The effectiveness of fusion music on anxiety and aggression in adolescent

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ABSTRACT

The present study aimed to investigate the effectiveness of fusion music on reducing anxiety and aggression in adolescent first-grade high school students in District 8 of Tehran. For this purpose, 5000 female students studying in the academic year of 2019-2020 were considered as the statistical population of the study. In the sampling process, two schools were selected using the cluster method and one class was randomly selected among each grade classes, and standard aggression and anxiety questionnaires were distributed among students (pre-test) and then students with higher anxiety and aggression scores were selected and randomly assigned to the experimental and control groups. Then, the experimental group participated in music therapy sessions for 10 weeks. After completing the training course, these students participated again in the aggression and anxiety post-test. Given the quasi-experimental nature of the research method and the formation of experimental and control groups in the seventh grade, eighth grade, and ninth grade high schools, about 15 female students were randomly included in each of the experimental and control groups. Besides, to assess and analyze the aggression variable, Aggression Questionnaire and Children's Anxiety Scale were used to measure anxiety in SPSS software. The results showed that traditional music therapy affects reducing anxiety and aggression of students in all seventh, eighth, and ninth grades, so all hypotheses were confirmed.

Keywords: music therapy, aggression, anxiety, first-grade high school students

Introduction

Worry about the mental health of children and adolescents and its effect on their growth and performance have increased dramatically in recent years with increasing the rate of detectable mental disorders and experts emphasize the importance of timely assessment and treatment of psychological disorders. Antisocial behaviors and aggression are among the most common reasons for referring children and adolescents to mental health clinics .Aggression is a behavior that aims at hurting oneself or others.

In this definition, the intention is important, that is, harmful behavior is considered aggressive if it is done intentionally to harm another or oneself. Sometimes many children and adolescents also have emotional problems and are prone to depression. These children tend to be hyperactive, impulsive, aggressive, and anxious. It is difficult for them to adapt to new situations and activities. The range of their accuracy is very limited and they need immediate reward .Aggressive behavior, like other human behaviors, follows some principles and rules of learning and can be used as a tool to explain the nature of aggression in humans based on the principles of response conditioning and operant conditioning. In this regard, music is one of the tools that can directly affect the level of emotion, feeling, and mental imagery, and indirectly affect one's cognition.

Music production and perception is one of the fascinating activities of the human brain, and music therapy means the use of music and music programs set to rehabilitate all physical and mental patients. A music therapist is a specialist, with a university

degree in this field, who designs various programs based on the patient's status using the application of music in therapy. Based on a definition provided by the National Association of Music Therapy (NAMT), music therapy is "the use of music to provide, maintain, and improve physical and mental health. Music therapy is a regular use of music, in which music therapist directly creates desired changes in the client's emotions and behavior in a therapeutic environment" .The results of a study conducted by the American Psychological Association in 2003 on 500 students at the University of Texas, showed that loud music and lyrics increased aggressive feelings and thoughts (ibid.). Since music stimulates the secretion of oxytocin hormone by stimulating the secretion of dopamine, it can also help improve the symptoms of hyperactivity by increasing this hormone. Moreover, it has been shown that music increases dopamine in various areas of the brain, including the basolateral cortex, nucleus accumbens, and nucleus amygdala. In addition, classical music causes changes in the striatal, prefrontal cortex, and mesencephalic areas of the brain. Hence, music hinders preventive behaviors by increasing dopamine in the upper areas of the brain on one hand and improves symptoms of aggression by improving the function of prefrontal areas on the other hand.

Warth et al. (2014) conducted a significant study on depression, anxiety, and social isolation of Mexican workers with the aim of determining group music therapy [1]. Anxiety, depression and social isolation are all seen at high levels in this population. However, no intervention study has been performed to determine the factors influencing the reduction of these symptoms. The results did not show a significant effect for the music therapy group compared to the control group, but the effect size was promising. Semple et al. (2005) showed that music therapy significantly increased social skills and corrected behavioral problems in children with behavioral and emotional disorders [2].

Mirbagher et al. (2010) carried out research entitled "The Effect of Music on Anxiety" to investigate the effect of music on anxiety and some physiological indicators of patients before general surgery [3]. In the experimental group, instrumental music was played for 20 minutes. No intervention was performed for the control group. The results showed that the level of anxiety and mean blood pressure in the experimental group were significantly different compared to control after the intervention. There was no significant difference between the two groups in terms of heart rate and respiration.

