Document Type: Original Article
https://dorl.net/dor/20.1001.1.26455447.2022.5.19.1.0

Iranian Journal of Learning and Memory, 2022, 5(19), 5-17

The Effectiveness of Mindfulness Training on Aggression, Mind Rumination and Self-Control

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Abstract

Mindfulness training optimally has positive effects on cognitive, emotional and behavioral processes. In mindfulness training, experiencing pure reality is taught which means mindfulness training helps one to find the here and now without judgment and to accept whatever is happening in each moment without any comment. The aim of this study was to investigate the effectiveness of mindfulness training on aggression, mind rumination, and self-control in female students with low academic performance. This research adopted an applied and true experimental design with pre-test/post-test and a control group and the data were analyzed quantitatively. The statistical population included all female students of the Junior high schools in Tabriz with low academic performance in the academic year of 2021-22, estimated as 8395 people. First, through multi-stage cluster sampling, district 1 was selected from among the 5 educational districts of Tabriz and then three schools were selected from this district. Afterwards, through simple random sampling, 50 people were selected and randomly assigned to two groups with 25 participants as the experiemental and control groups. The experimental group received the intervention program of mindfulness training for 8 sessions of 2 hours while the control group continued its traditional method. The tools used to collect data included a self-control questionnaire (Tangney, Baumeister, & Boone, 2004), the aggression questionnaire (Buss & Perry, 1992), and the mind rumination questionnaire (Nolen-Hoeksema, & Morrow, 1991). For data analysis, in addition to descriptive statistics, Shapiro-Wilk test, multivariate analysis of variance test (MANOVA), homogeneity of regression slope test, Box's M Test , Levene test, multivariate covariance analysis test (MANCOVA), one-way analysis of variance (ANOVA) and paired t-test were used. The findings showed that the intervention program of mindfulness training was effective in reducing aggression and mind rumination and increasing the self-control of female students with low academic performance. Also, a significant difference was found between the experimental and the control groups considering the reduction of aggression and mind rumination and increase in their self-control. According to the results, it can be concluded that it is beneficial to include mindfulness training intervention program in school curriculum.

Keywords: Mindfulness Training, Aggression, Self-Control, Mind Rumination

Receive Date: 13 August 2022
Revise Date: 22 September 2022
Accept Date: 28 September 2022
Publish Date: 01 October 2022

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How to Site: Mehraban, R., Hosseini Nasab, S. D., & Alivandi Vafa, M. (2022). The Effectiveness of Mindfulness Training on Aggression, Mind Rumination and Self-Control. *Iranian Journal of Learning & Memory*, 5(19), 5-17. https://dorl.net/dor/20.1001.1.26455447.2022.5.19.1.0

Introduction

Academic performance plays an important role in the future success of students (Olufemi, Adediran, & Oyediran, 2018). Many factors affect low academic performance including: family environment, illiteracy or low literacy of parents, economic conditions of the

family, teachers and school staff, having a goal, self-esteem, motivation, anxiety, study plan, attention, planning, gender, physical factors, dyslexia, behavioral incompatibility, emotional-psychological conditions and absence from school (Pornaghash Tehrani, Fadavi Ardakanni, & Nasri Tajabadi, 2017). In addition to these factors, the transition from childhood to adolescence is also faced with major biological, psychological, and social challenges. There is also the general belief that the growth and development processes are reflected in the emotional states, attitudes and behavioral patterns of adolescents (Oldehinkel, Verhulst, & Ormel, 2011). Meanwhile, one of the social harms is aggression that is increasing in school. For this reason, aggression is a social problem and one of the basic issues of mental health (Nicholson, 2003).

In fact, aggression, as one of the most important problems of teenagers, manifests itself in the form of verbal and non-verbal (physical) behavior and directly or indirectly harms others. Along with harming others, aggression leads the aggressive person to gain external benefits (Chamundeswari & Arulsamy, 2019). Aggression in teenagers is a common and costly problem in terms of mental health problems. The negative effects of aggression on health and economy are felt throughout a society. Also, according to researchers, there is a relationship between adolescent aggression, their perspective and high empathy (Day, Mohr, Howells, Gerace, & Lim, 2012; Zhou, Gan, Hoo, Chong, & Chu, 2018). Aggression is influenced by cognitive factors (Saeidi, Sabouri-Moghadam and Hashemi, 2020). In this regard, mind rumination is related not only to emotional reactivity, but also to emotional regulation strategies of thought suppression and reevaluation leading to the increase or decrease of each in the face of negative emotions and finally the appearance of emotions such as anger and its manifestations such as aggression (Sina, Golshani, & Badiee, 2021). Mind rumination is actually a coping style for depressed mood. Research has shown that mind rumination is related to self-regulation and emotional dysfunction in a structure. According to researchers, metacognitive beliefs supporting mind rumination are effective in starting and sustaining this style (Simos & Dimitriou, 1994).

