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The Effectiveness of Mindfulness-Based Education on Emotional Creativity and Academic Integration of Students with Oppositional Defiant Disorder

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ABSTRACT

Background: This study aimed to investigate the effectiveness of mindfulness-based education on emotional creativity and academic integration in students with oppositional defiant disorder (ODD).

Method: A quasi-experimental design with pretest-posttest and control group was employed. The statistical population included all sixth-grade elementary school students with ODD in Golestan province, Iran, during the 2022-2023 academic year. The sample consisted of 40 students with ODD selected via convenience sampling. All participants completed the Oppositional Defiant Disorder Questionnaire (Homersen et al., 2006), the Emotional Creativity Inventory (Averill, 2001), and the Academic Integration Scale (Rio & Tseng, 2013).

Results: Mindfulness-based training had a significant positive effect on post-test scores of the following variables: novelty (0.75), authenticity (0.81), preparedness (0.77), affective (0.71), behavioral (0.78), cognitive (0.74), and emotional (0.72).

Conclusion: By enhancing awareness and emotion regulation, mindfulness provides a suitable platform for fostering creativity and deepening academic integration in students with ODD.

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Extended Abstract

Introduction

One of the most common clinical disorders of childhood and adolescence is oppositional defiant disorder. Children with oppositional defiant disorder often have a low mood, become aggressive easily, are often angry, fight and argue with authority figures, are actively disobedient and stubborn, often deliberately upset others, blame others for their misbehavior and mistakes. They blame and are selfish and spiteful. In general, these children have many problems in social and academic fields, especially emotional creativity and academic integration. On the other hand, mindfulness training teaches people skills that increase visual-spatial processing, memory performance and executive functions of people, and they can become more aware of their thoughts without any judgment and also be able to replace negative thoughts. , consider positive or neutral thoughts as a reflection of reality and look at them only as transitory mental events. In general, mindfulness training on emotional self-regulation and resilience, resilience and emotion regulation strategies, emotional regulation and improving academic achievement in students with oppositional defiant disorder, academic integration in visually impaired students, management Stress, anxiety and improving emotion regulation skills, increasing internal control and controlling emotions, academic self-efficacy, have an effect. Therefore, the aim of the current research was to investigate the effectiveness of mindfulness-based education on emotional creativity and academic integration of students with confrontational disobedience.

Method

The present research method was semi-experimental with a pre-test/post-test design of control and experimental group. The statistical population of the study included all sixth grade elementary school students suffering from oppositional defiant disorder in Golestan province in the academic year of 2022-2023. The participants were 40 students with oppositional defiant disorder who were selected using the accessible method. All of them completed the Homersen et al.'s (2006) Oppositional Defiant Disorder Questionnaire, April's (2001) Emotional Creativity, and Rio and Tseng's (2013) Academic Blend. The method of conducting the research was as follows: first, the samples were divided into two groups of 20 people, control and experimental, and pre-tests of emotional creativity and academic engagement were taken from all the students. Then, mindfulness training was carried out on the experimental group during 8 sessions of 45 minutes by the mindfulness course specialist. A post-test was taken from the students one week after the end of the training course, and SPSS version 25 software was used for the inferential analysis of the obtained data.

Results

Before performing the multivariate covariance analysis test, the assumption of homogeneity of variances was checked with Levene's test. After that, the multivariate analysis of covariance test (MANCOVA) was performed. The findings show that the assumption of equality of variances has been met, so we can use the multivariate analysis of covariance test.

Table 1. Analysis of descriptive indices of research variables

Variable		group	test	average	Standard deviation	skewness	kurtosis
Emotional creativity	modernism	witness	pre-test	21.25	3.12	0.32	-0.92
			Post-test	21.80	3.05	0.39	-0.54
		test	pre-test	21.20	2.98	0.09	-0.38
			Post-test	28.95	2.75	-0.42	-0.51
	The effectiveness of honesty	witness	pre-test	38.60	4.25	0.46	-0.73
			Post-test	38.95	4.11	-0.37	-1.11
		test	pre-test	38.85	4.33	-0.49	-1.55
			Post-test	46.70	3.89	-0.26	-1.18

