

Comparison of the Effectiveness of Mindfulness Training and Social Competence Training on Aggression among Sixth-Grade Male Students in Tabriz

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ABSTRACT

The aim of the present study was to compare the effectiveness of mindfulness training and social competence training on aggression among sixth-grade male students in Tabriz. The research method was quasi-experimental using a pretest–posttest design with a control group. The statistical population included adolescent boys studying in the sixth grade in Tabriz during the 2023–2024 academic year. From this population, 90 boys were selected through multi-stage cluster random sampling and randomly assigned to two experimental groups and one control group (30 participants in each group). The first experimental group received an eight-session, 75-minute mindfulness training program, while the second experimental group received an eight-session, 75-minute social competence training program. All three groups were assessed in both the pretest and posttest stages using the Eysenck and Glynn Wilson Aggression Questionnaire. Data were analyzed using analysis of covariance (ANCOVA) and the LSD post hoc test to examine intergroup differences. The results indicated that both mindfulness training and social competence training led to a reduction in aggression among male students. Furthermore, the findings revealed a significant difference between the effectiveness of social competence training and mindfulness training in reducing aggression, with social competence training exerting a greater effect. It can be concluded that both mindfulness and social competence training are effective in reducing aggression among students, although their levels of effectiveness differ.

Keywords: mindfulness training, social competence training, aggression

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Introduction

Aggression in childhood and early adolescence remains a significant public health and educational concern, encompassing physical, verbal, and relational forms that undermine classroom climate, peer safety, and long-term psychosocial adjustment (1, 2). Developmental models conceptualize aggression as a multifactorial outcome of biological reactivity, cognitive-emotional processing, and social learning contingencies that may coalesce during late childhood when executive functions and peer norms undergo rapid change (1, 3). Schools therefore represent critical settings for both prevention and early intervention,

yet the selection of mechanisms-focused, developmentally attuned programs remains uneven across contexts (4, 5).

Empirical work highlights the proximal determinants of aggressive behavior, including hostile attribution bias, low emotion regulation capacity, and deficits in social problem solving (2, 6). Hostile attribution bias can potentiate retaliatory responding in ambiguous interpersonal encounters, a pattern observed in diverse interactional settings such as doctor–patient conflict and peer disputes (6, 7). At the same time, developmental reviews underscore that trajectories of physical aggression in late adolescence are shaped by earlier regulatory skills and contextual risks, suggesting the value of interventions that cultivate attention control, affect labeling, and prosocial decision-making before the transition to secondary schooling (1, 3). Against this backdrop, two candidate approaches—mindfulness-based training and social competence training—offer theoretically grounded pathways for reducing aggression in school-aged youth.

Mindfulness, defined as receptive attention to present-moment experience with an attitude of nonjudgmental awareness, is associated with a wide range of benefits for psychological well-being and self-regulation (8). Mechanistically, mindfulness practices are hypothesized to interrupt automatic emotional reactivity, enhance interoceptive awareness, and broaden cognitive appraisals, thereby reducing the likelihood of impulsive, aggressive responses under stress (8, 9). In applied educational contexts, mindfulness curricula have been associated with gains in executive functioning and social-emotional competence, capacities that act as proximal regulators of anger and conflict behavior in classrooms (10). Systematic evidence synthesizing child and adolescent outcomes suggests that mindfulness-based interventions yield small-to-moderate reductions in aggression, while also improving attention and affective control (11, 12). Experimental and quasi-experimental studies in youth and related populations further report improvements in stress, mood, and relational functioning following structured protocols such as Mindfulness-Based Cognitive Therapy (MBCT) and Mindfulness-Based Stress Reduction (MBSR), supporting the transferability of mindfulness mechanisms to interpersonal domains (9, 13).