Mind rumination is more common in youth than in other periods of life. This has an adverse effect on various aspects of young people's lives, such as academic performance and eating disorders (Hernando et al., 2019). In addition, the interpersonal relationships of adolescents are also affected by mind rumination (Chu, Fan, Liu, & Zhou, 2019; Grierson et al., 2019). In adolescence, mind rumination predicts internalizing symptoms in general (Hankin, Stone, & Wright, 2010); and symptoms of anxiety (Carlucci, D'Ambrosio, Innamorati, Saggino, & Balsamo, 2018; Dirghangi et al., 2015) and depression (Balsamo, Carlucci, & Sergi e Aristide Saggino, 2016; Stone, Uhrlass, & Gibb, 2010) in particular. Mind rumination is related to things like the onset, intensity and duration of depressive episodes (Stone, Uhrlass, Gibb, & Abela, 2011). Also, this variable plays an important role in increasing the interpersonal stress factors of fellow students (Hankin et al., 2010; Rose, Glick, Smith, Schwartz-Mette, & Borowski, 2017). Therefore, it is necessary to achieve adaptation through self-awareness processes, one of which is self-control.

Most theories emphasize that self-control includes inhibition of thoughts, feelings and behavior. Other approaches emphasize regulating impulses and addressing goal-oriented behaviors as separate forms of self-control (Sarafaraz, Ghorbani, & Javaheri, 2013). Self-control indicates a person's ability to think about the consequences of his behavior (Evenden, 1999). Self-control plays a very important role in teenagers and it is a kind of social skill that can determine the level of success in life (Mousavi-Moghadam, Nouri, Khodadai, Ahmadi, & Ghiashi, 2017). In this regard, there are various interventions for teenagers to reduce aggression and mind rumination and an increase in self-control. One of the important intervention programs is mindfulness training.

Mindfulness is the skill of how to focus attention. In this skill, attention is paid to things at the same time. In mindfulness, people are taught to increase their awareness of the present instead of dwelling on thoughts of the past and future. In fact, mindfulness is a critical skill which is necessary not only to regulate emotions, but also to study and concentrate in the school. In addition, this skill helps students notice and name their emotions, thoughts, and desires reducing students' impulse control problems while increases their self-awareness. Additionally, this skill helps students recognize the times when they make purely emotional or purely rational decisions. In this way, mindfulness helps students balance emotional and rational decisions. As a result, they have more choices and make more effective decisions with this awareness.

Furthermore, mindfulness skill helps students strengthen their identity, develop future goals and identify values (Mazza, Dexter-Mazza, Miller, Rathus, & Murphy, 2016). Accordingly, mindfulness is a method of training the mind. This skill acts like a microscope that reveals the deepest patterns of the mind. Therefore, when the mind is observed practically, thoughts and emotions automatically disappear (Williams & Penman, 2011). The effectiveness of mindfulness training has been proven in various fields

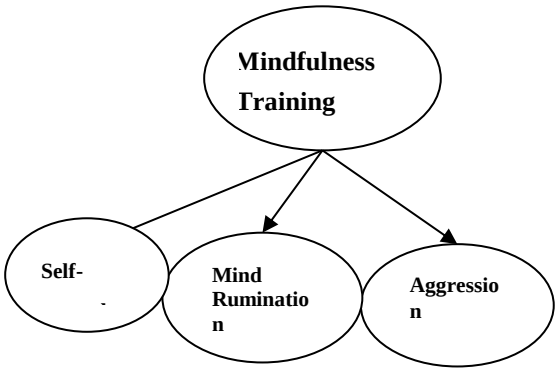
(Soltani & Mohammadi Forod, 2019); therefore, mindfulness training is increasingly used as one of the main features of dealing with emotion regulation and emotion tolerance. In particular, in various studies, the effectiveness of mindfulness training in the student community has been investigated.