Variable		group	test	average	Standard deviation	skewness	kurtosis
	preparation	witness	pre-test	19.15	2.80	0.10	-1.30
			Post-test	19.35	2.75	-0.08	-1.31
		test	pre-test	19.05	2.65	-0.04	-0.62
			Post-test	24.90	2.50	-0.15	-1.08
Academic integration	a factor	witness	pre-test	18.25	3.95	1.37	-1.41
			Post-test	18.55	3.80	0.11	-1.19
		test	pre-test	18.10	3.88	0.06	-1.20
			Post-test	23.40	3.45	0.30	-1.17
	behavioral	witness	pre-test	22.30	3.55	0.24	-1.10
			Post-test	22.55	3.48	-0.26	-0.90
		test	pre-test	22.15	3.42	-0.01	-.10
			Post-test	28.85	3.10	-0.52	-0.52
	cognitive	witness	pre-test	19.80	3.65	-0.12	-0.98
			Post-test	20.05	3.58	0.03	-0.65
		test	pre-test	19.70	3.70	-0.21	-1.42
			Post-test	25.60	3.30	-0.26	-0.77
	emotional	witness	pre-test	17.95	3.85	-0.04	-1.51
			Post-test	18.20	3.72	-0.05	-0.23
		test	pre-test	17.85	3.78	-.10	-1.17
			Post-test	23.45	3.40	0.30	-0.53

Table 2. Results of univariate analysis of covariance (ANCOVA) on post-test scores of emotional creativity and academic engagement components with pre-test control

Variable	SS	df	MS	F	P	Eta
modernism	928/22	1	928/22	2001.73	0.00	0.75
effectiveness of honesty	3600.03	1	3600.03	7173.79	0.00	0.81
preparation	1217.70	1	1217.70	2171.79	0.00	0.77
a factor	715.95	1	715.95	1216.58	0.00	0.71
behavioral	1196.86	1	1196.86	2337.32	0.00	0.78
cognitive	846.69	1	846.69	1632.71	0.00	0.74
emotional	706.02	1	706.02	1505.85	0.00	0.72

Table 3. Adjusted means

Variables	group	M	standard error	95% CI	
				Low estimate	High estimate
modernism	witness	28.36	0.15	28.05	28.66
	test	32.02	0.15	31.71	32.32
effectiveness of honesty	witness	59.72	0.15	59.40	60.03
	test	63.82	0.15	63.50	64.14
preparation	witness	38.60	0.16	38.27	38.93
	test	41.44	0.16	41.10	41.77
a factor	witness	22.41	0.17	22.07	22.75
	test	24.54	0.17	24.20	24.88
behavioral	witness	28.61	0.16	28.29	28.92
	test	31.74	0.16	31.42	32.05
cognitive	witness	22.45	0.16	22.13	22.77
	test	25.62	0.16	25.30	25.94
emotional	witness	22.20	0.15	21.90	22.51
	test	24.69	0.15	24.39	24.99

MANCOVA results, using Wilks' lambda statistic, revealed a significant difference between the experimental and control groups on the combined dependent variables (emotional creativity and academic engagement subscales) after controlling for pretest scores ($F_{(7, 37)}$= 20.77, p< 0.001, η^2= 0.89). This effect size indicates that 89% of the variance in the combined dependent variables was accounted for by the mindfulness training intervention.

The univariate analyses (Table 4) showed that the effect of mindfulness training was significant (p< 0.001) for all individual components: novelty ($F_{(1, 37)}$= 2001.73, η^2= 0.75), effectiveness/authenticity ($F_{(1, 37)}$= 7173.79, η^2= 0.81), preparedness ($F_{(1,76)}$= 2171.79, η^2= 0.77), agentic

engagement ($F_{(1, 37)}$= 1216.58, η^2= 0.71), behavioral engagement ($F_{(1, 37)}$= 2337.32, η^2= 0.78), cognitive engagement ($F_{(1, 37)}$= 1632.71, η^2= 0.74), and emotional engagement ($F_{(1, 37)}$= 1505.85, η^2= 0.72). Adjusted means for the posttest scores are presented in Table 5.

Conclusion

According to the findings of the research, it can be concluded that education based on mindfulness can confront students with oppositional defiant disorder with logical thinking and identifying factors related to emotional creativity can help them lead a better life and increase their understanding of current experiences. and promote self-control and intelligent behavior. Also, according to the findings of the research, it can be concluded that mindfulness training allows students with mind control disorder to have less spontaneous negative thoughts and experience positive thoughts in the field of education; On the other hand, since most of the psychological problems of students with polar disobedience disorder are caused by rumination, a person is not involved in the past or the future with awareness of the present and logically considers stressful situations such as the class and the learning process to be safe for him and the emergence of his abilities His education takes action and is involved with learning objects and the education process.

