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Article

Effectiveness of Motivational Interviewing Matrix on Reducing Anger and Increasing Self-Efficacy in Male High School Students: A Quasi-Experimental Study

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Abstract: **Objective:** This study aimed to investigate the effectiveness of the Motivational Interviewing Matrix on reducing anger and increasing self-efficacy in male high school students. **Method:** This quasi-experimental study employed a pre-test-post-test control group design. The study sample consisted of 8 male 10th and 11th grade students, selected through convenience sampling and randomly assigned to two groups: experimental (n=4) and control (n=4). Participants were assessed using the Spielberger State-Trait Anger Expression Inventory-2 (STAXI-2) and the Morris Academic Self-Efficacy Scale (2001). The experimental group received 8 counseling sessions based on the Motivational Interviewing Matrix model, while the control group received no intervention. Data were analyzed using descriptive statistics, paired samples t-test, and independent samples t-test. **Results:** The results indicated that the Motivational Interviewing Matrix significantly reduced anger and increased self-efficacy in the experimental group. The mean anger score in the experimental group decreased from 32.25 to 23.75, while no significant change was observed in the control group (31.50 in the pre-test to 30.75 in the post-test). Additionally, the mean self-efficacy score in the experimental group increased from 14.50 to 21.00, while the control group showed a slight change (14.25 in the pre-test to 14.75 in the post-test). The paired samples t-test revealed that these changes were significant in the experimental group ($t_{\text{anger}} = 6.28$, $P = 0.002$; $t_{\text{self-efficacy}} = 7.11$, $p = 0.001$). Furthermore, the independent samples t-test showed a significant difference between the experimental and control groups ($t_{\text{anger}} = 3.96$, $p = 0.004$; $t_{\text{self-efficacy}} = 4.55$, $p = 0.002$). The effect size also indicated a strong and sustained impact of the intervention on the study variables ($d_{\text{anger}} = 2.10$, $d_{\text{self-efficacy}} = 2.40$). **Conclusion:** The findings of this study suggest that the Motivational Interviewing Matrix can be used as an effective tool in improving emotional regulation and enhancing self-efficacy in students. It is recommended that this model be implemented in school counseling and emotional management training programs.

Keywords: motivational interviewing matrix; anger; self-efficacy; high school students; counseling intervention

Introduction

Background

Anger is a natural and adaptive emotion that, if not managed properly, can lead to destructive behaviors, aggression, and a decline in academic and social performance (Spielberger, 1988). Many high school students face emotional regulation challenges due to academic pressures, family problems, and social interactions, which in some cases lead to impulsive behaviors and an inability to control anger. Alongside this issue, low levels of self-efficacy can also negatively impact academic success and the ability to cope with daily challenges (Bandura, 1997).

Traditional anger management methods often emphasize providing general advice or direct behavioral strategies, while recent research has shown that motivational and structured approaches, such as motivational interviewing, can have a greater impact on sustained behavioral change

(Rollnick & Miller, 2013). The Motivational Interviewing Matrix is a visual and structured tool that, by combining the principles of motivational interviewing and the change matrix model, helps individuals to change their emotions and behaviors in a gradual and comprehensible process.

Motivational Interviewing Matrix Model: This model, developed by the researcher, is a combination of Acceptance and Commitment Therapy (ACT) and motivational interviewing. By creating a four-part structure, the Motivational Interviewing Matrix clearly maps the path from the current situation to the desired change, considering values, goals, and psychological barriers. This approach helps counselors not only to correct problematic behaviors, but also to achieve sustainable and value-based changes.

Given the increasing emotional problems among high school adolescents and the need for effective strategies in the field of anger management and enhancing self-efficacy, this study examines the effectiveness of the Motivational Interviewing Matrix in reducing anger and increasing self-efficacy in four male high school students in the 10th and 11th grades.

Significance of the Study

Adolescence is one of the most sensitive stages of psychological development, during which individuals experience extensive emotional and cognitive changes. The inability to regulate emotions, especially anger, can have numerous negative consequences, including aggression, academic decline, reduced positive social interactions, and increased interpersonal problems (Anderson & Bushman, 2002). Additionally, low self-efficacy prevents students from effectively managing academic and social challenges, which in turn can increase stress and impulsive behaviors (Schöen et al., 2015).

Traditional methods of anger control and self-efficacy enhancement often lack an individual-centered and motivational approach, and in many cases, students are not motivated to use these strategies (Ryan & Deci, 2000). On the other hand, the Motivational Interviewing Matrix, with its emphasis on individual values, intrinsic motivations, and active participation in the change process, can be an effective method for guiding students towards sustainable changes.