Mindfulness intervention program is effective in improving positive academic emotions and reducing negative emotions of students (Beyrami, Hashemi, Roodsari, Aliloo, & Eqhbali, 2014). Also, this intervention program has an effect on quality of life (Bazzano, Andersen, Hylton, & Gustat, 2018) and stress (Petterson & Olson, 2017). In addition, mindfulness intervention programs have also been effective for students (Turkal, Richardson, Cline, & Guimond, 2018; Hofmann & Gomez, 2017; Gouda, Luong, Schmidt, & Bauer, 2016) and it has an effect on students' academic performance (Bakosh, Mortlock, Querstret, & Morison, 2018). Also, mindfulness techniques are effective in increasing muscle relaxation and reducing worry, stress and anxiety (Rostami, Fathi, & Kheyri, 2019).

Given that aggression and mind rumination occur in daily life relationships, self-control is of double importance and necessity to deal with them.Thus, it is necessary to implement an effective intervention program, such as mindfulness, for the management of aggression and other variables related to the daily life of teenagers and young people (Kim et al., 2022). According to the above research literature, in Figure 1, the conceptual model of the research is presented. Considering the importance of mindfulness in interactions and all aspects of life in today's world, its importance in cognitive and behavioral processes, such as self-control and aggression, the necessity of its institutionalization in order to remove obstacles to cognitive, emotional, and behavioral processes, and considering the impact of interventions based on mindfulness training on various moderators, in this research, specifically, the impact of mindfulness interventions was investigated on aggression, mind rumination, and self-control and the research question of the study was as follows:

Do mindfulness interventions have an effect on aggression, mind rumination and self-control of students with low academic performance?

Figure 1.
Research Conceptual Model



The overall aim of the research was to 'investigate the effect of mindfulness interventions on reducing aggression and mind rumination, as well as increasing self-control of students with low academic performance.' In order to achieve this goal, instead of presenting hypotheses, some questions were asked. Because from the point of view of empiricism, investigating the research question is much more important than the method used by the researcher or the worldview that forms the basis of the method (Hosseini Largani & Mojtabazadeh, 2021). Accordingly, in the present study, the aim was to answer the following questions:

- Does mindfulness intervention have an effect on reducing aggression and mind rumination as well as increasing self-control of students with low academic performance?
- Is there a statistically significant difference between the effect of the mindfulness intervention method and the effect of the traditional routine program on reducing aggression and mind rumination and the increase of self-control in students with low academic performance?

Method

The present research is applied, in terms of its purpose. This study also adopted a qualitative and true experimental design considering the way the data were collected and analyzed with a pre-test/post-test and a control group. In Figure 2, the pre-test/post-test design with the control group is presented. In this design, RGR represents the experimental group and RGC represents the control group. T1 represents the pre-test and T2 the post-test. X represents the implementation of the independent variable. R also shows that the participants were randomly selected and replaced in the experimental and control groups using the same method.

Figure 2.
Pre-test/Post-test Design with a Control Group

RG_R	T_1	X	T_2
RG_C	T_1		T_2

In order to conduct the research, the participants were randomly selected and assigned to two groups: the experimental group was exposed to the independent variable (X), that is; mindfulness interventions and the other group, the control group, did not receive the special conditions of the experiment and engaged in academic activities in a traditional way. The purpose of selecting the control group was to analyze the results of the dependent variable (T2) of the experimental group.

In this experiment, aggression, mind rumination and self-control of students with low academic performance in the experimental and control groups were measured twice. The first measurement was administered through a pre-test before the mindfulness interventions. The second measurement was done through the post-test after the mindfulness interventions in the experimental group. In the interval between the pre-test and post-test, the participants received the mindfulness intervention program based on the mindfulness training intervention protocol, adapted from the previous studies (Motie, Heidari, Bagharian, & Zarani, 2019; Samadi, Ayatizade Tafti, & Keavanloo, 2022).The mindfulness intervention program was provided by the reseachers for 8 weeks, 1 session per week lasting 2 hours. The control group did not receive any intervention. In Table 1, the method of intervention is presented briefly.