Ethical Considerations

Ethics Code: This project was supported by Semnan University Research Vice-Chancellor under contract 1403106 i/1403/266.

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Authors' Contributions: Abdoljalal Toomaj: Writing the initial version of the article, collecting data and performing statistical analyses

Siavash Talepasand: Reviewing the theoretical foundations and planning the study, supervising and managing the research, reviewing, revising and approving the final version of the article.

Conflict of Interest: According to the authors, there was no conflict of interest in this study.

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Introduction

Behavioral disorders in children impose a significant burden on the individual, family, and society, and numerous studies have reported an alarmingly high prevalence of these disorders among children (1). One of the most common clinical disorders in childhood and adolescence is Oppositional Defiant Disorder (ODD) (2). In the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), ODD is classified among disruptive behavior disorders, characterized by a persistent pattern of angry/irritable mood, argumentative/defiant behavior, and/or vindictiveness (3). Affected individuals often have low mood, are easily agitated, frequently become angry, argue with authority figures, actively defy or refuse to comply with requests, deliberately annoy others, blame others for their own mistakes, and act spitefully or vindictively (4). Their social functioning becomes impaired, and their overall performance declines. The symptoms of this disorder are often part of a damaged interactional pattern in relationships with others (5).

These children often do not recognize their negative, vindictive, and aggressive behaviors as problematic; rather, they view them as justifiable responses to their unmet needs or to what they perceive as irrational conditions in their lives (6). ODD is a lesser-known disorder that is considered among the externalizing disorders. ODD is a disruptive behavior disorder that is distinct from Conduct Disorder (CD), which typically involves more severe behaviors and a longer duration (7). Children with ODD, due to poor social skills, have fundamental difficulties in relationships with parents, teachers, and peers (8); in later life stages, they show weaker academic and

occupational capabilities (3) and are at high risk of developing substance-related disorders (9).

ODD almost always interferes with the child's interpersonal relationships and academic performance. Despite having sufficient intelligence, they do not progress in school and may fail; consequently, these problems lead to decreased self-confidence, less tolerance for frustrations, depressed morale, and tantrums (10). Children with ODD often perform poorly in school, struggle with interpersonal relationships, and have attention problems and deficiencies in mental and executive functions. Consequently, they frequently lack the cognitive, social, and emotional skills—such as emotional creativity and academic engagement—necessary to address life and academic challenges (11).

Emotional creativity depends on an individual's ability to experience and express emotions in novel and situationally appropriate ways. It comprises three criteria: novelty, effectiveness, and authenticity (12). Novelty refers to the ability to modify habitual emotions and generate new emotional states; Effectiveness means the alignment of the creative response with the social and cultural context, such that it facilitates desirable interpersonal relationships (13).

In fact, Effectiveness refers to a response that is appropriate to the situation or beneficial for the individual or group. Authenticity means that emotions stem from the individual's genuine beliefs and values, rather than being expressed merely to conform to situational demands (14). Emotional creativity necessitates freeing oneself from usual emotional reactions and creating novel emotional reactions (15). Individuals prone to creative emotional expression invest more time and effort in recognizing their own and others' emotions (16). Thus, emotional creativity can influence students' motivations, emotions, perspectives, and academic status. Individuals with emotional creativity are able to evaluate the situation with correct belief and skillfully express their feelings. Using authenticity as a tool, they can express emotions in novel ways (novelty) and through flexible thinking (effectiveness) enhance interpersonal relationships (17).

Academic engagement is defined as a positive, fulfilling state of mind directed toward the educational process, characterized by investment of vigor, persistent attention, and absorption in learning activities (18). Academic engagement is a construct that was first proposed to understand and explain academic decline and failure and was considered as a basis for reformist challenges in the field of education (19). Learners who actively participate in the educational process show high levels of energy and persistence in studying and other academic duties, and persevere when facing educational challenges (20). Such students are dedicated to their education, experience a meaningful academic life, are enthusiastic about learning, take pride in their educational achievements, and are pleased with their engagement with academic tasks (18) and have a mastery orientation in goal selection (21). In contrast, students lacking academic engagement show little inclination to participate in classroom activities and group work, find the classroom environment unenjoyable, and achieve low success in teaching and learning; such students are at risk of academic decline and dropout (22). In Finn's model, academic engagement consists of two components: affective and behavioral. The behavioral component, such as persistence in academic tasks, and the affective component, such as valuing academic tasks and learning. However, a review of more recent evidence shows that academic engagement is a multidimensional construct consisting of various cognitive, affective, and behavioral components (23). Behavioral engagement includes observable behaviors of students in dealing with tasks and includes components of effort, persistence, and asking for help from others.