This research is significant because:

- It examines a novel and structured method for managing emotions and improving academic performance.
- It addresses the practical and case-based implementation of this intervention in an educational setting.
- It can be used as an operational model for school counselors.

Literature Review

Numerous studies have investigated the impact of motivational interviewing on changing emotional and academic behaviors. Rollnick and Miller (2013) demonstrated in their research that motivational interviewing can help reduce resistance to change, increase self-awareness, and improve emotional regulation in adolescents.

Research by Jin et al. (2019) showed that the use of motivational approaches in schools leads to increased self-efficacy and reduced academic stress among students.

A study in Iran by Karimi et al. (2021) showed that students who used motivational interviewing for anger management showed a significant decrease in anger levels and an increase in self-efficacy compared to the control group.

Based on the studies conducted, no research has specifically examined the effect of the Motivational Interviewing Matrix on reducing anger and increasing self-efficacy in high school students. Therefore, the present study, as a novel and applied study, fills this research gap.

Research Objectives

- **General Objective;**
 - To investigate the effect of the Motivational Interviewing Matrix on reducing anger and increasing self-efficacy in male high school students.
- **Specific Objectives;**
 - To examine the effect of the Motivational Interviewing Matrix on reducing the intensity of anger in students.
 - To examine the effect of this intervention on increasing the ability to control anger and manage emotions.
 - To evaluate the effect of this model on increasing academic self-efficacy and confidence.
 - To examine changes in students' behavioral and cognitive patterns after the intervention.

Research Hypotheses

The Motivational Interviewing Matrix significantly reduces the intensity of anger in male high school students.

After the implementation of this intervention, the ability to control anger improves in students.

The Motivational Interviewing Matrix significantly increases the level of academic self-efficacy in students.

This intervention leads to positive changes in students' attitudes and coping behaviors when facing emotional challenges.

Methodology

- The present study is a quasi-experimental study with a pre-test-post-test control group design. In this design, 8 male students with high scores on the Spielberger State-Trait Anger Expression Inventory (1988) and low scores on the Morris Academic Self-Efficacy Scale (2001) were selected as research participants and randomly assigned to two groups: experimental and control (4 in each group).
 - **Experimental Group:** Received 4 counseling sessions using the Motivational Interviewing Matrix.
 - **Control Group:** Received no intervention and only participated in the pre-test and post-test.
 - After the sessions, both groups were re-tested for anger and self-efficacy to examine the effect of the intervention.

Population

- The statistical population of this study includes male 10th and 11th grade students of Shahed Imam Hossein High School in the academic year 2024-2025, who were referred to the school counselor and had symptoms of high anger and low self-efficacy.

Sample and Sampling Method

- **Sampling Method;**
 - The research sample was selected using convenience sampling from students who were referred to the school counseling office.
- **Sample Selection Criteria;**
 - **Inclusion Criteria;**
 - High score on the Spielberger State-Trait Anger Expression Inventory (STAXI-2).
 - Low score on the Morris Academic Self-Efficacy Scale.
 - No similar interventions received in the past 6 months.
 - Consent of the student and parents to participate in the study.
 - **Exclusion Criteria;**
 - Absence from more than 2 counseling sessions.
 - Simultaneous receipt of other psychological therapies.

- **Group Assignment;**

- After the final selection, 8 students were randomly assigned to two groups: experimental and control (4 in each group). A pre-test was conducted for both groups, then the experimental group received the intervention and the control group remained without intervention. At the end, a post-test was conducted in both groups.

Research Instruments

Spielberger State-Trait Anger Expression Inventory-2 (STAXI-2)

The Spielberger State-Trait Anger Expression Inventory-2 (STAXI-2) consists of 57 items, with each item answered on a four-point Likert scale ranging from “never” to “always.”