Table 1.
Mindfulness Intervention in Time Intervals Considering the Intervention Content

Time	Intervention Content	Duration of Training
First Session	Communicating and conceptualizing the problem	Two Hours
2nd Session	Relaxation Training (muscle tension and relaxation)	Two Hours
3rd Session	Relaxation for each muscle of the body	Two Hours
4th Session	Breathing awareness training, repeating calming words in the mind while inhaling and exhaling	Two Hours
5th Session	Body scanning technique training, focusing on body parts and their movements, searching for the sense of hearing by listening to the surrounding sounds, training with the help of searching for the sense of smell and taste by smelling and tasting sweets	Two Hours
6th Session	Training to induce a negative thought and then practice on a positive thought about yourself	Two Hours
7th Session	Body movement technique practice, complete mindfulness practice and inhalation and exhalation practice	Two Hours
8th Session	Re-evaluation and planning for the practical use of trainings	Two Hours

Participants

The statistical population included all the female students of Junior high schools in Tabriz, in the academic year of 2021-22, comprised 8395 people. First, district 1 was randomly selected from among the 5 educational districts of Tabriz through multi-stage cluster sampling. In the next stage of cluster sampling, among 54 girls' schools in District 1, three schools were randomly selected. Because it was necessary to control the educational level variable, from among the three grades of the Junior high school, the 7th grade was selected with a completely random method. Then, students' academic profils were checked and a list of students was prepared of those who had a GPA of 15 (in the last academic year) and an age range of 13 to 15 years old. The number of students with these characteristics was 75. Given that the minimum number of participants in each of the experimental and control groups should be 15 people (Delavar, 2022), 50 people were selected from this list of 75 people by simple random sampling method from whom 25 people were randomly assigned to the experimental and 25 people to the control group.

Instruments

The Aggression Questionnaire: The aggression questionnaire was designed by Buss and Perry (1992). This questionnaire has 29 questions and 4 dimensions. The dimensions of this questionnaire are: physical aggression (questions 1, 5, 9, 13, 17, 21, 24, 26 and 28), verbal aggression (questions 2, 6, 10, 14 and 18), anger (questions 29, 22, 19, 15, 11, 7 and 3), and hostility (questions 27, 25, 23, 20, 16, 12, 8 and 4). This

questionnaire is made on a 5-point Likert scale (from "never" with a numerical value of 1 to "always" with a numerical value of 5). The overall score of this questionnaire is between 29 and 145. People whose score is lower than average have low aggression. The reliability coefficient of the questionnaire, estimated through retesting, is equal to .79 and it was equal to .874 through Cronbach's alpha coefficient (Denaeshpour & Sarvqhad, 2010).

The Mind Rumination Questionnaire: The mind rumination questionnaire was created by Nolen-Hoeksema and Morrow (1991). This questionnaire has 22 questions regarding response styles. Questionnaire of mind rumination measures three dimensions of expression (reflection) (questions 7, 11, 12, 20 and 21), thinking (questions 5, 6, 10, 13, 15 and 16), and depression (questions 1, 2, 3, 4, 6, 8, 9, 14, 17, 18, 19 and 22). This questionnaire is made on a 4-point Likert scale (in the range of "never" with a numerical value of 0 to "always" with a numerical value of 3). The range of scores of this questionnaire is between 0 and 66. Construct and content validity of the questionnaire was confirmed by the creators and its reliability is reported between .88 and .92 through Cronbach's alpha. In Iran, the construct validity as well as its concurrent validity was confirmed and its reliability obtained through Cronbach's alpha method equalled to .88 (Hoshi, Khodabakhshi Kolaei, & Falsafinejad, 2020).

The Self-Control Questionnaire: This questionnaire was created by Tangney, Baumeister and Boone (2004) to measure the level of people's self-control. The questionnaire has 13 questions on a 5-point Likert scale (ranging from "never" with a numerical value of 1 to "very much" with a numerical value of 5). However, in questions 2, 3, 4, 5, 7, 9, 10, 12 and 13, the scoring method is reversed ("never" with a numerical value of 5 and "very much" with a numerical value of 1). This questionnaire includes 2 sub-scales of primary self-control and inhibitory self-control. The minimum total score is 13 and the maximum score is 65. A high score indicates a higher level of self-control. On the contrary, a low score indicates a bad self-control situation. The designers of the questionnaire reported the reliability coefficient of the whole questionnaire as .83 and .85 using Cronbach's alpha method in two statistical samples (Mousavimoghadam, Houri, Omidi, & Zahirikhah, 2015; Tangney et al., 2004). In Iran, the reliability coefficient of the sub-scales of this questionnaire was reported as .81 and .75 (Azadmanesh, Abol-Maali Al-Husseini, & Mohammadi, 2019).