Cognitive engagement refers to the types of processing processes used by students for learning. Cognitive engagement includes cognitive and metacognitive strategies. Affective engagement includes three components: feeling, value, and affect (24).

Mindfulness-based training is a contemplative therapeutic approach that enables individuals to step back, observe their life circumstances, and respond in novel ways (25). Mindfulness training is an approach proposed by Teasdale and his colleagues. This therapy, which is a short-term and structured intervention, is built upon Kabat-Zinn's Mindfulness-Based Stress Reduction model and has had cognitive therapy principles added to it (26). In mindfulness practice, individuals constantly strive to gain insight and clarity into their thought patterns, emotions, and interactions with others. They can then skillfully choose purposeful, useful responses instead of reacting automatically through habitual, unconscious patterns (27). In mindfulness-based training, individuals are taught to accept unpleasant experiences as they are, instead of denying and rejecting them, which are considered non-constructive emotional regulation skills, and to be aware of themselves and their reactions to unpleasant experiences. Generally, based on studies, mindfulness is associated with higher temperament, less psychopathology, and increased psychological adaptation (26). This training teaches individuals skills that enhance visuospatial processing, memory performance, and executive functions (28) and, without any judgment, become more aware of their thoughts and also be able to consider positive or neutral thoughts as a reflection of reality instead of negative thoughts, and view them merely as transient mental events (29).

A review of research indicates that mindfulness training positively affects emotional self-regulation and resilience (30), resilience and emotion regulation strategies (31), emotion regulation and academic achievement in students with ODD (32), academic engagement in students with low vision (33), stress management, anxiety reduction, and the promotion of emotion regulation skills (34), increased internal control and emotional regulation (35), and academic self-efficacy (16). Given that children with ODD often struggle in social and academic domains, particularly in emotional creativity and academic engagement, this study sought to answer the following question: Is mindfulness-based training effective in improving the emotional creativity and academic engagement of students with ODD?

Method

Research Design: The present study employed a quasi-experimental design with a pretest-posttest and a control group.

Participants: The statistical population included all available sixth-grade elementary school students with ODD in Golestan province during the 2022-2023 academic year. Convenience sampling was used due to the lack of access to the entire population for random selection. A two-stage method was used for sample selection. First, the Homersen et al. (36) ODD Rating Scale was administered to sixth-grade students with reported behavioral problems. One hundred fifty-four students scoring above the cutoff score (16 out of 24) were identified. Second, a clinical interview conducted by two psychologists who were also specialists in educational sciences and mental disorders confirmed ODD in 54 students with ODD. From this pool, 40 students (23 boys and 17 girls) were selected via convenience sampling and randomly assigned to either the experimental or control group (20 per group). The inclusion criteria were a diagnosis of ODD and enrollment in a regular school. The exclusion criterion was unwillingness to participate in the research training sessions.

Instruments

1. Oppositional Defiant Disorder Questionnaire: This scale was developed

by Homersen et al. (36) to diagnose children with Oppositional Defiant Disorder. This scale includes 8 symptoms of Oppositional Defiant Disorder and is consistent with the Fourth Edition of the Diagnostic and Statistical Manual of the American Psychiatric Association. Parents rated each symptom that described their child over the past 6 months. The scoring method of the questionnaire was such that it was rated on a 4-point scale (0=Never, 1=Just a little, 2=Pretty much, 3=Very much), and the total score ranged from 0 to 24. In the study by Faramarzi et al. (37), the internal consistency coefficient of this scale using Cronbach's alpha was reported as.93 and its reliability coefficient using test-retest was reported as.94. In terms of validity, in this study, the criterion validity of the questionnaire was confirmed using clinical interview. Furthermore, its construct validity was examined through exploratory factor analysis, and its single-factor structure was confirmed, indicating the internal consistency of the items for measuring the unified construct of Oppositional Defiant Disorder.

