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The Effect of Mindfulness Training on Sports Orientation and Attitudes Toward Doping in Male Weightlifters

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ABSTRACT

Objective: Successful athletic performance in high-level competitions requires the integration of physiological, psychological, and interpersonal capacities and preparedness. Mindfulness training has gained attention as a psychological intervention for athletes. The present study aimed to examine the effect of mindfulness training on sports orientation and attitudes toward doping in weightlifters.

Methods: This was a randomized controlled trial with a pretest-posttest design and a control group. Twenty-four skilled male weightlifters (aged 18–25 years) who formally competed in national and international competitions were selected via convenience sampling and randomly assigned to either an experimental or a control group. The intervention was conducted according to the Gardner and Moore (2007) Mindfulness-Acceptance-Commitment (MAC) program for eight weeks, with one 50-minute session per week. Data were collected using the Performance Enhancement Attitude Scale (PEAS) and the Sports Orientation Questionnaire (SOQ). Data analysis was performed using multivariate analysis of covariance (MANCOVA) in SPSS version 26, with a significance level set at $p < .05$

Results: The results indicated a significant difference between the experimental and control groups at the posttest stage. Mindfulness training had a significant effect on sports goal orientation and attitudes toward doping in weightlifters ($p < .05$).

Conclusion: It appears that mindfulness training may contribute to the formation of positive attitudes against doping and the enhancement of sports orientations in weightlifters, although further research in this area is recommended.

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Introduction

Enhancing athletic performance is a multidimensional process that necessitates the integration of physiological, psychological, and interpersonal factors. Among effective psychological interventions, mindfulness training has been recognized as an efficacious approach that, through enhancing self-awareness and improving emotional regulation, can influence attitudes and behaviors related to doping (1). The underlying mechanisms of these effects include the enhancement of executive functions such as attentional control, cognitive flexibility, and psychological resilience, which are considered essential for success in competitive sport (2).

Research evidence indicates that mindfulness-based interventions not only increase athletes' psychological well-being and reduce anxiety but also improve sleep quality, all of which contribute to enhanced athletic performance (3). Furthermore, mindfulness facilitates the flow state—a condition of complete immersion in an activity accompanied by optimal performance—and reduces competitive anxiety, leading to improved performance indicators. Meta-analytic findings also confirm the significant effect of mindfulness training in enhancing performance and reducing psychological distress (4).

The benefits of mindfulness are not confined to clinical populations but are also evident in specialized groups such as elite athletes (5). In addition to its positive association with flow states, this practice improves physiological indicators (e.g., salivary cortisol levels and immune responses) and psychological performance (6). Existing evidence suggests that mindfulness can strengthen decision-making, self-awareness, and goal orientation in athletes, potentially reducing vulnerability to doping behaviors (1,2).

Within the context of Iranian sports, numerous studies have emphasized the central role of mindfulness in improving athletic performance and moderating attitudes toward doping. Shayani et al. (2021) demonstrated a positive association between mindfulness and athletes' perceived success, with training commitment serving as a mediator (7). Shahhosseini et al. (2020) observed enhanced attention, planning, and cognitive performance in elite judokas following a mindfulness-based performance enhancement intervention (8). International evidence aligns with domestic findings, confirming the positive impact of mindfulness on athletic performance and the reduction of psychological distress. Si et al. (2024), in their meta-analysis, reported improved attention, performance, and psychological state in athletes following mindfulness interventions (4). Nien et al. (2020) also observed increased endurance performance and executive functions in university athletes after implementing a five-week mindfulness program (2).

Doping is considered a negative phenomenon in sports; however, studies have shown that even athletes who perceive doping negatively still use prohibited substances in practice (9). In weightlifting—a sport long associated with performance-enhancing substances, to the extent that athletes from several countries were banned from participating in the Tokyo 2021 Olympics due to anti-doping rule violations (10)—concerning evidence of the psychological consequences of anabolic-androgenic steroid use has been reported. These consequences include depression, cognitive impairment, aggression, psychosis, and muscle dysmorphia (11). The significance of this issue is such that medical care protocols during the Tokyo 2021 Olympic Games emphasized the need for special attention to the mental health of elite weightlifters (12).