Procedure

Before conducting the research, the purpose of the research was explained to the participants and they were assured that the researchers adhere to the principle of confidentiality. Also, informed participation consent was obtained from the participants. In the pre-test stage, the self-control, the aggression and the mind rumination questionnaires were conducted on the participants on the web platform. Then, the experimental group was exposed to the mindfulness intervention program. At the end, in the post-test phase, all participants of the experimental and control groups answered the three mentioned questionnaires. For data analysis, in addition to descriptive statistics, Shapiro-Wilk test, multivariate analysis of variance test (MANOVA), homogeneity of regression slope test, Box's M Test , Levene test, multivariate covariance analysis test (MANCOVA), one-way analysis of variance (ANOVA) and paired t-test were used.

Findings

The experimental and control groups were tested twice in the pre-test and post-test stages. In Table 2, descriptive statistics of the research variables for the experimental and control groups are presented for each of the pre-test and post-test stages.

Table 2.
Descriptive Statistics of the Research Variables by Groups in Pre-Test and Post-Test Stages

Variable	Group	Stage	Mean	SD	Skewness	Kurtusis	Min.	Max.
Self-Control	Experimental	Pre-test	41.36	8.38	-0.357	-0.753	25	55
		Post-test	47.84	8.87	-0.209	0.324	30	68
	Control	Pre-test	40.04	6.83	-0.122	-1.01	27	51
		Post-test	40.48	6.11	-0.241	-0.183	26	50
Mind Rumination	Experimental	Pre-test	49.88	15.88	0.201	-1.23	22	77
		Post-test	37.60	10.88	-0.034	-0.969	19	55
	Control	Pre-test	48.44	15.18	0.503	-0.261	26	84
		Post-test	48.56	11.58	0.237	-0.728	28	70

Variable	Group	Stage	Mean	SD	Skewness	Kurtusis	Min.	Max.
Aggression	Experimental	Pre-test	88.32	12.61	0.181	-1.355	70	108
		Post-test	78.80	10.81	0.242	-0.196	58	102
	Control	Pre-test	89.08	9.82	-0.479	0.052	67	104
		Post-test	88.24	10.74	-0.015	-1.142	71	105

As can be seen in Table 2, the average of the experimental and control groups is almost the same in all three variables in the pre-test stage. However, in the post-test phase, the average of the experimental group increased in the variable of self-control and decreased in the variables of mind rumination and aggression. While, in the control group, minor changes are observed in the pre-test and post-test stages. The skewness and kurtosis indices of the variables are also in the range of +2 to -2. In order to check the normality of the distribution of research variables, the Shapiro-Wilk test was used. Table 4 shows the results of this test.

Table 3.
The Results of the Shapiro-Wilk Test of the Normality of Data Distribution

Group	Variable	Stage	Statistic	Sig.
Experimental	Self-control	Pre-test	0.953	0.290
		Post-test	0.963	0.473
	Mind Rumination	Pre-test	0.928	0.078
		Post-test	0.960	0.413
	Aggression	Pre-test	0.926	0.071
		Post-test	0.985	0.964
Control	Self-control	Pre-test	0.965	0.512
		Post-test	0.962	0.458
	Mind Rumination	Pre-test	0.957	0.358
		Post-test	0.963	0.479
	Aggression	Pre-test	0.954	0.311
		Post-test	0.948	0.221

As observed, Shapiro-Wilk test values related to research variables in both pre-test and post-test stages are greater than 0.05. Therefore, it is concluded that the research variables have a normal distribution and thus, parametric tests can be used to test the research hypotheses.

Multivariate Analysis of Variance (MANOVA) test was used to test the assumption of independence of the pre-test variables. Because in this research, the independent variable was the mindfulness intervention program that had 3 levels of aggression, self-control and mind rumination and the dependent variable also had 3 variables of aggression, self-control, and mind rumination, in order to determine that there is no significant difference between the experimental and the control groups in these 3 variables in the pre-test stage, the multivariate analysis of variance test was used. Table 4 shows the results of the multivariate analysis of variance test.

Table 4.
Multivariate Analysis of Variance Test on the Homogenity of Means in the Pre-test

Variables	F	df_1	df_2	*P* value
Aggression	.375	2	72	**.688**
Mind Rumination	.065	2	72	**.937**
Self-Control	.170	2	72	**.844**

The results showed that the F value is insignificant at the 0.05 level which shows that before the implementation of independent variables, there is no significant difference between the experimental and

control groups, in terms of research variables, that is, aggression, mind rumination and self-control. Therefore, the assumption of independence of the pre-test variables among the data related to the research variables is maintained.

