




Comparison of the Effectiveness of Cognitive Bias Modification Therapy and Mindfulness-Based Cognitive Behavioral Therapy on Cognitive Avoidance and Ineffective Attitudes in University Students with Social Anxiety

Somayeh. Tahmasebi¹, Moloud. Keykhosrovani^{2*}, Naser. Amini²

¹ Ph.D. Student, Department of Psychology, Bushehr Branch, Islamic Azad University, Bushehr, Iran.

² Assistant Professor, Department of Psychology, Bushehr Branch, Islamic Azad University, Bushehr, Iran

* Corresponding author email address: Moloud.keykhosrovani@gmail.com

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ABSTRACT

Objective: The present study aimed to compare the effectiveness of cognitive bias modification therapy (CBM) and mindfulness-based cognitive behavioral therapy (MCBT) on cognitive avoidance and ineffective attitudes in university students with social anxiety.

Methods and Materials: This research employed a semi-experimental design with pre-test, post-test, and control group. The statistical population included all university students with social anxiety disorder at Shiraz University of Teachers during the academic years 2022-2023. A sample of 60 individuals was selected using convenience sampling method, randomly assigned to three groups (20 participants per group). The interventions consisted of cognitive bias modification therapy (7 sessions of 90 minutes each) and mindfulness-based cognitive behavioral therapy (8 sessions of 90 minutes each). Data collection tools included the Connor Social Anxiety Scale (2000), the Cognitive Avoidance Questionnaire by Sexton and Dugas (2004), and the Dysfunctional Attitudes Scale by Weissman and Beck (1978). Data analysis was conducted using descriptive and inferential statistics (analysis of covariance).

Findings: Results indicated significant differences among the three groups in cognitive avoidance, and mindfulness-based cognitive behavioral therapy showed comparable effectiveness to cognitive bias modification therapy. However, there were significant differences in the mean scores of ineffective attitudes and its components between the experimental and control groups, with mindfulness-based cognitive behavioral therapy demonstrating greater effectiveness compared to cognitive bias modification therapy.

Conclusion: The results indicated significant differences among the three groups. This finding also shows that Cognitive Behavioral Therapy and

Mindfulness did not have significantly different effectiveness in terms of cognitive avoidance and its components (except for thought substitution).

Keywords: *Cognitive Avoidance, Ineffective Attitudes, Social Anxiety, Cognitive Bias, Mindfulness-Based Therapy.*

1. Introduction

Anxiety, as an inseparable part of human life, encompasses an unpleasant and pervasive feeling of uncertainty with unknown origins, accompanied by physiological symptoms, and transforms into a disorder when it becomes a persistent and recurrent mental experience that disrupts individuals' daily functioning (Nooripour et al., 2021). One of the most common anxiety disorders that significantly impacts daily life and functioning is social anxiety disorder, also known as social phobia. Social anxiety disorder involves severe fear or anxiety in social situations where individuals may be under the scrutiny of others (Mizzi et al., 2022). In such situations, individuals fear negative evaluation about themselves. College students are a group that experiences anxiety, particularly social anxiety, more than other groups, and it is prevalent in the student population (McBride et al., 2022). This prevalence is due to the significant changes in expectations and new roles in social relationships that accompany university enrollment, often accompanied by pressure and anxiety, affecting individuals' performance and productivity (Kim et al., 2022).

Social incompetence and lack of control over negative emotions are associated with higher levels of fear, anxiety, social avoidance, and negative thinking, leading to cognitive avoidance (Scotta et al., 2022). Cognitive avoidance results in interpersonal relationship disturbances, where attention shifts from worrying issues to other minor topics to reduce anxiety levels (Mihailova & Jobson, 2020). Cognitive avoidance prevents effective responses to emotional stimuli and proper emotion management. Cognitive avoidance includes cognitive and behavioral regulatory processes that individuals employ to adapt to stressful environments (Ottenbreit et al., 2014). Cognitive avoidance strategies include thought suppression, thought substitution, distraction, avoiding threatening stimuli, and transforming perception into thought. In all these strategies, the main factor is the diversion of attention from worrying issues to other subjects (Eisma et al., 2020). Cognitive avoidance is recognized as a significant factor in reducing various anxiety disorders. Most models indicate that excessive efforts to suppress thoughts lead to contradictory effects, creating a vicious cycle that increases the occurrence and types of worrying thoughts and prepares the ground for rumination (Zucchelli et al., 2020).