Observational and cross-sectional findings also indicate that lower dispositional mindfulness is associated with higher trait hostility and aggressive tendencies, a relation consistent with models positing mindfulness as a buffer against cognitive fusion and ruminative escalation (14). In student samples, mindfulness correlates inversely with aggression and may be positively linked with resilience, suggesting protective roles against stress-related acting out (15, 16). Complementary research in adolescents connects mindfulness-based activities to enriched social–emotional learning and collaborative reasoning, hinting that mindfulness may prime the same interpersonal skills targeted by social competence curricula (17). Meanwhile, experiential studies outside school contexts document that mindfulness training can reshape moment-to-moment appraisals and behavior in ecologically valid settings, reinforcing the ecological generality of attention-regulation mechanisms (18).

Social competence, in parallel, is a multidimensional construct capturing the knowledge, skills, and motivational dispositions that enable effective social interaction, goal attainment, and adaptive role performance across settings (19, 20). In school-aged youth, social competence encompasses assertiveness, emotion expression, perspective taking, conflict management, and prosocial problem-solving—capacities inversely associated with bullying and reactive aggression (7, 21). Meta-analytic and intervention literatures support the effectiveness of structured social competence programs in enhancing classroom behavior and

reducing externalizing symptoms, particularly when curricula integrate anger control, assertive communication, and perspective taking with opportunities for practice and feedback (22, 23). School-based implementations in “real-world” conditions emphasize the importance of fidelity, contextual adaptation, and multicomponent designs to achieve durable reductions in aggression and bullying (4).

Within Iranian and regional contexts, quasi-experimental and experimental studies have demonstrated that social competence training can decrease anger and improve communication skills among aggressive elementary students, and can reduce shyness while increasing self-esteem in learners with multiple disabilities, indicating cross-population utility (21, 24). Additional evidence suggests that social competence programs can attenuate bullying behaviors while enhancing academic motivation among identified bullies, highlighting the motivational and relational channels by which competence-building reduces problem behavior (25). In adolescents, social competence is also implicated as a moderator of the association between psychological distress and outwardly directed hostility, suggesting that higher perceived competencies may dampen the translation of stress into aggressive acts (26). Correlational and predictive studies from university samples similarly link social competence to lower aggression and violence, further underscoring competence-building as a preventative priority across educational levels (27).

Mindfulness and social competence approaches differ in proximal targets yet converge on aggression-relevant mechanisms. Mindfulness reduces automaticity and enhances emotional meta-awareness, thereby supporting inhibitory control and flexible responding (8, 9). Social competence training directly teaches assertiveness, negotiation, perspective taking, and anger management, which reconfigure social-cognitive appraisals and response repertoires during peer conflict (2, 22). Notably, recent school-age intervention syntheses report that mindfulness-based programs can also improve social-emotional competencies, while competence-focused curricula often incorporate affect regulation and attention exercises, indicating potential complementarity rather than exclusivity (10, 12). Technology-enhanced, collaborative formats further demonstrate that integrating mindfulness with social reasoning tasks can produce additive gains in adolescents’ social-emotional competence, suggesting hybrid designs as a promising frontier (17).

Beyond mechanisms, contemporary risk landscapes amplify the salience of these approaches. Digital media immersion and emerging behavioral addictions (e.g., problematic gaming) may erode attention control and increase irritability, thereby elevating aggression risk in vulnerable youth (28). Family functioning and socioeconomic stressors also predict adolescent aggression, highlighting the importance of school-delivered interventions that buffer risk when family-based resources are constrained (29). Cognitive-behavioral frameworks provide an overarching rationale: by restructuring maladaptive cognitions, enhancing problem-solving, and strengthening coping skills, interventions can reduce anger arousal and aggressive responding; this logic underlies both social problem-solving curricula and mindfulness-informed cognitive therapy (2, 9, 30). In practice, comprehensive school health guidance encourages scalable, evidence-based psychosocial programs that can be embedded in routine educational activities, aligning with global recommendations for adolescent health promotion and violence prevention (5).

Evidence from Iranian school settings is instructive for contextualization. Randomized and quasi-experimental projects have compared mindfulness and parenting/behavioral programs, with findings indicating meaningful reductions in externalizing symptoms among early graders following mindfulness or parent-training variants, thereby supporting multilevel intervention strategies in local systems (31).