To check the homogeneity of the regression slope, the interaction of the independent variable with the covariate variables was investigated. In Table 5, the result of homogeneity test of regression line slope between the pre-test and post-test variables of aggression, mind rumination and self-control in the experimental and control groups is presented.

Table 5.
Comparison of the Slope of the Regression Line of the Research Variables

Variable	F	*P*-Value
Aggression	.612	**.438**
Mind rumination	1.98	**.166**
Self-control	1.58	**.215**

According to the data in Table 5, the significance levels of the interaction of the independent variable (group) with 3 covariates (aggression, mind rumination, and self-control) are greater than 0.05 and are not significant. Therefore, it can be claimed with confidence that the condition of homogeneity of the regression slope is established to perform covariance analysis.

Moreover, Box's M test was used to check the assumption of homogeneity of the variance matrix and covariances of the dependent variables in the experimental and control groups. Table 6 shows the results of the test to check the equality of the covariance matrix of the dependent variables between the experimental and the control groups.

Table 6.
Examining the Assumption of Homogeneity of Variance Matrix and Covariances

Group	Box's M	F	*P* value
Experimental	7.835	1.217	**.**294

According to Table 6, the random errors, that is, the significance level is greater than 0.05. Therefore, the null hypothesis is confirmed and the equality of the observed covariance matrices of the research variables (aggression, mind rumination, and self-control) is established among the experimental and the control groups.

Another assumption of using covariance analysis test is the equality of the variances. Thus, Levene's test was used to check the equality of variance distribution of the research data. Table 7 shows the results of the Levene's test.

Table 7.
Levene's Test Regarding the Equality of Error Variances of the Research Variables

Variables	F	DF1	DF2	Sig.
Aggression	0.410	1	48	.529
Mind Rumination	.000	1	48	.999
Self-Control	0.08	1	48	.930

Considering the results of Table 7 and considering that the significance level values are greater than 0.05, it is concluded that the research data have equal variance, and therefore, the analysis of covariance test can be used.

To investigate the effectiveness of mindfulness interventions on reducing aggression and mind rumination as well as increasing the self-control of students with low academic performance, the multivariate covariance analysis (MANCOVA) was used. The results of this test are presented in Table 8.

Table 8.
The Results of MANCOVA to Determine the Difference in Dependent Variables

Multivariate Test	Value	F	Hypothesis Df	Error df	Sig.	Effect Size
Wilk's Lambda	**0.587**	**10.066**	**3**	**43**	**0.001**	0.413

Based on the results of Wilks' Lambda multivariate test in Table 8, there is a significant difference between the two experimental and control groups in the dependent variables (aggression, self-control and mind rumination). The F value in Wilks's lambda test is equal to 10.066 and its significance level is less than 0.001. In fact, the results of the Wilks Lambda test show that there is a significant difference between the two experimental and control groups in at least one of the research variables (aggression, mind rumination, and self-control). Based on this, one-way analysis of variance (ANOVA) was used to determine which of the dependent variables had a significant difference (Table 9).

Table 9.
Results of One-Way ANOVA to Determine Differences in the Dependent Variables

Variable	Source	Mean Squares	Df	Mean Square Error	F	Sig.	Eta Square
Self-control	Group	867.667	1	667.867	11.723	0.001	0.207
	Error	596.2563	45	56.969			
Mind Rumination	Group	158.1388	1	1388.158	10.705	0.002	0.192
	Error	435.5835	45	129.676			
Aggression	Group	364.1029	1	1029.364	13.541	0.001	0.231
	Error	767.3420	45	76.017			

As shown in the Table, it is concluded that there are significant differences between the experimental and the control groups in self-control variable (sig=0.001, F=11.723), mind rumination variable (sig=0.002, F=10.705) and aggression (sig=0.001, F=13.541).

To investigate the difference between the effect of mindfulness interventions and the effect of the traditional routine program on reducing aggression and mind rumination as well as increasing the self-control of students with low academic performance, the paired t-test was used (Table 10).

Table 10.
The Averages of the Dependent Variables in the Experimental and the Control Groups

Dependent Variable	Group	Mean	Mean Difference	T Statistics	Std. Error Mean	P Value
Self-control	EXP.	47.83	7.35	3.98	1.51	0.001
	CON.	40.48				
Mind Rumination	EXP.	37.77	10.60	5.62	2.28	0.001
	CON.	48.38				
Aggression	EXP.	49.95	9.13	4.33	1.74	0.001
	CON.	59.08				

*EXP stands for: Experiemntal
*CON stands for: Control

According to the results of Table 10, the means of the experimental group in self-control, mind rumination and aggression are 47.83, 37.77 and 49.95, respectively while the means of the control group in these variables are 40.48, 48.38 and 59.08, respectively. The mean difference between these two groups is significant at the 0.01 level in the post-test of all 3 dependent variables. Therefore, it can be concluded that the mean of the experimental group is significantly lower in aggression and mind rumination than the mean of the control group while it is higher in self-control than that of the control group. As a result, the intervention program based on mindfulness is effective in reducing aggression and mind rumination and increasing self-control.