2. Emotional Creativity Questionnaire (12): This inventory, which was prepared to measure emotional creativity in three dimensions of novelty, effectiveness/authenticity, and preparedness, consists of 30 items. Items 1 to 7 relate to preparedness, items 8 to 21 relate to novelty, and items 22 to 30 relate to effectiveness/authenticity. Scoring is based on a 5-point Likert scale from 1 (very little) to 5 (very much). The total score of the questionnaire is obtained from the sum of the scores of the 30 items, ranging from 30 to 150. Averill (12) obtained the reliability of the total emotional creativity score using Cronbach's alpha as.91 and the reliability of its dimensions between.8 and.9. To calculate validity, factor analysis and correlation with similar tests were used. The validity and reliability of this inventory have been confirmed in various studies (38). Jokar and Alborzi (39) also obtained a KMO of.81 for the correlation matrix using exploratory factor analysis. Ghadiri and Abdi (2010) also confirmed the three-factor structure of this inventory using confirmatory factor analysis. The reliability of the questionnaire was also obtained using Cronbach's alpha as.72.

3. Reeve and Tseng Academic Engagement Questionnaire (41): This questionnaire consists of 17 questions that form four subscales: agentic, behavioral, cognitive, and affective. The items of this questionnaire are scored on a 7-point Likert scale as follows: (Completely Disagree: 1, Disagree: 2, Somewhat Disagree: 3, Neither Agree nor Disagree: 4, Somewhat Agree: 5, Agree: 6, Completely Agree: 7). This questionnaire lacks reverse scoring (41). In exploratory factor analysis using principal factor extraction and oblique rotation with eigenvalues greater than one, four factors were obtained, supporting the validity of this questionnaire. Furthermore, they reported the reliability (Cronbach's alpha) of the agentic subscale as 0.86, behavioral as 0.86, affective as 0.90, and cognitive as 0.84, indicating desirable internal consistency. In Iran, this questionnaire was examined in the study by Ramezani and Khamsan (42), who administered it to high school students. They administered this questionnaire on high school students. Reliability using Cronbach's alpha for this questionnaire was obtained as 0.92. The calculated Cronbach's alpha for the subscales of this questionnaire were: agentic engagement, 0.85; behavioral engagement, 0.79; affective engagement, 0.87; and cognitive engagement, 0.79. Confirmatory factor analysis results indicated that the questionnaire structure had acceptable fit with the data and all goodness-of-fit indices for the underlying four-factor model of the questionnaire were confirmed. In this study, the Cronbach's alpha value was obtained as 0.82.

Research implementation process: First, the sample was divided into two groups of 20. Before the start of the intervention, a pretest consisting of the Emotional

Creativity and Academic Engagement questionnaires was administered to all 40 participants (both experimental and control groups) in a single simultaneous session. The experimental group underwent the mindfulness training program, while the control group received no intervention during this period and only participated in regular school programs. The present intervention was designed based on the integrated protocol of Van Son et al. (43), which is a combination of two validated programs: Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT). This protocol was translated and validated in Persian in the study by Ghasemi Jobneh (24) and has also shown its effect in other domestic studies such as Goodarzi et al. (44). The trainings were provided to the experimental group over 8 sessions of 45 minutes each for two months by an experienced psychologist holding a valid certificate in mindfulness training. The content of the training sessions is presented in Table 1. Ethical considerations included obtaining participants' informed consent at the outset of the study and ensuring the anonymity of their identities throughout the research process.

Table 1. Summary of Mindfulness Training Sessions

Meeting	Content
1/Automatic Pilot	Stating the rules and objectives of group sessions Mindful raisin eating (a meditation in which students with oppositional defiant disorder spend several minutes examining the visual, olfactory, taste, and tactile characteristics of a raisin). Academic homework: Performing mental and physical scanning for 6 days Body-mind scan; Academic homework: Performing one normal daily activity mindfully each day (washing, eating, brushing teeth, doing homework, etc.)
2/Confronting Obstacles	Review of previous week's assignments, thought and feeling exercises; Academic homework: Recording pleasant and unpleasant emotional and behavioral events.
3/Mindfulness of Breathing	Review of previous week's assignments, sitting meditation; Academic homework: 3-minute breathing space three times daily Mindful walking; Academic homework: Mindful walking 3-minute breathing space; Homework: Recording unpleasant events.
4/Staying in the Present Moment	Review of previous week's assignments, seeing meditation/listening meditation; Academic homework: Sitting meditation Sitting meditation; Academic homework: 3-minute breathing space not only three times daily, but whenever noticing stress and unpleasant emotions.
5/Permission and Allowance	Review of previous week's assignments, sitting meditation; Homework: Sitting meditation
6/Thoughts Are Not Facts	Review of previous week's assignments, visualization sitting meditation; Academic homework: Shorter guided meditation for at least 40 minutes Writing scenarios; Academic homework: 3-minute breathing space not only three times daily, but whenever noticing stress and unpleasant emotions.
7/Self-Care	Review of previous week's assignments, noting the connection between mood and activity; Academic homework: 3-minute breathing not only three times daily but whenever noticing stress and unpleasant emotions Creating a list of enhancing and diminishing activities and discussing them.
8/Using Learned Materials	Acceptance and change: Review of previous week's assignments, session summaries, review and discussion of plans and continuation of practice assignments, preparation for termination.

