical data. The RMSEA value of 0.057 also reflected an acceptable approximation error and supported the overall suitability of the structural model. Collectively, these fit indices confirmed that the proposed mediational model adequately explained the relationships among exercise addiction, perfectionism, self-compassion, and athlete burnout among athletes in Tehran.



Note. Standardized coefficients are reported.
 *** $p < .001$

Figure 1. Final Structural Model of the Mediating Role of Self-Compassion in the Relationship Between Exercise Addiction, Perfectionism, and Athlete Burnout

The final structural model demonstrated that exercise addiction and perfectionism both exerted direct and indirect effects on athlete burnout through self-compassion. The standardized pathways indicated that exercise addiction had the strongest direct positive association with burnout, whereas self-compassion showed the strongest negative association with burnout symptoms. The figure also illustrated that higher levels of perfectionism and compulsive exercise behaviors were associated with reductions in self-compassion, which subsequently increased burnout severity. Overall, the structural model explained a substantial proportion of the variance in athlete burnout, indicating that the combination of maladaptive behavioral tendencies and emotional self-regulation mechanisms plays a critical role in predicting psychological exhaustion among athletes. The findings derived from the model provide empirical evidence

supporting the theoretical importance of self-compassion as a protective psychological resource in athletic populations.

4. Discussion

The present study aimed to investigate the mediating role of self-compassion in the relationship between exercise addiction, perfectionism, and athlete burnout among athletes in Tehran. The findings demonstrated that exercise addiction and perfectionism were positively associated with athlete burnout, whereas self-compassion was negatively associated with both maladaptive variables and burnout symptoms. Furthermore, the structural equation modeling results confirmed that self-compassion significantly mediated the relationships between exercise addiction, perfectionism, and athlete burnout. Overall, the findings supported the proposed conceptual model and highlighted the protective psychological role of self-compassion within athletic contexts.

One of the major findings of the present study was that exercise addiction significantly predicted athlete burnout. Athletes who reported higher levels of compulsive exercise behaviors also experienced greater emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation. This finding is consistent with previous studies emphasizing the psychological risks associated with excessive exercise engagement (Hernández et al., 2021; Vicent et al., 2021). Exercise addiction is often accompanied by chronic pressure to maintain performance standards, fear of losing fitness, and inability to disengage from training routines even during periods of physical fatigue or emotional exhaustion. Such conditions gradually deplete athletes' psychological resources and increase vulnerability to burnout symptoms.

The positive relationship observed between exercise addiction and burnout can be explained through several psychological mechanisms. Athletes with compulsive exercise tendencies frequently define their self-worth through performance outcomes and physical competence. Consequently, they may feel obligated to continue intense training despite injury, fatigue, or emotional distress. Over time, persistent overtraining and insufficient psychological recovery contribute to emotional exhaustion and diminished intrinsic motivation toward sport participation. Previous research has shown that athletes involved in high-intensity sport environments often experience maladaptive perfectionistic tendencies and addictive exercise patterns simultaneously, increasing the likelihood of emotional dysregulation and psychological fatigue (Hernández et al., 2021). In this regard, the present findings support the argument that excessive commitment to training may eventually undermine athletes' emotional well-being rather than enhance performance.

Another important finding was the significant positive relationship between perfectionism and athlete burnout. Athletes with elevated perfectionistic tendencies experienced greater levels of emotional exhaustion and dissatisfaction with their sport participation. This finding aligns with earlier studies indicating that maladaptive perfectionism is one of the strongest predictors of burnout in competitive athletic settings (Hill, 2021; Olsson et al., 2021). Perfectionistic athletes often establish unrealistically high standards for themselves and interpret even minor mistakes as indicators of failure or inadequacy. Such rigid self-evaluative processes create chronic psychological pressure and increase emotional vulnerability.

The relationship between perfectionism and burnout may also be understood through cognitive-emotional mechanisms associated with self-criticism and fear of negative evaluation. Athletes with perfectionistic concerns frequently engage in repetitive negative thinking, excessive worry about mistakes, and constant dissatisfaction with performance outcomes. These maladaptive cognitive processes intensify stress responses and reduce emotional recovery following competitions or training sessions. Previous studies have similarly demonstrated that perfectionism contributes to anxiety, depressive rumination, and burnout in both sport and non-sport populations (Holden & Jeanfreau, 2021; Ijaz & Khalid, 2020). Hill et al. further emphasized that perfectionism in sport, dance, and exercise contexts often involves a persistent discrepancy between actual and ideal performance standards, which contributes to chronic psychological strain (Hill et al.,

2020). Therefore, the present findings reinforce the notion that perfectionism functions as a substantial psychological risk factor for athlete burnout.