Discussion

The aim of the present study was to investigate the effectiveness of mindfulness training on aggression, mind rumination and self-control of female students with low academic performance in the Junior high schools in Tabriz. This research showed that the intervention program of mindfulness was effective in reducing the aggression and mind rumination as well as increasing the self-control of the Junior high school female students with low academic performance in Tabriz. Also, it was shown that after receiving the mindfulness program, the mean score of the experimental group had a significant difference with that of the control group, in terms of reducing aggression and mind rumination as well as the increase in self-control of the participants. In other words, the mindfulness intervention program s was effective in reducing aggression and rumination and increasing self-control. The results of the present study are consistant with those of Chiodelli, Mello and Jesus (2018), Hofmann and Gómez (2017), Gouda et al. (2016), and Bazzano et al. (2018).

In explaining the results of the research, it can be stated that the mindfulness intervention program through regular meditation exercises increases a person's moment-by-moment awareness of body-oriented feelings and emotions. In this way, people learn to be aware and alert of negative emotional thoughts, accept

them non-judgmentally and express them calmly (Barcaccia et al., 2019). Also, accepting thoughts helps to organize thoughts. As a result, unconscious repressions are reduced and less energy is spent on stresses of unknown origin. In this regard, people learn how to communicate with their ineffective and irrational thoughts as well as negative emotions and feelings in a different way. This intervention method, by creating acceptance, prevents vulnerability and irrational sensitivities in stressful situations (Kabat-Zinn, 2003).

Being emotionally capable makes it easier for people to face life's challenges. As a result, they enjoy more mental health. Emotionally capable people recognize their feelings, understand their meanings and effectively express their emotional states to others. These people are more successful in coping with negative experiences. Also, they show a more suitable adaptation in relation to the environment and others (Mahbobi, Salimi, & Hosseini, 2016). People who control affairs usually show more optimism and have better mental health (Sadeghi, Sajjadian, & Nadi, 2020). Students with appropriate personality traits are motivated to progress and to succeed (MacIntyre & Vincze, 2017). Consequently, being exposed to the mindfulness intervention program, students are motivated with the least anxiety caused by low academic performance, and by strengthening positive academic emotions through self-control, they remove and reduce aggression and mind rumination.