One week after the end of the training course, a posttest was administered to the students, and the Emotional Creativity and Academic Engagement questionnaires were completed during two one-hour sessions. For the inferential analysis of the obtained data, SPSS software version 25 was used.

Results

The number of students with Oppositional Defiant Disorder aged 11, 12, and 13 years was 6, 11, and 3, respectively, and the number of students with a "very good" and "good" grade point average was 9 and 11, respectively. Table 2 shows the skewness and kurtosis of the dependent variables by group and time of administration. If the absolute values of skewness and kurtosis are less than 3 and 10, respectively, the distribution of the variables will be normal (45). Therefore, the distribution of the research variables is normal.

Before conducting the multivariate analysis of covariance test, the assumption of homogeneity of variances was first examined using Levene's test. Subsequently, multivariate analysis of covariance (MANCOVA) was performed. The findings indicate that the assumption of equality of variances was met; therefore, we can use the multivariate analysis of covariance test.

Table 2. Analysis of descriptive indices of research variables

Variable		group	test	Average	Standard deviation	skewness	kurtosis
Emotional creativity	modernism	witness	pre-test	21.45	3.12	0.32	-0.92
			Post-test	21.80	3.05	0.39	-0.54
		test	pre-test	21.20	2.98	0.09	-0.38
			Post-test	28.95	2.75	-0.42	-0.51
	The effectiveness of honesty	witness	pre-test	38.60	4.25	0.46	-0.73
			Post-test	38.95	4.11	-0.37	-1.11
		test	pre-test	38.85	4.33	-0.49	-1.55
			Post-test	46.70	3.89	-0.26	-1.18
	preparation	witness	pre-test	19.15	2.80	0.10	-1.30
			Post-test	19.35	2.75	-0.08	-1.31
		test	pre-test	19.05	2.65	-0.04	-0.62
			Post-test	24.90	2.50	-0.15	-1.08
Academic integration	a factor	witness	pre-test	18.25	3.95	1.37	-1.41
			Post-test	18.55	3.80	0.11	-1.19
		test	pre-test	18.10	3.88	0.06	-1.20
			Post-test	23.40	3.45	0.30	-1.17
	behavioral	witness	pre-test	22.30	3.55	0.24	-1.10
			Post-test	22.55	3.48	-0.26	-0.90
		test	pre-test	22.15	3.42	-0.01	-0.10
			Post-test	28.85	3.10	-0.52	-0.52
	cognitive	witness	pre-test	19.80	3.65	-0.12	-0.98
			Post-test	20.05	3.58	0.03	-0.65
		test	pre-test	19.70	3.70	-0.21	-1.42
			Post-test	25.60	3.30	-0.26	-0.77
	emotional	witness	pre-test	17.95	3.85	-0.04	-1.51
			Post-test	18.20	3.72	-0.05	-0.23
		test	pre-test	17.85	3.78	-0.10	-1.17
			Post-test	23.45	3.40	0.30	-0.53

Table 3. Levene's Test for Equality of Variances

Variables	f	P
Novelty	0.38	0.76
Effectiveness/Authenticity	1.96	0.12
Preparedness	0.67	0.57
Agentic	0.12	0.94
Behavioral	0.60	0.61
Cognitive	0.69	0.55
Affective	1.13	0.34

Prior to conducting the multivariate analysis of covariance, its assumptions were examined. The results of Levene's test (Table 3) indicated that the variance of scores for all dependent variables was equal in the two groups . The results of Box's M test indicated that the covariance matrices of the dependent variables were equal across groups (M Box= 71.82, p> 0.05). Therefore, all necessary assumptions for performing multivariate analysis of covariance were met.