Ineffective attitudes are among these cognitive factors and general rules through which individuals try to evaluate the data obtained from their experiences based on fundamental assumptions (central beliefs) and shape automatic thought patterns, valuing their perceptions, organizing them into cognitions, setting goals, evaluating and modifying their behavior, understanding how to cope with life events (Imani et al., 2019).

Numerous studies have shown that Cognitive Behavioral Therapy (CBT) is effective in treating depression, anxiety disorders, and many other mental disorders. In this regard, the implementation of mindfulness-based cognitive therapy can be beneficial in cases where traditional exposure therapy is ineffective due to its characteristics (Hamzelou et al., 2020).

In recent years, psychologists have largely agreed that acceptance-based approaches are more effective than control-based approaches in reducing anxiety. Therefore, acceptance-based approaches and mindfulness have been proposed as prominent methods in this field, and numerous studies have been conducted on them. Mindfulness is a form of contemplation rooted in the teachings and religious traditions of the East, especially Buddhism, and, in simple terms, refers to awareness of thoughts, emotions, and behaviors and is considered a specific form of attention characterized by two essential elements: present-moment awareness (mindfulness) and non-judgment (acceptance) (Ost, 2008). Mindfulness generally refers to cognitive processes through which individuals focus their attention on thoughts, emotions, and experiences that occur at the present moment, and, on the other hand, mindfulness helps individuals observe and describe internal thoughts, emotions, and experiences, enabling them to avoid negative thoughts such as fear of negative evaluation and rumination and to accept them non-judgmentally and non-reactively, thereby helping to accept them (Öst, 2008).

Cognitive theories of anxiety state that cognitive biases play a fundamental role in the etiology and persistence of emotional disorders. Cognitive bias refers to a form of attention in information processing where individuals pay more attention to some surrounding stimuli and ignore others (Arsanjani et al., 2021). Cognitive bias modification interventions follow the tradition of cognitive processing and are based on the implementation of experimental tasks. Cognitive bias modification aims to change specific

cognitive processing styles that appear to contribute to the development of disorders or unpleasant emotional reactions (Koster et al., 2009). Cognitive bias modification has its roots in recent anxiety patterns and is based on experimental data regarding threat biases in various conditions such as social anxiety. Cognitive bias modification training refers to methods aimed at changing cognitive automatic processes such as attention and interpretation, and these automatic processes can help in the growth and continuation of mental disorders. Therefore, this training is implicit and produced through targeted modification of cognitive biases in a specific direction (MacLeod & Mathews, 2012).

Various research results that have addressed Cognitive Behavioral Therapy and Cognitive Bias Modification Therapy have shown that effective treatments, as well as prevention strategies for the spread of behavioral and cognitive problems, including social anxiety, are major research lines in this area. Many methods are used to treat these disorders. Among the interventions that can be effective in improving social anxiety and other variables are mindfulness-based cognitive therapy and cognitive bias modification therapy. Most studies have either investigated the results of these treatments separately or, if they have been limited to the use of both treatment methods outside the country, the treatment protocols have been very limited, and there are many gaps in terms of the number of sessions used, the duration of treatment, the content of treatment sessions, etc. In Iran, no research has been found to fill the existing gaps and enrich the treatment process and its content. Therefore, this study seeks to take further steps towards more effective treatment of these disorders by comparing two treatment paths: Cognitive Behavioral Therapy and Cognitive Bias Modification Therapy, with the aim of agreeing on continuous behavior and various aspects of all variables, including social avoidance and anxiety, cognitive avoidance, etc. In general, it can be stated that although various studies have been conducted on social anxiety disorder, due to the lack of comprehensive and consistent examination of underlying factors, they have not yet clearly helped individuals with this disorder alleviate symptoms and prevent the recurrence of social anxiety. The question of the current study is whether the effectiveness of Cognitive Bias Modification Therapy and Mindfulness-Based Cognitive Behavioral Therapy on cognitive avoidance and ineffective attitudes in students with social anxiety disorder differs?