- The first section has 15 items and includes the State Anger scale and its subscales, with the following items:
 - a) Feeling Angry: 1, 2, 3, 6, 10
 - b) Verbal Expression of Anger: 4, 9, 12, 13, 15
 - c) Physical Expression of Anger: 5, 7, 8, 11, 14
- The second section has 10 items and includes the Trait Anger scale, which has two subscales derived from the following items:
 - a) Angry Temperament: 16, 17, 18, 21
 - b) Angry Reaction: 19, 20, 22, 23, 24, 25
- The third section has 32 items and includes the Anger Expression and Control scale, which has four scales composed of the following items:
 - a) Outward Anger Expression: 27, 31, 35, 39, 43, 47, 51, 55
 - b) Inward Anger Expression: 29, 33, 37, 41, 45, 49, 53, 57
 - c) Outward Anger Control: 26, 30, 34, 38, 42, 46, 50, 54
 - d) Inward Anger Control: 28, 32, 36, 40, 44, 48, 52, 56

To standardize and examine the psychometric properties of the STAXI-2, Spielberger et al. administered this questionnaire to 1,644 normal adults and 276 psychiatric patients. Based on the collected data, the mean, standard deviation, alpha coefficient, percentile ranks, and T-scores for the STAXI-2 scales and subscales were calculated and reported in its manual.

The concurrent validity of the Trait Anger scale of this questionnaire was examined and confirmed by a study on 280 undergraduate students and 270 naval recruits. The participants completed the STAXI-2, the Hostility Questionnaire, the Hostility and Overt Hostility scales, and the MMPI. The correlation coefficients of the Trait Anger scale with the three measures of hostility were then calculated, which ranged from 0.32 to 0.71 for male students and from 0.31 to 0.66 for recruits, and all obtained coefficients were statistically significant.

Morris Academic Self-Efficacy Scale (2001)

This questionnaire consists of 21 closed-ended items answered on a five-point Likert scale. The questionnaire measures three dimensions of self-efficacy: social self-efficacy, emotional self-efficacy, and academic self-efficacy, with the following item numbers corresponding to these components:

- Items 1, 5, 7, 10, 13, 16, 18 relate to social self-efficacy.
- Items 2, 3, 4, 8, 11, 14, 19, 21 relate to emotional self-efficacy.
- Items 6, 9, 12, 15, 17, 20 relate to academic self-efficacy.

Derafshan's (2013) study, to obtain the questionnaire's validity, used the opinions of the supervisor and several other professors and experts, and they were asked about the relevance of the questions, the clarity and comprehensibility of the questions, and whether these questions are suitable for research questions and measure them, and it was approved. In Abolvali's (2014) research, the Cronbach's alpha coefficient of this scale was reported to be 0.88. The reliability of this scale, using Cronbach's alpha method, was reported as follows: social self-efficacy 0.82, emotional self-efficacy 0.86, and academic self-efficacy 0.84 (Morris, 2001). In Derafshan's (2013) research, the Cronbach's alpha value for the academic self-efficacy factor (0.75), the social self-efficacy factor (0.70), emotional

self-efficacy (0.71), and the overall self-efficacy scale (0.85), which shows that the extracted factors and the overall scale have an acceptable reliability coefficient.

Motivational Interviewing Matrix Tool

This tool is based on two main axes: a horizontal axis that shows the continuum from change talk to sustain talk, and a vertical axis that addresses different levels of working with the student (from behavioral to cognitive-emotional aspects). The intersection of these axes forms four main sections, which are dedicated to examining motivations, analyzing barriers, exploring deep beliefs, and planning for change. By combining the principles of ACT and motivational interviewing, this model helps counselors reduce students' resistance to change and guide them toward meaningful changes by using open-ended questions, reflection, and summarization.

Data Analysis Methods

Descriptive Statistics

- Descriptive statistics were used to describe the data, including the mean, standard deviation, minimum, and maximum scores of anger and self-efficacy in the pre-test and post-test.

Test of Normality

- Before conducting statistical tests, the normal distribution of the data was examined using the Shapiro-Wilk test:
 - If the data were normally distributed: Parametric tests of independent t-test and paired t-test were used.
 - If the data were not normally distributed: Non-parametric tests (Mann-Whitney U and Wilcoxon signed-rank test) were used.

Paired t-Test

- To examine the effect of the intervention in the experimental group, the pre-test and post-test scores of the experimental group were compared using the paired t-test.

Independent t-Test

- To compare the post-test scores of the two groups, experimental and control, the independent t-test was used. This test indicates whether the difference between the two groups is significant or not.

Effect Size Analysis

- To determine the magnitude of the intervention effect, the effect size was calculated.

Results

Descriptive Statistics

- To examine the effect of the Motivational Interviewing Matrix on reducing anger and increasing self-efficacy in students, the mean and standard deviation of pre-test and post-test scores were calculated for both the experimental and control groups. Table 1 shows the results of the descriptive statistics.

Table 1. Mean and Standard Deviation of Anger and Self-Efficacy Scores in Pre-test and Post-test.