Programmatic research further reports that nonviolent communication training improves social adaptation and academic self-efficacy in aggressive male students, consistent with competence-focused pathways to behavior change (32). Studies on cognitive-based problem-solving skills show downstream changes in parenting style and reductions in parental anger, suggesting that family climate improvements can complement student-focused programs in mitigating aggression triggers at home (33). Among female students, mindfulness training has been associated with reductions in aggression and improved adaptation, paralleling benefits seen in broader adolescent samples and reinforcing the generalizability of mindfulness effects across genders and performance strata (34, 35).

At the same time, not all youth present with identical risk constellations. Internalizing syndromes and morbid curiosity have been linked to cyber aggression in adolescents, indicating that affective-cognitive vulnerabilities may manifest within digital ecologies where social cues are attenuated and impulsivity is disinhibited (36). Biology-informed accounts also continue to explore endocrine correlates of aggression, with emerging systematic reviews examining cortisol and testosterone dynamics in youth; such work invites consideration of how stress physiology interacts with intervention-induced regulatory gains (37). These converging lines underscore the importance of assessing both behavioral and psychophysiological markers when evaluating anti-aggression interventions, particularly during early adolescence when pubertal change intersects with classroom demands (1, 37).

The practical realities of implementation matter. School-based prevention science stresses the need for high-fidelity delivery, teacher buy-in, and culturally responsive tailoring to maintain effects outside controlled trials (4). Social competence programs benefit from role-play, feedback loops, and opportunities for generalization across settings, while mindfulness curricula require regular practice schedules and developmentally appropriate exercises (e.g., brief guided attention, movement-based mindfulness) to sustain engagement (12, 22). The broader organizational culture—including norms for collaboration and communication—can facilitate or hinder transfer of learned skills, echoing findings from adult workplaces in which social competence predicts effective functioning in intercultural teams; these insights reinforce the life-span relevance of competence-building and its potential early seeding in schools (20).

Emerging intervention formats provide additional support for feasibility and scalability. Pilot investigations in late adolescents show that mindfulness-based psychological programs can be developed and delivered with measurable improvements in distress-related outcomes, suggesting a template for age-proximal adaptation in middle schools (38). In clinical and community samples, mindfulness has shown promise for reducing covert aggression and improving relationship quality, indicating a breadth of applicability across problem presentations and relational contexts (39). Broader mental health syntheses similarly posit that mindfulness-oriented and competence-oriented interventions may converge on shared regulatory endpoints—downregulating threat appraisals and upregulating flexible problem-solving—thereby reducing the frequency and severity of aggressive incidents (2, 13).

Local programmatic studies in Iran further support competence-based training for students in socioeconomically constrained contexts, demonstrating reductions in aggression and improvements in problem-solving and optimism, with implications for equity-sensitive school mental health strategies (40). Research with students with multiple disabilities documents increases in self-esteem and decreases in shyness following social competence training, illustrating adaptability to diverse learner needs (24).

Complementarily, investigations of learning communities as vehicles for social competence indicate that structured peer interaction can strengthen communicative competencies central to conflict de-escalation, pointing to the value of group formats commonly used in schools (41). Technology-enhanced social reasoning tasks combined with mindfulness practices represent a promising direction for adolescent social-emotional learning ecosystems, potentially expanding reach and personalization (17).

Despite this encouraging evidence base, several gaps remain. First, direct comparative trials of mindfulness versus social competence training within the same student population and time frame are relatively rare, limiting causal inference about differential effectiveness on aggression outcomes (11, 12). Second, many studies rely on single-source ratings and short follow-up windows, making it difficult to determine durability and ecological generalization, especially across classroom, playground, and home settings (4, 5). Third, comorbidities such as problematic gaming or internalizing symptomatology may moderate response patterns, necessitating stratified analyses within school-based samples (28, 36). Finally, although cognitive-behavioral principles underpin both approaches, relatively few studies integrate measurement of key mediators (e.g., hostile attribution bias, cognitive fusion, mindfulness facets, assertive communication) alongside aggression outcomes, limiting mechanistic clarity (6, 42).