MANCOVA results, using Wilks' lambda statistic, revealed a significant difference between the experimental and control groups on the combined dependent variables (emotional creativity and academic engagement subscales) after controlling for pretest scores ($F_{(7,\ 37)}$= 20.77, p< 0.001, η^2= 0.89). This effect size indicates that 89% of the variance in the combined dependent variables was accounted for by the mindfulness training intervention.

The univariate analyses (Table 4) showed that the effect of mindfulness training was significant (p< 0.001) for all individual components: novelty ($F_{(1,\ 37)}$= 2001.73, η^2= 0.75), effectiveness/authenticity ($F_{(1,\ 37)}$= 7173.79, η^2= 0.81), preparedness ($F_{(1,76)}$= 2171.79, η^2= 0.77), agentic engagement ($F_{(1,\ 37)}$= 1216.58, η^2= 0.71), behavioral engagement ($F_{(1,\ 37)}$= 2337.32, η^2= 0.78), cognitive engagement

($F_{(1, 37)}$= 1632.71, η^2= 0.74), and emotional engagement ($F_{(1, 37)}$= 1505.85, η^2= 0.72). Adjusted means for the posttest scores are presented in Table 5.

Table 4. Multivariate covariance analysis

Variable	SS	df	MS	f	p	Eta
modernism	928/22	1	928/22	2001.73	0.00	0.75
effectiveness of honesty	3600.03	1	3600.03	7173.79	0.00	0.81
preparation	1217.70	1	1217.70	2171.79	0.00	0.77
a factor	715.95	1	715.95	1216.58	0.00	0.71
behavioral	1196.86	1	1196.86	2337.32	0.00	0.78
cognitive	846.69	1	846.69	1632.71	0.00	0.74
emotional	706.02	1	706.02	1505.85	0.00	0.72

Table 5. Adjusted means

Variables	Group	M	standard error	95% CI	
				Low estimate	High estimate
modernism	Witness	28.36	0.15	28.05	28.66
	Test	32.02	0.15	31.71	32.32
effectiveness of honesty	Witness	59.72	0.15	59.40	60.03
	Test	63.82	0.15	63.50	64.14
preparation	Witness	38.60	0.16	38.27	38.93
	Test	41.44	0.16	41.10	41.77
a factor	Witness	22.41	0.17	22.07	22.75
	Test	24.54	0.17	24.20	24.88
behavioral	Witness	28.61	0.16	28.29	28.92
	Test	31.74	0.16	31.42	32.05
cognitive	Witness	22.45	0.16	22.13	22.77
	Test	25.62	0.16	25.30	25.94
emotional	Witness	22.20	0.15	21.90	22.51
	Test	24.69	0.15	24.39	24.99

Discussion

The present study was conducted with the aim of investigating the effectiveness of mindfulness-based training on emotional creativity and academic engagement in students with Oppositional Defiant Disorder. The findings of the study showed that mindfulness-based training had a positive and significant effect on the emotional creativity of students with Oppositional Defiant Disorder and led to an increase in novelty, effectiveness/authenticity, and preparedness in students with Oppositional Defiant Disorder. The obtained finding is consistent with the results of studies by Hopwood and Schutte (46) and Perry-Parrish et al. (47), which state that there is a positive relationship between mindfulness training and emotional creativity. It is also consistent with the results of Turner and Brown (48), which showed that mindfulness, by strengthening cognitive flexibility, provides the necessary groundwork for creating new and unconventional emotional solutions (novelty). In other words, it aligns with the idea that when students learn to let go of automatic judgment of their emotions, the mental space for producing novel and authentic emotional responses expands in them.

Mindful individuals perceive internal and external reality freely and without distortion and have a great ability to face a wide range of thoughts, emotions, and experiences (both pleasant and unpleasant). Mindfulness helps us understand that negative emotions may occur, but they are not a permanent part of the personality. It also enables the individual to respond to events with thought and reflection instead of responding involuntarily and impulsively. Mindfulness is defined as paying attention in a particular way, purposefully, in the present moment, and without judgment in each moment and prejudice. Individuals who possess a higher level of mindfulness achieve higher scores, have more awareness of their daily activities, become increasingly familiar with the automatic characteristics of their mind, and cultivate moment-to-moment awareness in themselves (24). Mindfulness has been defined as a type of awareness or a quality of

