

The Effectiveness of Art Therapy on Reducing Manifest Anxiety in Children in Science Classes

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Abstract: Objectives: This research aimed to investigate the effectiveness of art therapy in reducing manifest anxiety in 10 to 11-year-old children in the science class. Methods: It was an applied, quasi-experimental research with pre-test and post-test, and a control group. The statistical population consisted of all fourth-grade male and female students in Giulan province. Two classes were selected through convenience sampling, and after conducting an anxiety test, anxious children were randomly assigned to an experimental group and a control group. The Children's Manifest Anxiety Questionnaire was used as the measurement tool. The intervention for the experimental group involved six sessions of drawing therapy. Data were analyzed using descriptive and inferential statistics. Findings: Research findings indicated that art therapy has a significant impact on reducing manifest anxiety in children. Conclusion: Given that art therapy has a positive effect on reducing manifest anxiety, it is necessary for elementary school teachers to properly identify anxious children and employ effective art therapy strategies in the experimental science class.

Keywords: Anxiety, Art therapy, Science.

1. Introduction

Today, most countries are pursuing scientific progress and the development of their educational systems. Societies require individuals who have the ability to effectively understand and timely apply their acquired knowledge. Achieving this goal requires fostering a scientific mindset and a deeper familiarity with the sciences. The sciences are the result of human effort and knowledge gained from certain phenomena at specific times, based on the evidence available at that time [1]. To improve understanding and learning in the field of sciences among students, it is necessary to reduce significant levels of manifest anxiety in science classes. Manifest anxiety in learning sciences is a feeling of tension and fear that hinders students' free and thoughtful engagement with scientific activities. Previous research has repeatedly shown a negative relationship between manifest anxiety and academic success in various age groups. Anxiety is an excessive feeling of concern about events and various activities over an extended period [2]. Anxiety can be considered as a distressing emotional and motivational state or a pervasive sense of alertness in response to threatening conditions [3]. Having some level of anxiety is natural and even necessary for performing tasks [4]. However, when the anxiety becomes intolerably disruptive, it can lead to maladjustment [5]. Anxiety disorders are highly prevalent [6] and often affect children and adolescents [7]. The evidence suggests that the prevalence of manifest anxiety among students is on the rise, with an estimated one in seven adolescents worldwide experiencing mental disorders [8]. Anxiety disorders typically have a negative impact on the quality of life in various functional areas, including academic performance, social interactions, self-confidence, and the ability to enjoy everyday life experiences. Identifying and preventing anxiety is a hopeful and effective approach in reducing the incidence of anxiety disorders [9]. Anxiety disorders in childhood are often treatable, and research predicts successful outcomes with treatment [10]. Therefore, given the high prevalence and the impact of anxiety disorders on current and future performance, effective interventions are necessary. Given the prevalence of anxiety disorders in childhood, elementary schools provide a suitable environment for prevention, identification, and initial support for students

[2]-[11]. Today, the use of art therapy for improving the mental health of children is emphasized by researchers. Informed teachers with sufficient educational background in art therapy and educational psychology create opportunities for children to express their thoughts and beliefs freely by incorporating these exercises and providing conducive environments for children [12]. Art therapy provides a non-invasive therapeutic space for young children to process their fears, injuries, and issues [13]-[14]. Art therapy offers a potential, valuable, and effective strategy for preventing mental health problems in young children by providing a structured outlet for addressing chronic emotional discomfort [15]. One of the prominent branches of art therapy is painting therapy. Painting is a psychotherapeutic approach aimed at facilitating psychological changes and personal growth in children. Children express complex emotions and feelings that are not easily verbalized through painting [16]. Based on the literature review, this study aims to investigate the effectiveness of art therapy in reducing manifest anxiety in 10 to 11-year-old children with a focus on the content of science lessons. Therefore, this study seeks to answer the following question: A) Is Art therapy effective in reducing manifest anxiety in children?