Materials and Methods

The present study has a quasi-experimental design with experimental and control groups selected from seventh, eighth, and ninth grades of high schools. The statistical population of this study included high school female students studying in the schools of District 8 of Tehran. A convenience sampling method was used and the sample size was estimated using a clustering method. In the sampling process, two schools were selected, and

among classes of each grade, one class was randomly selected and standard aggression and anxiety questionnaires were distributed among students (pre-test) and then students with higher anxiety and aggression scores were selected and randomly assigned to the experimental and control groups. Then, the experimental group participated in music therapy sessions for 10 weeks. After completing the training course, these students participated again in the aggression and anxiety post-test. In the present study, the standard Hajati et al.'s aggression questionnaire (2008) was used to measure aggression and the standard Spence et al.'s anxiety scale (2004) was used to measure anxiety [4, 5]. To make inferential analyses and test the research hypotheses, the pre-test and post-test methods were used with the control group. The difference of scores obtained by subtracting each subject's pre-test score from her post-test score and then the mean scores were calculated for the two groups, and finally, the calculated means were compared between two groups by the analysis of covariance.

Results and Discussion

Based on **Table 1**, the mean scores of aggression and anxiety in all three grades in the control group did not change significantly in the two stages of pre-test and post-test, but in the experimental group, they decreased in the post-test stage.

Table 1. Descriptive Characteristics of Scores in Pre-test and Post-test Stages in Two Groups

Grade	Group	Experimental		Control	
		Mean	SD	Mean	SD
Seven	Aggression Pre-Test	71.4667	9.68701	66.6	10.5884
	Aggression Post-Test	54.8667	7.45335	66	10.21204
	Anxiety Pre-Test	46.5333	12.55768	33.6667	13.35058
	Anxiety Post-Test	21.6	5.34255	35.2	12.82965
Eight	Aggression Pre-Test	70.0667	9.54289	62.6	10.5884
	Aggression Post-Test	54.7333	6.68117	63.2667	10.5929
	Anxiety Pre-Test	45.5333	12.55768	32.6667	13.35058
	Anxiety Post-Test	18.7333	5.77515	32.6	12.51171
Nine	Aggression Pre-Test	68.8	9.49586	62.6	10.52751
	Aggression Post-Test	55.1333	8.22771	63.5333	10.24602
	Anxiety Pre-Test	43.5333	12.55768	30.6667	13.35058
	Anxiety Post-Test	19.1333	5.30319	32.2667	12.70246

	Test			Control		
Anxiety Pre-Test	0.149	.200^{C,D}	Normal	0.157	.200^{C,D}	Normal
Anxiety Post-Test	0.165	.200^{C,D}	Normal	0.167	.200^{C,D}	Normal

Table 2 shows the results of the Kolmogorov-Smirnov test. The significance value of this test for all variables is more than 0.05, so H_0 the hypothesis is accepted. Therefore, the assumption of normality of data for the variables in the control and experimental groups is confirmed.

Table 2. Kolmogorov-Smirnov Test Results to Check the Normality of Pre-test Data

Grade	Group	Test			Control		
		K-S	Sig	Result	K-S	Sig	Result
Seven	Aggression Pre-Test	0.147	.200^{C,D}	Normal	0.173	.200^{C,D}	Normal
	Aggression Post-Test	0.226	.058^{C}	Normal	0.194	.132^{C}	Normal
	Anxiety Pre-Test	0.164	.200^{C,D}	Normal	0.173	.200^{C,D}	Normal
	Anxiety Post-Test	0.217	.055^{C}	Normal	0.149	.200^{C,D}	Normal
Eight	Aggression Pre-Test	0.149	.200^{C,D}	Normal	0.136	.200^{C,D}	Normal
	Aggression Post-Test	0.162	.200^{C,D}	Normal	0.174	.200^{C,D}	Normal
	Anxiety Pre-Test	0.149	.200^{C,D}	Normal	0.157	.200^{C,D}	Normal
	Anxiety Post-Test	0.189	.158^{C}	Normal	0.139	.200^{C,D}	Normal
Nine	Aggression Pre-Test	0.149	.200^{C,D}	Normal	0.157	.200^{C,D}	Normal
	Aggression Post-Test	0.185	.177^{C}	Normal	0.116	.200^{C,D}	Normal

To examine the homogeneity of the regression slope using the analysis of covariance, the interaction between the covariate and the independent variable was examined and its results are presented in **Table 3**.