2. Methods and Materials

2.1. Study Design and Participants

The present research method was quasi-experimental with pre-test, post-test, and control group. The statistical population of the present study consisted of all students with social anxiety disorder at Farhangian University in Shiraz who were studying between 2023-2022. The sample was selected through invitation based on participation in therapy groups and definite diagnosis of social anxiety disorder (by sending a link to the social anxiety questionnaire) and according to the entry criteria determined during execution. Therefore, the sample was selected from students of Farhangian University, Shiraz, using the convenience sampling method. Individuals were randomly assigned to three groups (each group had 20 participants).

A pre-test was administered to the three groups before implementing the interventions. The first group received Cognitive Bias Modification Therapy in seven 90-minute sessions, while the second group underwent Mindfulness-Based Cognitive Behavioral Therapy in eight 90-minute sessions. No intervention was provided to the third group. After the interventions, a post-test was administered to all three groups to examine the impact of the independent variables on the dependent variables. For ethical considerations, informed consent was obtained from all participants.

2.2. Measures

2.2.1. Cognitive Avoidance

This questionnaire, developed by Sexton and Dugas (2004; as cited in Dugas & Robichaud, 2007), consists of 25 items measuring different aspects of cognitive avoidance (thought suppression, thought substitution, distraction, avoidance of activating situations and activities, and changing mental images into verbal thoughts). Responses are rated on a 5-point Likert scale from 1 (completely wrong) to 5 (completely right). Hamidpour, Andoz, and Akbari (2008) reported a Cronbach's alpha of 0.86 for the total scale (Aghajani et al., 2017; Mahmoudpour, 2021). In this study, Cronbach's alpha for the total cognitive avoidance score was 0.91, and for subscales: thought suppression 0.90, thought substitution 0.71, distraction 0.89, avoidance of threatening stimuli 0.90, and transforming images into thoughts 0.84. Validity was also supported by a 0.48 correlation with the White Bear Suppression Inventory.

2.2.2. Social Anxiety

The Social Anxiety Scale, a self-report measure developed by Connor et al. (2000), consists of 17 items rated on a 5-point Likert scale ranging from 1 (very little) to 5 (very much), with higher scores indicating greater social anxiety. The scale has three subscales: fear (6 items), avoidance (7 items), and physiological discomfort (4 items). The total score is derived from summing all items. Connor et al. (2000) found the scale suitable for screening social anxiety, with test-retest reliability of 0.78 and Cronbach's alpha of 0.94. A cut-off score of 19 distinguishes individuals with social anxiety disorder in most studies. The psychometric properties, including internal consistency, test-retest reliability, divergent and convergent validity, and sensitivity to clinical changes, have been confirmed in various samples (Imani et al., 2019; Salmani Cholabi et al., 2020). In this study, the Cronbach's alpha for the total social anxiety score was 0.90.

2.2.3. Dysfunctional Attitudes

Developed by Weissman and Beck (1978) based on Beck's cognitive theory of depression, this scale contains 26 items and four subscales: achievement-perfectionism, need for approval, need to please others, and vulnerability-performance evaluation. Items are rated on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating more dysfunctional attitudes. The Cronbach's alpha reported by the developers exceeded 0.70. In the study by Ebrahimi and Mousavi (2013), internal consistency was 0.89, and split-half reliability was 0.79 (Imani et al., 2019).