In Iran, alongside the growth of professional sports and the enhanced socio-economic status of athletes, the prevalence of doping has increased. According to data from the International Weightlifting Federation for the period 2003–2022, Iran, with 22 sanctioned weightlifters, ranks fifth globally for the highest number of athletes sanctioned due to positive doping results—all of whom are male. This statistic indicates a significant prevalence of doping in Iranian weightlifting (13).

Sports orientation, as a fundamental construct in sport psychology, plays a decisive role in athletes' perception of success and motivation, and ethical decision-making (14). Based on goal orientation theory (15), two main patterns can be distinguished: task orientation and ego orientation. Task-oriented athletes define success in terms of learning, personal growth, and continuous improvement, whereas ego-oriented athletes conceptualize success within a win–lose comparison framework and superiority over others. Numerous studies have shown that ego orientation predicts more favorable attitudes toward doping, reduced moral sensitivity, and an increased likelihood of unethical behaviors in sports (14,16). Petróczi (17), found that athletes who place greater emphasis on winning and social comparison are more prone to perceive doping as a legitimate strategy for achieving success.

The findings of Nicholls et al. (18) in a study of 1,265 adolescent athletes also revealed that ego orientation is associated with greater vulnerability to doping and stronger instrumental attitudes, whereas task orientation and intrinsic motivation are linked to stronger anti-doping attitudes. In other words, a motivational structure based on competition and dominance over others creates a context for justifying doping. Other research employing mediation analysis models has shown that moral disengagement is a significant pathway through which ego orientation influences attitudes toward doping (19). Ingleman et al. (20) reported that moral disengagement fully mediated the relationship between ego orientation and favorable attitudes toward doping. These findings suggest that athletes with ego-oriented goal-setting may construct moral

justifications for unethical behaviors more readily than others.

Furthermore, research by Hurst et al. (21) and Lee (22) has examined the relationship between goal orientations, mindfulness, and the likelihood of doping inclination, demonstrating that ego-oriented characteristics and perceived stress influence the use of supplements and doping. Additionally, an individual's attitude toward doping can be influenced by latent personality traits, prior experiences, environmental factors, and goal-setting characteristics (23). On the other hand, Barkoukis et al. (24) found that athletes with high sportsmanship (e.g., social attitudes and behaviors), autonomous motivation (i.e., motivation stemming from enjoyment or personal value), and mastery-approach goals (i.e., emphasis on improvement and personal effort) reported lower doping intentions compared to individuals with low sportsmanship, controlled motivation (i.e., motivation driven by pressure, social approval, or guilt), and performance-approach goals (i.e., emphasis on demonstrating normative superiority). Hadipour Fard et al. (25), found that hopelessness and self-handicapping were significantly associated with doping inclination among athletes, and that to reduce doping in competitive athletes, attention must be paid to their psychological issues.

Despite the growing prominence of weightlifting and the increasing emphasis on the mental health of elite athletes, limited research has been conducted in this area, and most existing information pertains to bodybuilders. Overall, evidence suggests that mindfulness can enhance both athletic and cognitive performance in athletes, and that personality traits and goal orientations play an important role in doping inclination. However, there is a scarcity of studies focusing on mindfulness interventions and doping prevention in specific athletic populations, such as weightlifters, highlighting the need for further research.

A systematic review of credible studies indicates that the initiation of doping typically occurs from late adolescence to the early twenties, with most reported users being between 20 and 40 years of age; furthermore, the majority of studies suggest that approximately 80% of athletes begin doping before the age of 30 (26). For this reason, the age group of 18 to 25 years was targeted in this study as young weightlifters who are at a critical age for doping initiation. Accordingly, this research was conducted to address two hypotheses:

H1: Mindfulness training will yield more adaptive goal orientation in the experimental group than control.

H2: Mindfulness training will lead to more anti-doping attitudes in the experimental group than control.

Materials and Methods

The present study is a randomized controlled trial with a pretest-posttest design accompanied by a control group. The research variables included: mindfulness

training as the independent variable, and goal orientation and attitudes toward doping as the dependent variables.