Table 3. Examining the Interaction between the Covariate and the Independent Variable of Aggression

Source of Variations	Sum of Squares	Df	Means of Squares	F	Sig.
Seventh Grade					
Group	7.818	1	7.818	.693	.413
Pre-Test	1789.671	1	1789.671	158.663	.000
Group*Pre-Test	74.620	1	74.620	1.615	.116
Eighth Grade					
Group	13.584	1	13.584	2.694	.113
Pre-Test	1864.749	1	1864.749	222.883	.000
Group*Pre-Test	92.047	1	92.047	1.258	.186
Ninth Grade					
Group	.947	1	.947	.146	.706
Pre-Test	2159.970	1	2159.970	332.144	.000
Group*Pre-Test	20.947	1	20.947	3.221	.084

As shown in **Table 3**, the interaction of the independent variable and covariate is not significant [P-Value ≤ 0.05, F=1.615]. Thus, it can be concluded that the assumption of homogeneity of the aggressive regression slope in three grades has been observed.

Table 4. Examining the Interaction between Covariate and Independent Variable of Anxiety

Source of Variations	Sum of Squares	df	Means of Squares	F	Sig.
Seventh Grade					
group	112.1	1	112.1	222.	642.
Pre-test	016.2053	1	016.2053	516.409	000.
Group*Pre-test	161.400	1	161.400	820.2	102.
Eighth Grade					
Group	313.1	1	313.1	199.	659.
Pre-test	748.2039	1	748.2039	659.308	000.
Group*Pre-test	363.336	1	363.336	899.3	091.
Ninth Grade					
Group	001.	1	001.	000.	993.
Pre-test	700.1980	1	700.1980	449.321	000.
Group*pre-test	349.394	1	349.394	999.3	093.

As shown in **Table 4**, the interaction of covariate independent variable is not significant [P-Value ≤0.05, F=2.820]. Therefore, it can be concluded that the assumption of homogeneity of anxiety regression slope has been observed.

To examine the homogeneity of variances, Levene's test was used and its results are presented in **Table 5**.

Table 5. Levene's Test Results based on Homogeneity of Variances

Variable	Grade	F	Df1	Df2	Sig.
Aggression	Seventh Grade	3.972	1	28	.051
	Eighth Grade	3.878	1	28	.056
	Ninth Grade	3.162	1	28	.055
Anxiety	Seventh Grade	.063	1	28	.804
	Eighth Grade	.081	1	28	.778
	Seventh Grade	.067	1	28	.798

Ninth	Pre-Test	1422.875	1	1422.875	172.180	.000	.864
	Group	2227.439	1	2227.439	316.484	.000	.921
	Post-Test	1317.459	1	1317.459	187.190	.000	.874

Based on the results of **Table 5**, the assumption of homogeneity of variances has been also observed (P-Value ≥ 0.05).

After confirming the hypotheses, the ANCOVA test was used to compare the mean scores of the groups in the post-test. Accordingly, pre-test scores were controlled as a covariate, and then post-test scores were compared, the results of which are presented below.

Fusion music affects reducing aggression in female high school students.

ANCOVA test was used to compare the mean scores of aggression in the post-test. The pre-test scores were controlled as a covariate and then the post-test scores were compared. The results are presented in the following Tables.

Table 6. Results of Analysis of Covariance to Compare the Mean of Post-test Scores

Grade	Source	Sum of Squares	Df	Mean of Squares	F	Sig.	Eta-Squared
Seventh	Pre-Test	1869.841	1	1869.841	137.229	.000	.836
	Group	1600.704	1	1600.704	117.477	.000	.813
Eighth	Post-Test	1972.742	1	1972.742	238.718	.000	.898

Based on **Table 6**, the effect of pre-test scores on post-test scores is significant in all three groups and it can be stated that the correlation between the covariate and independent variables has been observed. F-value was reported to be significant at an error level of less than 0.05. it means that after removing the effect of the pre-test, there is a significant difference between the mean scores of the two groups in the post-test. Therefore, the null hypothesis is rejected and the opposite hypothesis is confirmed. In other words, fusion music reduces the aggression of female adolescents. **(Table 7)**

Table 7. Adjusted Means

Grade	Group	Mean	Standard Deviation Error	%95 Confidence Level Lower Bound	%95 Confidence Level Upper Bound
Seventh	Experimental	52.907[A]	.968	50.922	54.893
	Control	67.960[A]	.968	65.974	69.945
Eighth	Experimental	?	51.624[A]	.769	50.046
	Control	?	66.376[A]	.769	64.798
Ninth	Experimental	52.375[A]	.702	50.934	53.816
	Control	66.291[A]	.702	64.850	67.732

Fusion music affects reducing the anxiety of high school students. The results of comparing the mean scores of anxieties in the post-test using the ANCOVA test are presented in **Table 8**.