The current study addresses these gaps by implementing and comparing two theoretically grounded, group-based interventions—mindfulness training based on established protocols and social competence training adapted for school settings—among sixth-grade male students in Tabriz, leveraging standardized aggression assessment and rigorous analytic controls to estimate relative effectiveness under educationally realistic conditions (4, 9, 22). This design builds on local evidence that nonviolent communication and competence-focused programs enhance school adaptation, and on international findings that mindfulness augments executive control and socioemotional competencies, thereby offering a strong test of competing and potentially complementary mechanisms within a single cohort (10, 32). By situating the trial within a public-school context and benchmarking against contemporary developmental and implementation science, the study contributes both to the Iranian evidence base and to global debates about optimizing school mental health interventions for aggression reduction (1, 5).

Accordingly, the aim of this study was to compare the effectiveness of mindfulness training and social competence training on reducing aggression among sixth-grade male students in Tabriz.

Methods and Materials

Study Design and Participants

The present study employed a pretest–posttest design with a control group and, in terms of purpose, is categorized as an applied research study. The statistical population included all sixth-grade male elementary school students in Tabriz during the 2023–2024 academic year. Considering the limited use of large samples in quasi-experimental studies and based on the target population, according to Tao et al. (2021), with an effect size of Hedges' $g = 0.48$, a test power of 0.80, and a significance level of 0.05, the required sample size was estimated to be 87 participants using G*Power software. However, to increase the statistical power of the study, 96 participants were selected using a multi-stage cluster random sampling method. First, among the five educational districts of Tabriz, District 4 was randomly selected. Then, three elementary schools were randomly chosen from that district, and from each school, one sixth-grade class was randomly

selected. In the first stage, a pretest was administered to all students in the selected classes (32 students per class). In the next stage, based on the collected questionnaires and following sample attrition and the exclusion of incomplete questionnaires, 90 students were randomly assigned to two experimental groups and one control group (30 participants per group).

The inclusion criteria were being male and currently enrolled in the sixth grade of elementary school. The exclusion criteria included concurrent participation in similar educational or therapeutic interventions and absence from more than one training session. Participation required obtaining written informed consent from parents, voluntary student participation, and assurance of confidentiality of the collected data.

Data Collection

The study utilized the Eysenck and Glynn Wilson Aggression Questionnaire (1975), which is designed to assess the level of aggression among children, adolescents, and adults. The questionnaire consists of 30 items rated on a 3-point Likert scale (*Yes* = 2, *I don't know* = 1, *No* = 0), yielding total scores ranging from 0 to 60, with higher scores indicating greater aggression. Eysenck (1975) reported a Cronbach's alpha of 0.68 for the scale, and its content validity was established through administration to over 120,000 participants across various demographic and clinical groups, including 2,000 twin pairs. In subsequent research, Sobhani Najafabadi et al. (2024) found a Cronbach's alpha of 0.82, and Shokoohi Yekta and Motamed Yeganeh (2024) reported a content validity index of 0.81. In the present study, internal consistency reliability was confirmed with a Cronbach's alpha coefficient of 0.804.

Interventions

The first experimental group participated in an eight-session mindfulness-based intervention, conducted in 75-minute group sessions based on the training protocol developed by Williams, Segal, and Teasdale (2002). The intervention was designed to enhance emotional regulation and self-control. In the first session, participants were introduced to the concept of mindfulness and engaged in activities such as mindful raisin eating and body scan exercises, followed by daily mindfulness practices in routine activities. The second session focused on awareness of thoughts and emotions and identifying obstacles, with homework involving recording pleasant events. The third session emphasized acceptance of thoughts and emotions through 30–40-minute seated meditations and mindful walking. The fourth session addressed the application of mindfulness skills in stressful situations through “seeing” and “hearing” meditations. The fifth session cultivated present-moment awareness of emotions and resistance to affective experiences through guided seated meditation. The sixth session focused on detachment from automatic thoughts and pre-planned mental scripts through visualization and cognitive labeling exercises. The seventh session aimed to foster self-care and manage daily stress through discussions about relapse prevention and self-directed coping. The final session involved reviewing and consolidating learned mindfulness techniques through reflective discussions, feedback, and closure of the training program.