The study population consisted of skilled male weightlifters aged 18 to 25 years, active in Tehran province, who had at least two years of training experience and participation in national competitions. Sampling was conducted using convenience sampling, and participants were allocated via block randomization by person who not informed about the specific research objectives or study hypotheses.

Inclusion criteria were: at least two years of training experience or formal participation in national championship competitions, full physical and mental health, no history of psychiatric disorders, and providing informed consent to participate in the study. Exclusion criteria included: unwillingness to cooperate at any stage of the study, occurrence of unforeseen events, use of specific medications, participation in other mindfulness workshops or training classes within the past six months or during the research implementation, absence from three training sessions, and failure to complete assigned tasks during the training period.

Throughout the implementation stages of this research, the ethical principles for working with human subjects outlined in the Helsinki Declaration were observed (27).

Instruments

a) Performance Enhancement Attitude Scale (PEAS).

The Performance Enhancement Attitude Scale was developed by Petróczi and Aidman (28) to assess individuals' attitudes toward the use of doping. This unidimensional scale consists of 17 items, with responses and scoring based on a 6-point Likert scale anchored at one for strongly disagree and six for strongly agree. The score range on the Performance Enhancement Attitude Scale is between 17 and 102, with higher scores indicating a more positive attitude toward doping. The findings of Petróczi and Aidman's research indicate favorable psychometric properties of the scale (28). Results from confirmatory factor analysis and exploratory factor analysis supported a unidimensional structure of the scale. Cronbach's alpha coefficients in various groups ranged from 0.71 to 0.91, indicating appropriate internal consistency of the scale. The findings also confirmed the test-retest reliability of the scale (r = 0.752). Furthermore, Petróczi and Aidman (2009) reported satisfactory validity of the scale by examining its relationship with the intention to use doping and self-reported doping use (28). The results of Morente-Sánchez et al.'s (29) study also indicated acceptable reliability (0.64) and validity (0.85). The Persian version of this questionnaire has also been used in previous studies, and its validity and reliability have been reported as acceptable (30).

b) Sport Orientation Questionnaire (SOQ)

The SOQ, developed by Gill and Deeter (1988), measures achievement orientation in sport through 25 items distributed across

three subscales: competitiveness (13 items), win orientation (6 items), and goal orientation (6 items) (29). Items are rated on a five-point Likert scale, producing total scores between 25 and 75. Reported Cronbach's alpha coefficients are 0.834 for goal orientation, 0.797 for win orientation, and 0.866 for competitiveness. Reliability and validity were confirmed in Persian by Bahram and Shafizadeh (2003), with an overall reliability coefficient of 0.89.

This questionnaire is used to measure sports orientation or achievement motivation in sports. It consists of 25 items and three subscales: Competitiveness (13 items), Win Orientation (6 items), and Goal Orientation (6 items). It is scored based on a 5-point Likert scale, with the lowest possible score being 25 and the highest 75. The values for the Competitiveness and Win Orientation subscales are considered equivalent to ego orientation, while the Goal Orientation subscale is considered equivalent to task orientation. Cronbach's alpha for the goal orientation, win orientation, and competitiveness indices were 0.834, 0.797, and 0.866, respectively. The total questionnaire score is obtained by summing the scores of each subscale. The reliability of the Persian version of this questionnaire was reported as acceptable by Abyari et al. (31) using Cronbach's alpha (α = 0.90). Furthermore, Bahram and Shafizadeh (32) confirmed the validity of the questionnaire at 0.89.

Procedure

Following the approval of the research proposal by the university's academic department and after visiting weightlifting clubs in Tehran, the objectives of the study were explained to managers and athletes. Due to the limited number of available weightlifters in the target clubs, 30 weightlifters expressed willingness to participate in the study. After applying the inclusion and exclusion criteria, 27 individuals were invited to participate in the research. After informing all participants about the conditions of participation, confidentiality, and the privacy of personal information, informed consent forms along with the questionnaires were distributed and completed by the participants.