Table 8. Results of Analysis of Covariance to Compare the Mean of Post-test scores

Grade	Source	Sum of Squares	Df	Mean of Squares	F	Sig.	Eta-Squared
Seventh	Pre-Test	494.2173	1	494.2173	620.110	000.	804.
	Group	108.2963	1	108.2963	807.150	000.	848.
Eighth	Post-Test	352.2150	1	352.2150	250.114	000.	809.
	Pre-Test	731.3021	1	731.3021	546.160	000.	856.
Ninth	Group	111.2098	1	111.2098	152.102	000.	791.
	Post-Test	050.2801	1	050.2801	376.136	000.	835.

As shown in **Table 8**, the effect of pre-test scores on post-test scores is significant. F-value was reported to be significant at an error level of less than 0.05. It means after removing the effect of the pre-test, there is a significant difference between the mean scores of the two groups in the post-test. Therefore, the null hypothesis is rejected and the opposite hypothesis is confirmed. In other words, fusion music reduces the anxiety of female adolescents at all three levels. **(Table 9)**

Table 9. Adjusted Mean

Grade	Dependent Variable	Group	Mean	Standard Deviation Error	95% Confidence Level Lower Bound	95% Confidence Level Lower Bound
Seventh		Experimental	17.227[A]	1.218	14.728	19.725
		Control	39.573[A]	1.218	37.075	42.072
Eighth	Post-Test	Experimental	14.383[A]	1.192	11.938	16.829
		Control	36.950[A]	1.192	34.505	39.395
Ninth		Experimental	14.836[A]	1.245	12.282	17.391

Control	36.564[A]	1.245	34.009	39.118

Conclusion

The present study aimed to investigate the effectiveness of fusion music on reducing anxiety and aggression in adolescent female high school students in District 8 of Tehran. The results of this study showed that fusion music affects reducing aggression in seventh grade, eighth grade, and ninth grade female high school students. and adults and concluded that music therapy had a positive effect on reducing aggression. Music is a powerful stimulant that can simultaneously affect the body and soul and modulate aggressive behaviors. Since an aggressive person suffers disorders in behavior, emotion, feeling, mental imagery, and interpersonal relationships, music can, directly and indirectly, affect cognition by affecting these aspects [6]. Disturbing behavior is the result of a lack of harmony in the person, and music can help restore harmony and order and thus health. In general, music helps the person to access the subconscious mind and release emotions. The effect of music rhythms on the pituitary gland leads to the secretion of endorphins and finally pain relief and relaxation in people. Given the emotional burden of music as a means of expression and psychological relief, people who suffer stress reach the desired level of emotion and peace of mind through music by projecting pressures and emotions through it. The results also revealed that fusion music affects reducing anxiety in seventh grade, eighth grade, and ninth grade female students. The obtained results are consistent with the results of studies conducted by Saberi et al. (2018), Mirbagher et al. (2010), and Warth et al. (2014) [1, 3, 7].

The most important effect of music is its positive and negative effects on the brain. By listening to music, people's inner states can be changed, but their variability level depends on the music perception of people. With increasing people's level of knowledge of music, the level of enjoyment of music also increases. Since listening to classical music for about 20 minutes can significantly reduce the level of anxiety, it is necessary to pay attention to the daily effects of popular and favorite music of adolescents in various other styles of music. In explaining the results of these hypotheses, it can be stated that since traditional music has an enjoyable rhythm and melody, it balances feeling and emotion and makes people aware of their abilities and adjust and control their feelings correctly during stress and anxiety in dealing with various situations. In line with the results of this study, it is recommended for therapists, social workers, and especially school counselors to pay special attention to this issue and hold annual workshops for students in the area of anger control in schools to prevent unfavorable events in school and family settings as a result of lack of control over adolescent anger. Since music used by people can affect their behavior, emotions, and general health, families and even schools must play music (both classical and traditional) for the children to enjoy listening to this type of music in adulthood, as various studies have shown that it is useful and to avoid listening to music that is harmful and promotes superficial and sometimes anti-human concepts. It is also recommended that music therapy workshops are held to raise the level of awareness and knowledge of people, especially parents so that music therapy as a scientific and specialized treatment method can be used in various treatment centers and clinics.

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