The second experimental group received an eight-session, 75-minute group-based social competence training program designed according to the Tokalizadeh et al. (2018) protocol, aimed at improving social skills and reducing aggression. The first session introduced the concept and importance of social competence, encouraging reflection on situations where participants acted incompetently or failed to express

themselves. The second session focused on self-awareness regarding reactive behaviors and fundamental human rights, followed by practical exposure exercises. The third session emphasized assertiveness skills through role-playing and identifying characteristics of assertive behaviors. The fourth session enhanced awareness of anger triggers and taught anger management techniques alongside tolerance of individual differences. The fifth session strengthened healthy self-expression through training in assertive criticism and refusal skills. The sixth session improved emotional awareness and communication of positive and negative feelings while fostering active listening. The seventh session developed group communication and public speaking skills through guided discussions and presentations. The final session involved reviewing and consolidating previously learned skills, discussing appropriate self-disclosure, apologizing, and providing explanations in interpersonal interactions.

Data Analysis

Data analysis was performed using analysis of covariance (ANCOVA) with the aid of SPSS software, version 24.

Findings and Results

The demographic data of the participants indicated that 90 students (three groups of 30 participants each) took part in the study. The mean and standard deviation of age were 12.53 and 0.506 for the mindfulness group, 12.33 and 0.478 for the social competence group, and 12.26 and 0.448 for the control group, respectively. The minimum age of participants was 12 and the maximum age was 13. Table 1 presents the descriptive indices (mean and standard deviation of the research variables), Shapiro–Wilk test, and ANOVA results for participants based on the stage and group membership.

Table 1. Results of Descriptive Statistics, Shapiro–Wilk Test, and ANOVA for the Aggression Variable in Pretest and Posttest Stages

Variable	Stage	Group	N	Mean	SD	Shapiro–Wilk (Statistic)	Sig	F	Sig
Aggression	Pretest	Experimental 1	30	36.87	4.70	0.927	0.052	1.645	0.199
		Experimental 2	30	39.97	8.28	0.946	0.132		
		Control	30	37.00	8.80	0.968	0.477		
	Posttest	Experimental 1	30	29.33	4.85	0.865	0.087	0.164	0.164
		Experimental 2	30	24.93	7.31	0.943	0.107		
		Control	30	37.90	7.77	0.960	0.340		

The results of the Shapiro–Wilk test indicated that the distribution of scores was normal in both stages and for all groups. Therefore, the null hypothesis of normality was confirmed ($Sig > 0.05$). One of the assumptions of one-way analysis of covariance (ANCOVA) is the homogeneity of pretest aggression scores among groups. Based on the ANOVA results, this assumption was confirmed ($F = 1.645$, $Sig > 0.05$). The Levene's test results also showed that the assumption of homogeneity of variances was met ($Sig > 0.05$). According to the assumption of homogeneity of regression slopes, since the Sig value for the group \times pretest interaction was 0.849 (greater than 0.05) and $F = 0.164$, the assumption of homogeneity of regression slopes was accepted for the research variables. To determine in which variables there were significant differences between the experimental and control groups in the posttest stage, a one-way ANCOVA was conducted. The results are presented in Table 2.