The findings also revealed that self-compassion was negatively associated with exercise addiction, perfectionism, and athlete burnout. Athletes with greater self-compassion reported lower levels of compulsive exercise behaviors, reduced perfectionistic concerns, and lower burnout symptoms. This finding is highly consistent with prior research demonstrating the beneficial role of self-compassion in emotional regulation and psychological resilience among athletes (Ferguson et al., 2014; Mosewich et al., 2011). Self-compassion encourages athletes to respond to failures and setbacks with understanding and emotional balance rather than harsh self-criticism. Consequently, self-compassionate athletes may be less likely to engage in maladaptive behaviors aimed at preserving self-worth or avoiding perceived inadequacy.

The inverse relationship between self-compassion and perfectionism observed in this study is particularly important. Athletes who possess greater self-compassion may evaluate mistakes more adaptively and avoid interpreting performance failures as personal deficiencies. Such emotional flexibility likely reduces the intensity of perfectionistic self-criticism and promotes healthier coping strategies under competitive pressure. These findings align with research indicating that self-compassion interventions significantly reduce perfectionism, anxiety, and depressive symptoms (Woodfin et al., 2021). Similarly, Killham et al. found that self-compassion was negatively related to self-criticism and positively associated with healthier perceptions of sport performance (Killham et al., 2018). The present results therefore support the argument that self-compassion serves as a psychological counterbalance to maladaptive perfectionistic cognition.

The negative relationship between self-compassion and burnout also corresponds closely with previous findings in sport psychology literature. Walker demonstrated that self-compassion mediated the relationship between mindfulness and athlete burnout among adolescent athletes (Walker, 2021). Likewise, research conducted in professional and educational settings has consistently shown that self-compassion protects individuals from emotional exhaustion and psychological distress (Světlák et al., 2021; Wong, 2020). Athletes with high self-compassion may recover more effectively from stressful experiences because they maintain emotional equilibrium and avoid excessive self-condemnation after poor performances. Consequently, they experience lower emotional fatigue and greater psychological endurance.

The most significant finding of the present study was the mediating role of self-compassion in the relationships between exercise addiction, perfectionism, and athlete burnout. The results demonstrated that both exercise addiction and perfectionism contributed to burnout indirectly through reductions in self-compassion. This finding suggests that self-compassion functions as an important psychological mechanism linking maladaptive behavioral and cognitive tendencies to emotional exhaustion among athletes.

From a theoretical perspective, this mediational relationship may be explained through emotional regulation theory and self-determination frameworks. Exercise addiction and perfectionism often increase athletes' dependence on external validation and performance-based self-worth. Athletes who constantly seek perfection or engage compulsively in exercise may gradually lose the capacity to respond compassionately toward themselves during moments of failure or stress. Reduced self-compassion then intensifies emotional exhaustion because athletes become trapped in cycles of self-criticism, guilt, and chronic dissatisfaction. In contrast, athletes with higher self-compassion are more capable of maintaining emotional resilience even when facing setbacks or performance challenges.

The mediating role of self-compassion identified in this study is strongly supported by previous empirical findings. Mosewich et al. emphasized that self-compassion represents a valuable psychological resource for athletes because it promotes adaptive coping and emotional recovery following stressful experiences (Mosewich et al., 2011). Furthermore, Mosewich et al. later demonstrated that self-compassion interventions improved athletes' emotional adjustment and reduced maladaptive self-evaluative responses (Mosewich et al., 2013). These findings indicate that self-compassion may interrupt the pathway through which perfectionistic tendencies and compulsive exercise behaviors contribute to burnout symptoms.

The present results are also consistent with studies highlighting the relationship between self-compassion and psychological well-being among athletes. Adam et al. found that self-compassion was associated with improved well-being and more adaptive performance perceptions around important competitions (Adam et al., 2021). Ferguson et al. similarly demonstrated that self-compassion contributed positively to eudaimonic well-being in women athletes (Ferguson et al., 2014). Collectively, these findings suggest that self-compassion not only protects against distress but also enhances positive psychological functioning within competitive sport environments.