consciousness that arises from paying attention purposefully in the present moment without moment-to-moment evaluation. Mindfulness is a predictor of positive emotions and through vitality and seeing experiences clearly, it can create positive changes in the emotional creativity of students with Oppositional Defiant Disorder. Mindfulness creates the ability to face a wide range of thoughts, emotions, and experiences, whether pleasant or unpleasant. Therefore, in this educational method, students with Oppositional Defiant Disorder gain the ability to analyze their life conditions such that they strive moment by moment to gain awareness and insight into their thought patterns, emotions, and interactions with others, and react positively to life's problems and needs with a new perspective and creativity accompanied by passion and excitement. Furthermore, in this educational method, students with Oppositional Defiant Disorder learn to accept problems and unpleasant experiences as they are by regulating their emotions, instead of confronting them, and by strengthening visuospatial skills, executive functions, and emotional creativity, which is rooted in individual ability and the unique instrument of expressing emotions, they seek to solve their problems and meet their needs and acquire positive thinking towards life's realities and refrain from their negative, vindictive, and aggressive behaviors. In general, it can be said that in mindfulness-based training, instead of changing the content of negative thoughts and attitudes, emphasis is placed on changing the relationship with thoughts and ineffective attitudes, as a kind of subjective truths, and also, instead of changing and avoiding negative emotions, emphasis is placed on non-judgmental acceptance and increasing tolerance of negative emotional states related to thoughts and mental images. In other words, it can be concluded that mindfulness-based training can equip students with logical thinking and effective coping strategies, teaching them to identify factors related to emotional creativity can help promote them toward a better life, increasing understanding of current experiences, and enhancing self-control and intelligent behavior.

Also, the findings of the study showed that mindfulness-based training has a positive and significant effect on the academic engagement of students with Oppositional Defiant Disorder and leads to an increase in the agentic, cognitive, behavioral, and affective dimensions of students with Oppositional Defiant Disorder. The obtained finding is consistent with the results of studies by Hicks and Wu (33), Comerford et al. (49), Emanuel et al. (50), and Mirzaei and Shayiri (51). Mindful individuals are better able to respond to difficult situations without performing involuntary and maladaptive behaviors. They tend to interact with new perceptions, such as learning new educational content, in an open manner, tend to be more creative, and are better able to cope with difficult conditions, thoughts, and feelings (academic exams) without fatigue and discomfort. With the increase of mindfulness in students with Oppositional Defiant Disorder, their self-management skills increases and they focus on the present moment and changing internal and external stimuli, and as a result, they also become aware of the signs of psychological problems. Mindfulness can increase deeper awareness and management of perception regarding learning and thoughts and reduce inattention and disobedience. The more awareness and alertness students with Oppositional Defiant Disorder have, the better and sooner they can evaluate various learning situations, adopt appropriate behaviors, and become engaged in the academic process. Also, the presence of mindfulness promotes academic self-regulation and reflective thinking in individuals, improves psychological health, and increases coping strategies for irritability and aggression in individuals. Furthermore, mindfulness training causes students with Oppositional Defiant Disorder

to have fewer negative automatic thoughts through cognitive control and experience positive thoughts in the context of education; on the other hand, since most psychological problems of students with Oppositional Defiant Disorder stem from rumination, the findings of this study can also be explained within the framework of the role of mindfulness in emotion regulation and reduction of rumination. New evidence from neurocognitive studies shows that mindfulness practices modulate the activity of the default mode network, which is associated with distraction and self-related rumination (52). For students with Oppositional Defiant Disorder, who are typically caught in a cycle of negative thoughts and impulsive reactions rumination instead of being involved with internal conflicts, and to experience deeper cognitive and affective engagement with the learning process. In other words, mindfulness, by creating a space between the stimulus (academic challenge) and the response (impulsive reaction), allows them to choose more adaptive responses, which themselves are the core of academic engagement.

This study had limitations, including the use of a single type of research tool (questionnaires), geographical and grade-level restrictions, and a focus on a single spectrum of psychological disorders. Future research should utilize diverse assessment methods, be conducted in other geographical areas and grade levels, and include students with other psychological disorders to enhance the generalizability of the findings. It is also suggested that further research explores the mechanisms and long-term effects of mindfulness-based training. Based on the results, empowering teachers to integrate mindfulness principles into subjects like social studies could promote emotional creativity and academic engagement in students with ODD.

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