Table 2. Results of One-Way ANCOVA

Source of Variation	Sum of Squares	df	Mean Square	F	Sig	Partial η^2
Corrected Model	5593.16	3	1864.38	160.837	0.000	0.849
Intercept	3.43	1	3.43	0.296	0.588	0.003
Aggression (Pretest)	2984.34	1	2984.34	257.453	0.000	0.750
Group	3434.88	2	1717.44	148.160	0.000	0.775
Error	996.89	86	11.59			
Total	91537.00	90				
Corrected Total	6590.06	89				

According to the results shown in the table above, there was a significant difference in the level of aggression among the two experimental groups and the control group ($F = 148.160$, $p < 0.01$, $\eta^2 = 0.775$). To determine the precise nature of these differences among the groups, the LSD post hoc test was conducted, and the results are presented in Table 3.

Table 3. Results of LSD Post Hoc Test Comparing the Mean Differences of the Two Interventions on Aggression

Group (I)	Group (J)	Adjusted Mean Difference (I-J)	Sig
Experimental 1	Experimental 2	6.826	0.000
Experimental 1	Control	-8.462	0.000
Experimental 2	Control	-15.288	0.000

Based on the LSD post hoc test results, it was found that both mindfulness training and social competence training significantly affected students' aggression levels. At the 0.01 significance level, mindfulness and social competence training demonstrated differential effectiveness in reducing aggression among sixth-grade male students in Tabriz. Furthermore, social competence training had a greater effect on reducing aggression compared to mindfulness training (mean difference = 6.826).

Discussion and Conclusion

The results of the present study demonstrated that both mindfulness training and social competence training significantly reduced aggression among sixth-grade male students in Tabriz, confirming the effectiveness of both interventions in improving emotional and behavioral self-regulation. However, the findings further revealed that social competence training had a stronger effect on decreasing aggressive behaviors compared to mindfulness training. This suggests that interventions focused on interpersonal skills and adaptive social functioning may yield more substantial reductions in aggression within this age group. These findings are consistent with the growing body of research emphasizing the importance of both mindfulness and social competence as mechanisms for promoting emotional balance, behavioral control, and prosocial behavior among adolescents (10, 11, 43).

The reduction in aggression following mindfulness training supports the theoretical basis of mindfulness as articulated by Segal, Williams, and Teasdale, who described it as a cognitive process involving non-judgmental awareness and acceptance of present-moment experiences, which allows individuals to disengage from automatic emotional reactivity (9). Consistent with this conceptualization, mindfulness promotes attentional regulation and decentering, which reduce impulsive responses to anger-provoking stimuli. The observed reduction in aggression aligns with prior research showing that mindfulness-based interventions enhance emotion regulation, executive functioning, and self-control in children and

adolescents (10, 12). Moreover, mindfulness encourages metacognitive awareness, enabling adolescents to recognize early signs of frustration and employ adaptive coping mechanisms rather than aggressive reactions (8, 14).

The findings also correspond to evidence from meta-analyses showing that mindfulness-based interventions effectively decrease externalizing problems, including anger and aggression, in youth populations (11). For example, in their systematic review and meta-analysis, Tao et al. found that mindfulness training led to small-to-moderate reductions in aggression among children and adolescents by improving self-awareness and emotional inhibition. Similarly, Puthusserry and Delariarte (38) demonstrated that mindfulness-based psychological interventions improved emotion regulation and quality of life in adolescents experiencing psychological distress. In the present study, the structured eight-session mindfulness protocol may have enhanced students' ability to identify emotional cues and employ breathing or attention-focused exercises to reduce aggressive impulses. This explanation is consistent with the cognitive-behavioral foundations of mindfulness, which aim to interrupt maladaptive cognitive patterns that trigger aggressive reactions (30).

Furthermore, the present findings echo those of previous Iranian studies highlighting the value of mindfulness in adolescent behavioral regulation. Ghorbani et al. (42) reported that adolescent-centered mindfulness therapy significantly reduced cognitive fusion and improved emotional flexibility in adolescents with externalizing behavioral-emotional disorders. Likewise, Fouladi et al. (39) found that positive mindfulness therapy effectively reduced covert aggression and improved marital adjustment in women, reinforcing mindfulness as a universal self-regulatory mechanism across developmental stages. The observed decrease in aggression in this study indicates that even at early adolescence, structured mindfulness practices can cultivate awareness of emotional triggers and inhibit reactive behaviors.