2.3. Interventions

2.3.1. Cognitive Bias Modification Therapy

For developing the protocol, target and neutral words were collected from the study questionnaires. An initial list of target words, including positive and negative terms, was reviewed by 10 psychology and counseling experts to ensure content validity. The Content Validity Ratio (CVR) for the words was 0.91 (Arsanjani et al., 2021; Salmani Cholabi et al., 2020), which is acceptable for 10 experts based on Lawshe's method, where the minimum acceptable ratio is 0.62. After removing repetitive and similar words and categorizing them, the number of words was reduced. In the present study, a pilot sample of 10 individuals with social

anxiety was assessed to determine the words' positive and negative load.

Session 1: Each participant in the experimental group completed the dot-probe task with 80% neutral stimuli.

Session 2: Each participant in the experimental group completed the dot-probe task with 80% neutral stimuli.

Session 3: Each participant in the experimental group completed the dot-probe task with 85% neutral stimuli.

Session 4: Each participant in the experimental group completed the dot-probe task with 90% neutral stimuli.

Session 5: Each participant in the experimental group completed the dot-probe task with 95% neutral stimuli.

Session 6: Each participant in the experimental group completed the dot-probe task with 100% neutral stimuli.

Session 7: Each participant in the experimental group completed the dot-probe task with 100% neutral stimuli.

2.3.2. Mindfulness-Based Therapy

Session 1: Mindfulness (Basic Strategies)

In the first session, the participants are introduced to the concept of mindfulness and the overall structure of the intervention. This session includes a pre-test to assess baseline measures. The importance of mindfulness is discussed, and basic techniques such as observing, describing, and participating are taught. These foundational skills are crucial for developing mindfulness in everyday life.

Session 2: Mindfulness (Advanced Strategies)

The second session builds on the basic strategies introduced in the first session. Participants learn techniques to strengthen the wise mind, a state of balance between emotional and rational thinking. Core acceptance skills are introduced, along with practical ways to integrate mindfulness effectively into daily routines. Overcoming common obstacles to mindfulness practice is also addressed.

Session 3: Distress Tolerance (Acceptance Strategies)

In the third session, the focus shifts to distress tolerance through acceptance strategies. Techniques such as basic acceptance, observing the breath, practicing gentle awareness, and self-soothing through positive imagery are taught. These skills help participants manage distressing emotions and enhance emotional resilience.

Session 4: Distress Tolerance (Change Strategies)

The fourth session emphasizes distress tolerance through change strategies. Relaxation techniques, staying present in the moment, and analyzing the pros and cons of situations

are introduced. Participants also learn various coping strategies to effectively manage stress and distress.

Session 5: Emotional Regulation (Understanding Emotions)

In the fifth session, participants are educated about the dimensions of emotions. They learn to classify emotions, understand their aspects and functions, and analyze emotional experiences. This session aims to enhance participants' emotional literacy and awareness.

Session 6: Emotional Regulation (Basic and Advanced Strategies)

The sixth session teaches participants to identify emotions in the moment and reduce physical and cognitive vulnerabilities. Techniques to increase positive emotions, face emotional challenges, act contrary to emotional impulses, and problem-solving are covered. These strategies help participants manage emotions more effectively.

Session 7: Effective Interpersonal Skills (Basic Strategies)

In the seventh session, participants learn about different behavioral styles, unhealthy emotional habits, difficulties in identifying needs, harmful relationships, and mistaken beliefs. These basic interpersonal skills are essential for improving relationships and communication.

Session 8: Effective Interpersonal Skills (Advanced Strategies)

The final session focuses on advanced interpersonal skills, such as being aware of events, making requests, assertiveness, active listening, saying no, negotiating, and resolving conflicts. The session concludes with a comprehensive review of the skills learned throughout the intervention, followed by a post-test to assess the outcomes (Teasdale et al., 2002).