2. Research Method

The current research was conducted to investigate the impact of art therapy on manifest anxiety in students using a quasi-experimental pretest-posttest design with a control group. The statistical population consisted of all 10 to 11-year-old students in the Giulan province who were enrolled in the academic year 2021-2022. A sample of 39 students was selected through convenience sampling. To identify anxious learners, a pretest was first administered by distributing the Manifest Anxiety Questionnaire. Based on the test results, 18 students who scored 13 or higher on the Anxiety Questionnaire were identified as anxious learners. Among these, 3 children were excluded from the study due to a lack of willingness to participate, and the remaining students were randomly assigned to two groups: The control group (7 students) and the experimental group (8 students). Following the guidelines of [17], the intervention consisted of 6 sessions, each lasting 45 minutes.



FIG. 1. Sample artwork from the children in the experimental group

3. Research Tools

In the current study, the Revised Children's Manifest Anxiety Scale (RCMAS), developed by Reynolds and Richmond in 1978, was used to identify anxious children. This questionnaire consists of 37 items, with 9 items serving as lie scales and 28 items related to anxiety. Out of these, 9 items pertain to physiological symptoms of anxiety, 10 items relate to excessive worry and sensitivity, and 9 items are associated with fear/concentration. The reading level of the items is set to be appropriate for an average eight-year-old child. Each question is answered with a "yes" or "no," and scoring is done with either a one or zero. Therefore, the score range for anxiety-related items is from zero to twenty-eight, and for lie scales, it ranges from zero to nine. A lower score (below 13) indicates a lower level of anxiety, while a higher score (13 and above) suggests a higher level of anxiety. A lower score on the lie scale indicates greater honesty in responding to the questions.

4. Findings

The collected data in the current research were analyzed in two parts: descriptive and inferential statistics. In this study, painting therapy was considered the independent variable; manifest anxiety scale as the dependent variable, and the pretest as a covariate or auxiliary variable. Data analysis was carried out using Excel 10 and SPSS 24. To answer the research question, both Analysis of Covariance (ANCOVA) and Multivariate Analysis of Covariance (MANCOVA) were used.

5. Descriptive Statistics:

TABLE I. Estimation of the Reliability Coefficient of the Questionnaires

Variable		Group	Reliability Coefficient	Number of Questions
Manifest Anxiety	Pre-test	Experimental Group	0.736	23
		Control Group	0.777	23
	Post-test	Experimental Group	0.651	23
		Control Group	0.624	23

Since the items in the Manifest Anxiety Questionnaire were binary, Kuder Richardson's method was used to estimate the reliability coefficient. The results in the table above indicate that the reliability of the pretests for the experimental and control groups in the manifest anxiety variable is greater than 0.7, indicating good reliability. Additionally, the reliability of the posttests for the experimental and control groups in the manifest anxiety variable is greater than 0.6, which is considered acceptable.

TABLE II. Descriptive Results of the Research Variable Separated by Groups in Pretest and Posttest

Variable	Group		Number	Mean	Standard Deviation	Test Statistics	Degree of Freedom	p
Manifest Anxiety	Experimental Group	Post-test	8	10.125	3.56	0.754	7	0.014
		Pre-test	8	13.08	4.34	0.927	6	0.557
	Control Group	Post-test	7	14.28	3.59	0.918	7	0.458
		Pre-test	7	14.21	4.67	0.784	6	0.042

According to the results in the table above, the mean value of the manifest anxiety variable in the experimental group in the posttest is lower than that in the pretest, which indicates that after painting therapy, the mean score in the experimental group decreased in the manifest anxiety scale. The results of the above table also show that the obtained p-value in the pretest and posttest for both the experimental and control groups is greater than 0.05. Therefore, with normal distribution of scores, the research variables are confirmed, and only the statistical test results for the posttest of the experimental group and the pretest of the control group have p-values less than 0.05. Thus, the distribution of scores for this test is not normal.

TABLE III. Levene's Test Results

Variable	F	Df1	Df2	P
Manifest Anxiety	0.037	1	11	0.851

The results of the table above show that the Levene's test results for the manifest anxiety variable are equal to $F = 0.037$ and $P = 0.851$. The obtained P-value in the Levene's test is greater than 0.05. Therefore, the homogeneity of variance is confirmed. Considering that the sample size is equal in both groups, comparing the variances of the groups and the lack of confirmation of homogeneity of variances for these two variables in the groups do not pose a problem for the analysis. [18]. The results of the Box's test indicate $F = 1.635$ and $P = 0.179$. Since the P-value for the Box's test is greater than 0.05, the assumption of homogeneity of the covariance variances matrix of the score distribution is confirmed.