Despite these positive outcomes, social competence training proved more effective in reducing aggression. This finding aligns with theories positing that aggression often arises not merely from poor emotional regulation but also from deficits in social communication, assertiveness, and perspective-taking (21, 43). The structured sessions in the social competence program emphasized assertive communication, anger management, emotion expression, and conflict resolution—skills directly related to reducing aggression in school contexts. The significant improvement in the experimental group receiving this intervention supports prior studies showing that enhancing social and emotional skills can significantly mitigate aggressive tendencies. For instance, Ahmadpour Torki et al. (40) reported that emotional-social competency training decreased aggression and increased optimism in students with low socioeconomic status. Similarly, Naimati et al. (25) demonstrated that social competence training reduced bullying behaviors and enhanced academic motivation among aggressive students, confirming its role in fostering adaptive social functioning.

The stronger impact of social competence training compared to mindfulness may be due to its explicit focus on social interaction and behavioral rehearsal. Social competence programs provide structured opportunities for adolescents to practice non-aggressive responses to interpersonal conflict through modeling, feedback, and reinforcement (24). In contrast, mindfulness interventions, although effective for intrapersonal regulation, may not directly address the social and communicative dimensions of aggression. Supporting this interpretation, Leff et al. (4) emphasized that school-based aggression prevention programs integrating social skills and emotional management techniques achieve significant behavioral changes under

real-world conditions. The present results therefore strengthen the argument that interventions combining self-regulation and interpersonal competence yield optimal outcomes for aggression reduction in school populations.

From a socio-developmental perspective, aggression among adolescents is often influenced by peer dynamics, emotional immaturity, and contextual stressors (1). Enhancing social competence directly targets these contextual variables by teaching adolescents how to interpret social cues accurately, express needs appropriately, and manage interpersonal disagreements constructively (26, 41). Karam et al. (26) further demonstrated that perceived social competencies moderate the relationship between psychological distress and aggression, suggesting that socially skilled adolescents are better equipped to manage frustration without resorting to aggression. Likewise, Undiyaundeye et al. (27) found that higher levels of social competence were inversely correlated with adolescent aggression in Nigerian schools. In the current study, the significant decline in aggression following social competence training may therefore reflect improved emotional expression, empathy, and assertive communication.

Additionally, social competence training aligns with broader frameworks of positive youth development, emphasizing the cultivation of social and emotional skills as buffers against maladaptive behaviors. Interventions grounded in these frameworks not only reduce aggression but also improve cooperation, empathy, and academic adjustment (10, 17). Social competence is a multidimensional construct encompassing cognitive (social understanding), behavioral (communication and assertiveness), and emotional (empathy and regulation) skills (19, 20). Thus, the present results add to the evidence that targeting these competencies can address both the emotional and relational roots of aggression.

Moreover, the findings are consistent with cultural and contextual research conducted in Iran, underscoring the adaptability of social competence interventions in local educational settings. For instance, Sobhani Najafabadi et al. (32) developed a nonviolent communication training program that enhanced social adaptation and academic self-efficacy among aggressive male students. Similarly, Shokoohi Yekta and Motamed Yeganeh (33) found that problem-solving skill training reduced parental anger and improved family communication patterns, illustrating the social-learning mechanisms underlying aggression control. The current study extends this evidence by demonstrating that structured group-based social competence programs can effectively reduce aggressive tendencies among early adolescents in Iranian schools.

The comparative analysis also highlights the differential mechanisms through which each intervention operates. Mindfulness exerts its influence primarily through intrapersonal change—enhancing self-awareness, attention control, and emotion regulation—while social competence training operates through interpersonal learning—improving communication, empathy, and conflict-resolution strategies (14, 26). The stronger outcomes observed for social competence training in this study may therefore result from its closer alignment with the interpersonal nature of aggression. Aggression is, by definition, a social behavior directed toward others; thus, interventions that directly target social cognition and communication may produce larger behavioral shifts.