2.4. Data analysis

The collected data will be analyzed using SPSS software and descriptive statistics (mean, standard deviation, frequency, skewness, kurtosis) and inferential statistics (multivariate analysis of variance with repeated measures and post hoc tests and mean comparison).

3. Findings and Results

As shown in Table 1, in the Cognitive Bias Modification Therapy group, the mean cognitive avoidance scores in the pre-test and post-test were 67.20 and 88.75, respectively. In the Mindfulness Therapy group, the mean scores in the pre-test and post-test were 68.15 and 86.95, respectively. In the control group, the mean scores in the pre-test and post-test were 76.40 and 75.90, respectively.

Table 1

Mean and Standard Deviation of Research Variables and Their Components in Pre-Test and Post-Test Stages

Variable	Stage	Cognitive Bias Modification	Mindfulness	Control
Thought Suppression	Pre-test	M = 14.40, SD = 2.91	M = 14.75, SD = 1.86	M = 16.20, SD = 2.59
	Post-test	M = 19.70, SD = 3.39	M = 18.90, SD = 3.45	M = 16.55, SD = 2.37
Thought Substitution	Pre-test	M = 12.30, SD = 2.70	M = 13.90, SD = 1.97	M = 14.15, SD = 3.62
	Post-test	M = 16.15, SD = 4.32	M = 15.75, SD = 3.23	M = 14.14, SD = 3.28
Distraction	Pre-test	M = 13.35, SD = 2.52	M = 13.65, SD = 1.14	M = 14.55, SD = 3.57
	Post-test	M = 17.70, SD = 3.01	M = 19.25, SD = 2.40	M = 13.80, SD = 3.78
Avoidance of Situations	Pre-test	M = 14.15, SD = 2.39	M = 12.60, SD = 2.54	M = 16.70, SD = 2.36
	Post-test	M = 17.90, SD = 2.99	M = 16.60, SD = 3.22	M = 16.25, SD = 2.55
Changing Mental Images	Pre-test	M = 13.00, SD = 2.57	M = 13.25, SD = 2.45	M = 16.80, SD = 3.41
	Post-test	M = 17.30, SD = 3.61	M = 16.45, SD = 4.20	M = 15.30, SD = 3.28
Cognitive Avoidance	Pre-test	M = 67.20, SD = 7.66	M = 68.15, SD = 6.71	M = 76.40, SD = 11.58
	Post-test	M = 88.75, SD = 12.11	M = 86.95, SD = 14.08	M = 75.90, SD = 12.96
Perfectionism	Pre-test	M = 40.35, SD = 8.50	M = 47.90, SD = 18.33	M = 43.30, SD = 16.89
	Post-test	M = 36.40, SD = 6.23	M = 35.90, SD = 11.17	M = 43.50, SD = 14.79
Need for Approval	Pre-test	M = 16.75, SD = 4.75	M = 17.90, SD = 5.83	M = 16.50, SD = 6.76
	Post-test	M = 12.15, SD = 2.60	M = 13.10, SD = 2.94	M = 16.30, SD = 6.00
Need to Please Others	Pre-test	M = 17.80, SD = 4.10	M = 21.25, SD = 6.47	M = 19.45, SD = 6.19
	Post-test	M = 14.70, SD = 2.79	M = 14.80, SD = 4.42	M = 18.80, SD = 5.19
Vulnerability	Pre-test	M = 16.90, SD = 1.94	M = 17.10, SD = 4.51	M = 16.45, SD = 3.36
	Post-test	M = 12.70, SD = 2.73	M = 13.45, SD = 3.46	M = 15.70, SD = 3.25
Ineffective Attitudes	Pre-test	M = 91.80, SD = 10.87	M = 104.15, SD = 29.07	M = 97.70, SD = 27.46
	Post-test	M = 75.95, SD = 8.72	M = 77.25, SD = 15.53	M = 96.30, SD = 23.77

Given the non-significant Mauchly’s test of sphericity for the negative evaluation variable, the assumption is met, allowing for the consideration of sphericity in variance for the ANOVA model. The Box’s M test results also indicated a significance level greater than 0.05, confirming the homogeneity of variance-covariance matrices. Data

normality was checked using the Shapiro-Wilk test, which yielded values greater than 0.05, indicating normality. Levene’s test results showed a significance level above 0.05, confirming the homogeneity of error variances. The results of the multivariate covariance analysis are shown in [Table 2](#).