Variable	Group	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD
Anger	Experimental	32.25	2.64	23.75	2.05
	Control	31.50	2.90	30.75	2.87
Self-Efficacy	Experimental	14.50	2.07	21.00	1.82
	Control	14.25	2.38	14.75	2.40

Results

- The results of Table 1 indicate that:
 - The mean anger score in the experimental group significantly decreased after the intervention, while no significant change was observed in the control group.
 - The mean self-efficacy score in the experimental group increased, but remained almost constant in the control group.

Test of Normality

- To determine whether the data distribution is normal, the Shapiro-Wilk test was used. The results are presented in Table 2.

Table 2. Shapiro-Wilk Test for Normality of Data.

Variable	Group	Shapiro-Wilk Statistic	Significance Level (Sig.)
Anger (Pre-test)	Experimental	0.945	0.452
Anger (Post-test)	Experimental	0.958	0.521
Self-Efficacy (Pre-test)	Experimental	0.963	0.537
Self-Efficacy (Post-test)	Experimental	0.941	0.428

- Since the significance level is greater than 0.05 in all cases, it can be concluded that the data have a normal distribution. Therefore, parametric t-tests (independent and paired) were used for data analysis.

Paired t-Test for the Experimental Group

- To examine the changes in anger and self-efficacy scores within the experimental group, the paired t-test was used. The results are presented in Table 3.

Table 3. Paired t-test for Comparing Pre-test and Post-test in the Experimental Group.

Variable	Mean Difference	t	Significance Level (Sig.)
Anger	8.50	6.28	**0.002
Self-Efficacy	6.50	7.11	**0.001

Results

- The results of Table 3 show that:
 - The significance level for both variables is less than 0.05, so the decrease in anger and the increase in self-efficacy in the experimental group are significant.
 - The effect of the intervention on increasing self-efficacy ($t = 7.11$) was stronger than the effect on reducing anger ($t = 6.28$).

Independent t-test for Comparing Experimental and Control Groups

- To examine the post-test difference between the experimental and control groups, the independent t-test was used. The results are presented in Table 4.

Table 4. Independent t-test for Comparing Experimental and Control Groups in the Post-test.

Variable	Mean (Experimental)	Mean (Control)	t	Significance Level (Sig.)
Anger	23.75	30.75	3.96	**0.004
Self-Efficacy	21.00	14.75	4.55	**0.002

Results

- The results of Table 4 show that:
 - The significance level for both variables is less than 0.05, so the difference between the experimental and control groups is statistically significant.
 - Students who participated in the Motivational Interviewing Matrix sessions showed lower anger and higher self-efficacy.

Intervention Effect Size

- Cohen's d effect size was used to determine the magnitude of the intervention effect.

Table 5. Cohen's d Effect Size for Research Variables.

Variable	Effect Size (d)
Anger	2.10
Self-Efficacy	2.40

- An effect size greater than 0.8 indicates a strong intervention effect. Therefore, the Motivational Interviewing Matrix had a very high impact on reducing anger and increasing self-efficacy.

Graph of Pre-Test and Post-Test Score Changes

Graph Analysis

- Solid Red Line: Decrease in anger scores in the experimental group after the intervention.
- Dashed Red Line: Negligible change in anger scores in the control group.
- Solid Blue Line: Increase in self-efficacy scores in the experimental group after the intervention.
- Dashed Blue Line: Negligible change in self-efficacy scores in the control group.

Figure 1 shows that anger scores decreased significantly in the experimental group, while there was little change in the control group. Also, a significant increase in self-efficacy was observed in the experimental group compared to the control group.