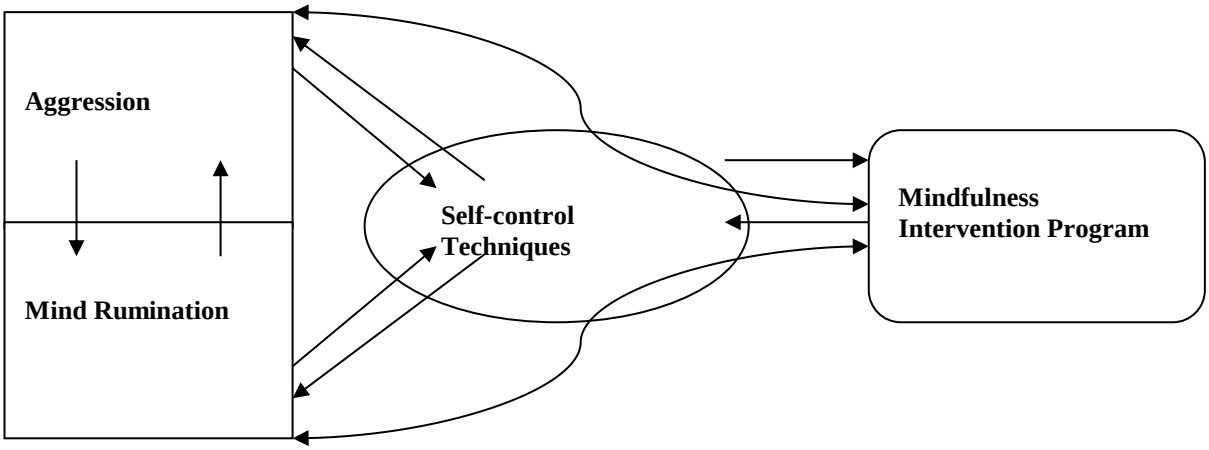
Conclusion

Mindfulness includes the skills of staying in the moment, acceptance and living consciously (Kabat-Zinn, 2003). Flexibility and acceptance are the basic principles of mindfulness (Barnard & Teasdale, 1991). Higher mindfulness is correlated with less impulsivity and greater ability to control emotions. The ability to be aware of the mind and to live mindfully is related to the feeling of mastery over oneself and the environment. People who can show ability in regulating their emotions in the moment, can act more capable in controlling themselves. This skill is developed by practicing not to judge, but face and accept unwanted thoughts. The ability to control and regulate emotions is the central core of mindfulness exercises (Sadeghi et al., 2020). In sum, the main mechanism of mindfulness is self-control of attention because repeatedly focusing attention on a neutral stimulus, such as breathing, increases the ability to control attention (Kabat-Zinn, 2003).

Self-control skill is a model of cognitive-behavioral coping skill and its success has been confirmed in evaluation and treatment processes (Azadmanesh et al., 2019). This skill is an exercise for self-control, in order to return to the path of preferred criteria (Vohs & Baumeister, 2004). Self-control skill consists of the ability to resist temptations, change one's thoughts, feelings and behaviors, ignore impulses and habits in order to meet expectations, as well as their supervision and control (Gillebaart, 2018). Previous studies have shown that self-control skills can effectively reduce various emotional and behavioral problems and maintain success and motivation (Mezo, 2009). The current research, also in line with past studies, showed that self-control has a two-way interaction with research variables. On the one hand, this variable is influenced by the mindfulness intervention program.

This means that, in the interactive cycle, mindfulness leads to increased self-control and self-control leads to more use of mindfulness techniques. On the other hand, self-control affects aggression and mind rumination and leads to their reduction. By eliminating and reducing aggression and mind rumination, a person benefits from its psychological advantages and finds more motivation to use self-control and mindfulness techniques. In this way, this interactive cycle continues and leads to the elimination or reduction of cognitive, emotional and behavioral problems. In Figure 3, the interactive cycle of mindfulness, self-control, aggression, and mind rumination is presented.

Figure 3.
The Model of Interactive Cycle of Mindfulness, Self-Control, Aggression and Mind Rumination designed by the Researchers



The current research, like all research, had some limitations. The most important limitations of this research were the limitation in the selection of the population and the statistical sample, and the occurrence of the COVID 19 pandemic. Hence, it is suggested to study other age and gender groups in normal conditions in order to increase the power of generalization.

The present study showed the effectiveness of the mindfulness intervention program on aggression, mind rumination and self-control. Based on the findings, it is suggested that school counselors and psychologists prepare educational brochures about mindfulness training for students with low academic performance. Moreover, it is suggested that mindfulness intervention program be taken into consideration in teaching-learning processes, so that the academic performance of students in learning environment improve. Also, the mindfulness intervention program should be implemented in different groups, both clinical and non-clinical. In particular, mindfulness training should be implemented in order to help reduce the level of aggression and mind rumination and increase the level of self-control of female students in schools.

Considering the effectiveness of the mindfulness intervention program and that during the Corona period, students faced serious emotional and educational problems, it is suggested to implement such intervention programs, even in virtual form. In this research, the effectiveness of the exclusive implementation of the intervention program of mindfulness, was confirmed on aggression, mind rumination and self-control. It is suggested to study different combinations of intervention programs with mindfulness intervention program. In addition, in comparative studies, the effectiveness of other programs could be compared with the mindfulness intervention program. In the current research, female students of the Junior high schools in Tabriz with low academic performance were studied, other groups with background problems can be studied in future studies. Also, the effectiveness of the mindfulness intervention program should be investigated in other age, educational and gender groups as well as other geographical settings.

Acknowledgments

This article is extracted from the Doctoral Dissertation approved by the Islamic Azad University of Tabriz Branch with the ethics code IR.IAU.TABRIZ.REC.1400.210. The authors consider it necessary to express their sincere appreciation and gratitude to the officials and professors of the Islamic Azad University of Tabriz, the principals and teachers of the girls' schools of the Junior high school in Tabriz, the female students of the seventh grade in Tabriz and others who helped us in carrying out and improving the quality of this research**.**

Conflicts of Interest

No conflicts of interest declared.

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