Allocation of participants to the experimental and control groups was performed using block randomization with a random number generator to ensure relative equality in group sizes (14 in the experimental group versus 13 in the control group) throughout the study. Two participants from the experimental group and one from the control group were excluded due to unwillingness to continue in the research process. Consequently, considering the limitations in the target population size and in line with previous studies (33), 24 individuals were included as the final sample for analysis in this research.

For the experimental group, the mindfulness intervention was conducted according to the training program (Table 1). The mindfulness intervention followed the Mindfulness-Acceptance-Commitment (MAC) program by Gardner and Moore (33) over eight weeks,

with one 50-minute session per week. The mindfulness intervention sessions were conducted by a master's student in motor behavior who had received adequate training in mindfulness, under the supervision of a specialist in sport psychology with a doctoral degree. The MAC program is a flexible protocol with seven modules; participants were exposed to various mindfulness exercises and homework at the end of each session. Adherence to home practice was monitored using a daily log and, at the beginning of each weekly group session, brief feedback (5–10 minutes) was collected either individually or in groups regarding the home practice experience. These feedback sessions were recorded by the instructor, and any issues or deviations from the protocol were immediately corrected (34).

The control group, during the same period, solely engaged in their routine daily training. One day after the final mindfulness intervention session, the questionnaires were completed again by all participants in the posttest phase. To ensure blinding, all assessment and data analysis procedures during the pretest and posttest phases were carried out by individuals who were unaware of the group allocations.

Table 1. Summary of the content of the mindfulness program

Session	Session explanation
First	Preparing players for psychological training: training and information on the theoretical and practical aspects of the intervention, information on ethical guidelines and structure for the full MAC training program, discussion of thoughts, feelings, emotions and behaviors related to the participants' past performance experience.
Second	Introducing mindfulness and cognitive dissonance: The concepts will be clarified and justified by their use in sports environments.
Third	Introducing Value-Driven Behavior: The brief relationship between goals, values, and behaviors will be discussed, and the differences between value-driven versus emotion-driven behaviors will be determined.
Fourth	Introducing Acceptance: Explaining the concept of acceptance and the implications associated with experiential avoidance, and the benefits accrued by practicing experiential acceptance when aiming for resilience, self-confidence, and emotion regulation.
Fifth	Increasing Commitment: The concepts of motivation and commitment will be presented based on their relationship to behavior. Their differences will also be considered.
Sixth	Consolidating skills and balance - a presentation on combining mindfulness, acceptance, and commitment.
Seventh	Maintaining and Enhancing Mindfulness, Acceptance, and Commitment: An explanation of how to integrate and apply mindfulness during weightlifting training and competitions.

Eighth	Overall program evaluation: Participants will be evaluated both written and oral.

Data Analysis

Data analysis was conducted using both descriptive and inferential methods. In the descriptive approach, central tendency and dispersion indices were used to describe the research variables and demographic characteristics. The assumptions of homogeneity of variance were examined using Levene's test, and the normality of data distribution was assessed using the Shapiro–Wilk test. Prior to conducting analysis of variance, the necessary assumptions—including normality of the distribution of dependent variables, homogeneity of variances, homogeneity of regression slopes, and regression slope assumptions—were examined. Subsequently, to test the research hypotheses, multivariate analysis of covariance (MANCOVA) tests were performed at a significance level of .05 using SPSS version 26.

Results

The descriptive statistical results for the professional weightlifters examined in the experimental and control groups, according to age, indicate that the mean age of participants in the experimental group was 21.38 ± 0.86 years and in the control group was 21.89 ± 1.03 years. The description and examination of each main research variable, separated by pretest and posttest among weightlifters in the experimental and control groups, are presented in Table 2.