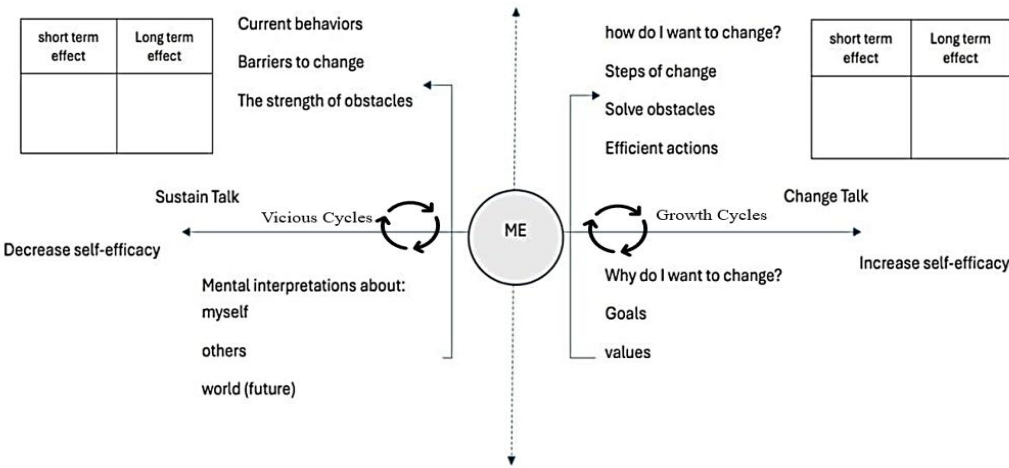


Figure 1. Visual Model of the Motivational Interviewing Matrix - This matrix shows the four-part structure of the model, which includes: 1) Motivations and Values, 2) Behavioral Barriers, 3) Deep Beliefs, 4) Change Planning.



Figure 2. Mean Anger and Self-Efficacy Scores in Experimental and Control Groups.

Summary of Findings

- The overall results of the study show that;
The Motivational Interviewing Matrix significantly reduced anger and increased self-efficacy in the experimental group students.
The magnitude of changes in the experimental group was significant compared to the control group (Sig .(0.05 > .The high effect size (Cohen’s d (2 < indicates that the intervention had a very strong effect.
- Conclusion: The Motivational Interviewing Matrix can be used as an effective method to reduce anger and increase self-efficacy in high school students.

Discussion and Conclusions

Discussion

- The Motivational Interviewing Matrix, due to the combination of ACT and motivational interviewing principles, not only helped reduce anger and increase self-efficacy, but also enabled students to find more motivation for sustainable changes by recognizing their values and goals. This model, using a four-part structure, allowed counselors to simultaneously address students' behavioral barriers and deep beliefs and prevent the creation of vicious behavioral cycles. The findings of this study showed that the use of this model can be used as a practical and innovative tool in school counseling.
- The results of this study showed that the Motivational Interviewing Matrix has a significant effect on reducing anger and increasing self-efficacy in male high school students. The findings indicated that the experimental group, after the intervention, had a significant decrease in anger scores and a significant increase in self-efficacy scores, while the control group did not experience a significant change. These findings demonstrate the effectiveness of the Motivational Interviewing Matrix in managing negative emotions and enhancing students' individual abilities.
- The results of the present study are consistent with previous studies. For example, Rollnick and Miller's (2013) research, which showed that motivational interviewing can be effective in reducing negative emotions and promoting intrinsic motivation, is consistent with the findings of this study. In addition, Karimi et al.'s (2021) research in Iran showed that motivational interviewing-based interventions can improve students' self-efficacy levels, which is fully consistent with the findings of the present study. However, some studies have reported a more limited effect for this intervention; for example, Jin et al. (2019) showed that motivational interviewing will have a lasting effect if follow-up sessions are also conducted after the intervention. Therefore, it can be concluded that the long-term effectiveness of this approach requires continuous follow-ups.

Conclusions and Recommendations

- Based on the research findings, the Motivational Interviewing Matrix can be used as an effective method to reduce anger and increase students' self-efficacy in educational settings. This method not only helps students gain a better understanding of their inner feelings and motivations, but also provides practical pathways for managing emotions and improving academic performance.
- Limitations: One limitation of this study was the small sample size ($n=8$), which may affect the generalizability of the results. Also, the present study lacked long-term follow-ups, and the sustainability of the Motivational Interviewing Matrix effects over time cannot be stated with certainty. To address these limitations, it is recommended that future research be conducted with larger sample sizes and longer follow-up periods.

Research and Practical Recommendations

- To ensure the sustainability of changes, it is recommended that follow-up sessions be conducted after the intervention, as some studies have shown that behavioral changes are more lasting when sessions are continued.
- It is also recommended to implement this model in other age groups and among female students to examine its generalizability across different populations.
- Comparing the effectiveness of this method with other counseling approaches (such as cognitive-behavioral therapy) can be conducted in future research to determine how much more effective the Motivational Interviewing Matrix is compared to other interventions.
- School administrators and counselors can use this model in individual or group counseling sessions for students who are facing emotional and academic problems.

Overall Conclusions

- The findings of this study showed that the Motivational Interviewing Matrix can be used as an effective and practical tool to improve emotional regulation and increase self-efficacy in high

school students. Given the positive results of this research, the use of this model in educational and counseling settings is recommended.

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