6. Inferential Statistics:

TABLE IV. Analysis of Covariance of Posttest Scores of Manifest Anxiety in Control and Experimental Groups

Variable	Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F-value	P-value	Effect Size
Manifest Anxiety	Pre-test	40.544	1	40.544	4.132	.069	0.292
	Group	63.077	1	63.077	6.429	*0.030	0.391
	Error	98.114	10	9.811			

*Significant at the 0.05 level

The table above shows that the F is significant for the independent variable group. That is, after adjusting for pretest scores, there is a significant difference between the experimental and control groups in the posttest scores of manifest anxiety. Therefore, it can be concluded that painting therapy has an effect on manifest anxiety in children.

TABLE V. Pairwise Comparison of Adjusted Means of the Research Variable in the Experimental and Control Groups

Dependent Variable	Group (I)	Group (J)	Mean Difference of the Two Groups	Standard Error	P	Lower Limit	Upper Limit
Post-test of Manifest Anxiety	Experimental Group	Control Group	*-4.431	1.748	*0.030	-8.325	-0.537

**Significant at the 0.01 level

The comparison of adjusted means between the experimental and control groups demonstrates that the difference between the two means in the manifest anxiety variable is -4.431, and the p-value is 0.030, which is less than 0.05. Thus, the research hypothesis regarding the effect of painting therapy on reducing manifest anxiety in children is confirmed.

7. Discussion

The present study aimed to determine the effectiveness of art therapy in reducing manifest anxiety in children aged 10 to 11 years. According to the findings of this research, painting therapy is effective in reducing manifest anxiety in children. The art therapy sessions in the experimental group led to a reduction in children's anxiety levels, which was significantly different compared to their anxiety level before the intervention. This finding aligns with the results of most of the previous studies [19]. Ref [19] acknowledged that art therapy, especially painting, could reduce anxiety levels in school-age children, and make them feel joyful and enthusiastic about participating in activities. Additionally, [20] demonstrated that group painting therapy was effective in reducing anxiety and improving self-acceptance in children and adolescents [21]. In a study on the impact of painting therapy on reducing separation anxiety symptoms in school boys aged 7 to 13, the results showed that painting therapy reduced separation anxiety symptoms significantly [16]. Furthermore, [22] found that painting therapy is a cost-effective and convenient therapeutic approach that requires fewer skills and can reduce anxiety levels in preschool children. [23] emphasized the vital role of painting therapy in reducing anxiety and enabling non-verbal expression of negative emotions. Painting therapy was shown to reduce aggression and anxiety in children with cancer and is considered a therapeutic intervention for releasing negative emotions in children. A study conducted by [24] on college students with pre-exam anxiety provided evidence that art therapy is effective in reducing anxiety before exams. Additionally, [25] demonstrated that art therapy can reduce anxiety, eliminate stress and fear, and encourage children to discuss their personal problems in learning and performance.

8. Conclusion

Based on the findings of this study, painting therapy can reduce manifest anxiety in children. These findings hold significance for teachers as they can provide insights into how to best support students with anxiety disorders in science classrooms. In other words, teachers can design integrated instruction that includes art therapy and science experiments to improve the emotional, behavioral, and physical states of anxious students, and make them engage in deep and sustained learning of scientific concepts with lower levels of anxiety. However, it is important to note that this study has limitations that may affect the generalizability of its results. First, the number of painting therapy sessions was limited, and increasing the number of sessions may lead to more sustainable positive behaviors. Secondly, the results of this research only apply to girls and boys aged ten. Hence, it is recommended to explore the impact of art therapy across a broader age spectrum. Given that the research results confirm the effectiveness of art therapy in reducing students' anxiety, it is recommended to consider painting therapy as part of care programs in schools and social settings to manage children's anxiety [26].

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9. References

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