Table 2. Description of the research variables in the experimental and control groups from pre-test to post-test

Group	Variable	Subscale	Post-test		Pre-test	
			Mean	Std. Deviation	Mean	Std. Deviation
Experimental group	Attitudes toward doping	Total score	44.25	1.99	47.00	2.43
	Sport orientation	Competitivenesss	60.08	4.16	55.83	5.00
		Win orientation	26.83	2.91	22.58	4.48
		Goal orientation	29.08	3.02	26.41	2.19
		Total score	112.79	1.88	105.00	1.50
Control group	Attitudes toward doping	Total score	46.38	2.02	46.24	2.19
	Sport orientation	Competitivenesss	55.92	3.34	55.83	4.01
		Win orientation	23.00	3.03	22.58	3.34
		Goal orientation	26.43	2.50	26.41	2.19
		Total score	104.83	1.34	104.72	2.56

After ensuring the assumptions for conducting parametric tests were met (for further details, refer to the supplementary file), multivariate analysis of covariance (controlling for the pretest stage) was used to examine the effect of the intervention on the dependent variables. Based on the results of Wilks' Lambda test ($F(2,19) = 9.328$, $p =$

.002, Partial η^2 = 0.495), it can be inferred that, while controlling for the pretest effect, mindfulness training is effective on the linear combination of the dependent variables (goal orientation and attitudes toward doping), and there is a significant difference between the two groups in at least one of the studied variables. Subsequently, the results of the multivariate analysis of covariance for testing the main hypothesis between the experimental and control groups are presented in Table 3.

Table 3. Results of the MANCOVA test between the experimental and control groups

Dependent variable	Sum of Squares	df	F	Eta Squared	p-value
Attitudes toward doping	585.283	1	7.824	0.281	0.011*
Competitivenesss	81.814	1	4.445	0.190	0.049*
Win orientation	51.77	1	4.934	0.206	0.039*
Goal orientated	20.535	1	5.905	0.237	0.025*

* statistically significant at p < 0.05

The results of the between-subject's effects examining differences between the experimental and control groups on the dependent variables indicate that there is a significant difference between the experimental and control groups in the variables of attitudes toward doping and all subscales of sports goal orientation (competitiveness, win orientation, and goal orientation) (Table 3). This means that mindfulness training has had a significant effect on attitudes toward doping and goal orientation in the weightlifters of the experimental group (figure 1).

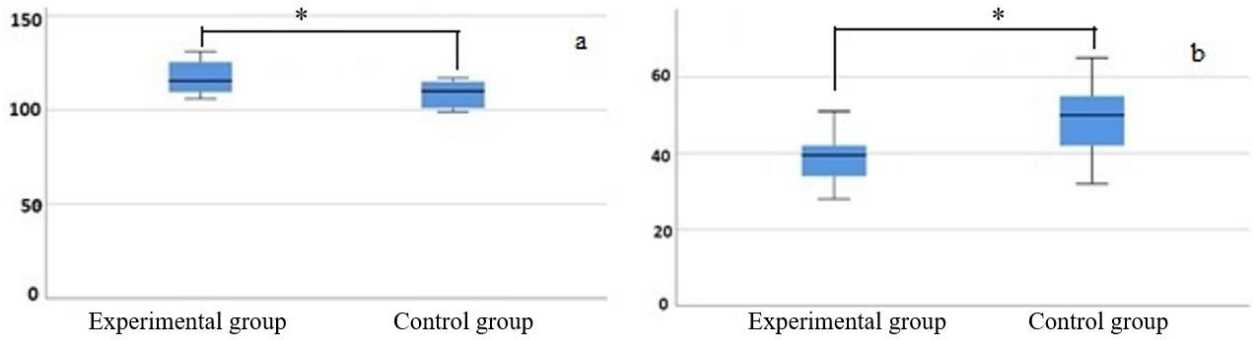

Figure 1. Comparison of posttest scores between experimental and control groups: (a) total score of sports orientation and (b) attitudes toward doping.

Error bars represent standard deviation. * p< .05 compared to the control group.

Discussion

This study was conducted with the aim of examining the effect of mindfulness training on sports goal orientation and attitudes toward doping in skilled male weightlifters. The results of this research indicate a significant difference between the control and experimental groups in the variable of attitudes toward doping following the mindfulness intervention, and that mindfulness training led to a reduction in attitudes toward doping among young skilled male weightlifters. These findings are consistent with the results of research by Ryoo et al. (9), Bagheri-Sheikhangafsheh et al. (35), and Jowett et al. (36).