Another possible explanation for the stronger effects of social competence training is its interactive and experiential learning format. Adolescents benefit from role-playing, peer feedback, and real-life situational practice, which reinforce new behavioral patterns and promote generalization to everyday contexts (23, 31). In contrast, mindfulness training often involves more introspective and individual practices, which may

require longer-term engagement to produce equivalent behavioral changes (13, 18). Nevertheless, combining both approaches might yield synergistic benefits: mindfulness could strengthen emotional awareness and self-control, while social competence training could channel those internal capacities into adaptive social interaction (35, 42).

This interpretation is supported by cross-disciplinary findings showing that mindfulness fosters cognitive flexibility and non-reactivity, which are prerequisites for effective social behavior. For instance, Finistrella and Luchina (13) reported that mindfulness-based stress reduction improved psychological well-being in healthcare professionals, suggesting that mindfulness enhances tolerance and composure—traits essential for conflict management. Similarly, Nagpal et al. (17) demonstrated that technology-enhanced mindfulness and collaborative reasoning improved adolescents' social-emotional competencies, providing further evidence for integrating mindfulness and social skills training.

The present study also aligns with neuropsychological research suggesting that mindfulness and social competence both engage the prefrontal cortex—responsible for emotion regulation, decision-making, and social cognition—thereby influencing aggression reduction pathways (37). This shared neural mechanism may explain the effectiveness of both interventions in decreasing aggression levels. Furthermore, contextual factors such as family functioning, peer relationships, and school climate have been found to moderate intervention outcomes (29, 36). Students with supportive family environments and positive peer networks may internalize the lessons of these programs more effectively.

Overall, the results of the current study add to the empirical evidence supporting mindfulness and social competence as complementary approaches to aggression reduction. The greater efficacy of social competence training suggests that aggression, as an interpersonal phenomenon, may respond more robustly to interventions emphasizing communication and social problem-solving. However, the improvements observed in both experimental groups affirm that enhancing self-awareness and self-regulation remains crucial for adolescent behavioral adjustment.

Several limitations should be acknowledged. First, the study relied on self-report questionnaires, which may be subject to social desirability bias or inaccurate self-assessment. Future studies should incorporate multi-informant approaches, including teacher or parent reports and behavioral observations, to ensure validity. Second, the sample included only male sixth-grade students in one city, limiting generalizability to females or adolescents from other regions and socio-economic contexts. Third, the duration of the intervention was relatively short (eight sessions), and long-term follow-up data were not collected; therefore, the persistence of treatment effects over time remains unknown. Fourth, the study did not control for potential confounding variables such as family conflict, peer relationships, or prior exposure to violence, which may influence aggression independently of the interventions. Finally, cultural factors specific to the Iranian educational system may have shaped students' responses, warranting cross-cultural replications.

Future studies should explore longitudinal designs to examine the sustainability of treatment gains over extended periods. Researchers could also investigate hybrid models that integrate mindfulness and social competence components to determine whether combined approaches yield additive or synergistic effects. Comparative analyses across genders, age groups, and cultural contexts would enhance the understanding of differential responsiveness to these interventions. Incorporating neurocognitive and physiological measures—such as executive function tasks or hormonal assessments—could further elucidate the

mechanisms underlying aggression reduction. Lastly, mixed-methods designs, including qualitative interviews, could provide deeper insights into participants' experiences and perceived benefits of the interventions.

Practitioners and educators should consider implementing social competence and mindfulness programs within school curricula as preventive strategies against aggression. Structured, interactive sessions emphasizing self-awareness, emotion regulation, assertive communication, and empathy can foster healthier peer relationships and reduce disruptive behaviors. School psychologists can adapt these interventions to local cultural and developmental contexts while ensuring parental involvement and teacher training to reinforce positive behavioral models. Integrating mindfulness and social competence training into regular classroom activities may not only mitigate aggression but also promote broader social-emotional learning, resilience, and academic engagement among students.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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