Additionally, the findings can be interpreted within the broader framework of athlete mental health. Walton et al. emphasized that mental health concerns among youth athletes have become increasingly prominent due to growing performance pressures and competitive demands (Walton et al., 2021). Athletes frequently encounter expectations related to achievement, body image, and constant improvement, which can intensify emotional vulnerability. Self-compassion may therefore represent a critical protective resource capable of reducing the harmful effects of these pressures by encouraging emotional acceptance and adaptive coping.

The cultural context of the present study is also noteworthy. Although most previous studies on self-compassion and burnout have been conducted in Western societies, the current findings suggest that the protective role of self-compassion extends to athletes within Iranian sport culture as well. Consistent with the findings of Ziarat et al., self-compassion appears to promote psychological well-being and emotional adjustment among athletes in Tehran (Ziarat et al., 2021). This highlights the cross-cultural relevance of compassionate self-attitudes in promoting athlete mental health and reducing maladaptive psychological outcomes.

Moreover, the findings concerning self-compassion and athletic functioning are consistent with research demonstrating that compassionate self-attitudes contribute positively to performance-related outcomes. Tingaz and Çakmak reported that self-compassion and mindfulness improved athletic performance by strengthening concentration and emotional regulation capacities (Tingaz & Çakmak, 2021). Similarly, Mosewich et al. found positive associations between self-compassion, athletic identity, and domain-specific grit among intercollegiate athletes (Mosewich et al., 2021). These studies support the idea that self-compassion not only reduces psychological distress but also enhances adaptive motivation and persistence in athletic contexts.

Finally, the present findings underscore the importance of addressing maladaptive perfectionism and compulsive exercise behaviors within sport psychology interventions. Athletes are often socialized to believe that relentless self-criticism and excessive training are necessary for success. However, the findings of this study suggest that such patterns may ultimately undermine psychological well-being and increase burnout vulnerability. Promoting self-compassion may therefore help athletes maintain motivation and competitive engagement while simultaneously protecting their emotional health.

One limitation of the present study was the use of a cross-sectional design, which restricted the ability to establish causal relationships among exercise addiction, perfectionism, self-compassion, and athlete burnout. Additionally, the reliance on self-report questionnaires may have increased the possibility of response bias and socially desirable responding. Another limitation involved the sampling procedure, as participants were selected only from athletic centers and sports clubs in Tehran, limiting the generalizability of the findings to athletes from other cultural or geographical contexts. Furthermore, variables such as coaching style, type of sport, injury history, and competitive level were not examined in the proposed model despite their potential influence on burnout and psychological functioning.

Future research should employ longitudinal and experimental designs to better clarify the causal pathways among perfectionism, exercise addiction, self-compassion, and athlete burnout over time. Researchers are also encouraged to investigate additional psychological variables such as resilience, emotional intelligence, motivational climate, and coping strategies within similar structural models. Comparative studies involving athletes from different sports disciplines, age groups, and cultural settings may provide deeper

understanding regarding the generalizability of the present findings. Moreover, future intervention studies could evaluate the effectiveness of self-compassion-based training programs in reducing burnout and maladaptive perfectionism among competitive athletes.

The findings of the present study have several practical implications for sport psychologists, coaches, athletic organizations, and mental health professionals working with athletes. Psychological training programs aimed at enhancing self-compassion may help athletes regulate stress more effectively and reduce excessive self-criticism associated with perfectionism and compulsive exercise behaviors. Coaches and athletic staff should also be educated regarding the psychological risks of unrealistic performance expectations and chronic overtraining. Integrating self-compassion practices into athlete development programs may contribute to healthier emotional functioning, improved well-being, and greater long-term athletic sustainability. Additionally, screening athletes for signs of exercise addiction and maladaptive perfectionism may facilitate early psychological intervention and reduce the likelihood of burnout development.

Moral standards

In the present study, the ethical principles related to qualitative researches were observed.

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Contribution of authors

In this research, each of the authors had a share in collecting the theoretical and research background, and the author was responsible for the initial writing of the article, analysis, writing and editing of the final article.

Conflict of interest There was no conflict of interest in this research.

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