Mindfulness experiences can increase athletes' sensitivity to the consequences of using doping substances. Mindfulness training helps athletes pay greater attention to the ethical and health-related outcomes of doping through critical thinking. Furthermore, this method can strengthen athletes' sense of self-awareness and responsibility, thereby reducing positive attitudes toward doping. According to the Theory of Planned Behavior, behavior is considered a proximal outcome of 1) intention, 2) attitude, 3) subjective norm, and 4) perceived behavioral control, which is proposed to influence behavior through their impact on behavioral intention (37). Additionally, Nien et al. (2) found that since mindfulness enhances thinking and decision-making, it may help athletes align their actions with their values and potentially reduce the likelihood of doping.

In sports disciplines, particularly weightlifting, where competitive pressures and stresses are high, mindfulness can be an effective tool for increasing awareness and self-awareness. Mindfulness training can heighten weightlifters' awareness of the negative effects of doping on their physical and mental health. This awareness helps athletes better understand the adverse consequences and ethical implications of using prohibited substances (4). Therefore, athletes who engage in mindfulness training typically hold more negative attitudes toward doping and are more likely to consider its short- and long-term consequences. Moreover, focusing on the present moment and reducing competition-related stress encourages weightlifters to concentrate on natural improvement and performance stabilization rather than seeking quick solutions such as doping. This reduction in tension can lead to genuine and sustainable performance improvement and positively influence attitudes toward adherence to ethical principles in sports (2).

On the other hand, the results of this study showed that mindfulness training had a significant effect on the sports goal orientation of weightlifters. These results align with the findings of Si et al. (4), Hurst et al. (21), and Hardwick et al. (37). This finding is also consistent with scientific evidence indicating that mindfulness training can improve cognitive functions (such as focus and attention) and emotional regulation (reducing anxiety and psychological tension) (7, 8). Other studies have also confirmed that

mindfulness-based interventions enhance physiological activities and athletic performance in disciplines such as shooting and weightlifting (6).

Since athletes with mindfulness can better set their goals and execute training programs without distraction (2), and since these practices can improve their flow states and increase self-awareness (1), it seems logical that the sports goal orientation of the studied sample was influenced. Mindfulness allows athletes to understand their personal goals more clearly, enabling them to set realistic and achievable objectives. This process can enhance motivation and maintain commitment through methods such as clarifying expectations and focusing on long-term goals (8). Weightlifters who view mindfulness as a training tool may be less inclined toward negative and deceptive behaviors such as doping when facing challenges and failures. Additionally, with mindfulness training, athletes pay more attention to the ethical and physical consequences of doping substance use and may exhibit less willingness to use such substances. This shift in attitude may be due to increased awareness of consequences and individual responsibilities (9, 22).

Conclusion

Overall, the results of this study demonstrated that mindfulness training had a significant effect on sports goal orientation and attitudes toward doping in the young male weightlifters who participated in this research. Although factors such as the limited number of participants, the lack of observation of long-term effects, and the use of self-report instruments for the dependent variables constitute notable limitations of this study, the generalization of these results should be approached with caution. It is recommended that future research investigate the effectiveness of mindfulness training programs on larger samples, including both male and female athletes at elite and professional levels, through longitudinal studies. Finally, it is suggested that coaches, athletes, and policymakers in this field within the country allocate special attention and importance to the provision of psychological interventions by specialists in sport psychology.

Author Contributions

Conceptualization, H.K. and M.H.; methodology, H.K.; software, H.K.; validation, H.K., M.H. and F.G.; formal analysis, H.K.; investigation, H.K.; resources, H.K.; data curation, H.K.; writing-original draft preparation, H.K.; writing-review and editing, H.K. and M.H.; visualization, H.K.; supervision, M.H.; project administration, H.K.; funding acquisition, M.H. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

Data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Ethical considerations

The study protocol was reviewed and approved by the Department of Sport Sciences, Islamic Azad University. All procedures involving human participants were conducted in accordance with the ethical standards of the institutional research committee and with the Declaration of Helsinki and its later

amendments. Informed consent was obtained from all participants prior to data collection.

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Conflict of interest

The authors declare no conflict of interest.

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