Table 2

Univariate Covariance Analysis on Post-Test Scores of Cognitive Avoidance Variable

Source	Sum of Squares	df	Mean Square	F	Sig.	Eta Squared
Thought Suppression	218.38	2	109.19	23.21	.001	.47
Thought Substitution	163.37	2	81.68	16.67	.001	.39
Distraction	249.25	2	124.62	27.35	.001	.51
Avoidance of Situations	73.70	2	36.85	5.78	.005	.18
Changing Mental Images	138.26	2	69.13	12.21	.001	.32
Cognitive Avoidance	3893.37	2	1946.69	31.13	.001	.54
Perfectionism	1383.97	2	691.99	28.46	.001	.52
Need for Approval	245.08	2	122.54	20.74	.001	.44
Need to Please Others	266.36	2	133.18	23.70	.001	.47
Vulnerability	151.46	2	75.73	12.38	.001	.32
Ineffective Attitudes	6110.25	2	3055.12	54.26	.001	.67

Based on [Table 2](#), the results of the covariance analysis, adjusting for the pre-test effect, showed significant differences among the three groups ($p < .001$). To compare

the scores of the research variables and their components across the three groups, the Bonferroni test was used, with results presented in [Table 3](#).

Table 3

Bonferroni Test Results for Determining Group Differences in Effectiveness

Variable	Comparison Groups	Mean Difference	Sig.
Thought Suppression	Bias Mod - Mindfulness	.69	1
	Bias Mod - Control	5.78	.001
	Mindfulness - Control	5.09	.001
Thought Substitution	Bias Mod - Mindfulness	1.74	.07
	Bias Mod - Control	5.08	.001
	Mindfulness - Control	3.34	.003
Distraction	Bias Mod - Mindfulness	.91	.65
	Bias Mod - Control	5.53	.001
	Mindfulness - Control	6.43	.001
Avoidance of Situations	Bias Mod - Mindfulness	.75	1
	Bias Mod - Control	3.41	.004
	Mindfulness - Control	2.67	.06
Changing Mental Images	Bias Mod - Mindfulness	.72	1
	Bias Mod - Control	4.64	.001
	Mindfulness - Control	3.92	.001
Cognitive Avoidance	Bias Mod - Mindfulness	2.99	.81
	Bias Mod - Control	24.44	.001
	Mindfulness - Control	21.45	.001
Perfectionism	Bias Mod - Mindfulness	7.08	.001
	Bias Mod - Control	5.35	.005
	Mindfulness - Control	12.42	.001
Need for Approval	Bias Mod - Mindfulness	1.12	.52
	Bias Mod - Control	3.82	.001
	Mindfulness - Control	4.94	.003
Need to Please Others	Bias Mod - Mindfulness	2.60	.005

Vulnerability	Bias Mod - Control	2.85	.002
	Mindfulness - Control	5.45	.001
	Bias Mod - Mindfulness	.83	1
	Bias Mod - Control	3.82	.001
Ineffective Attitudes	Mindfulness - Control	2.99	.002
	Bias Mod - Mindfulness	9.95	.001
	Bias Mod - Control	15.85	.001
	Mindfulness - Control	25.81	.001

As observed in Table 3, except for the component of avoidance of situations (where Mindfulness-Based Cognitive Behavioral Therapy was not significant), the mean differences of the research variables and their components in the two experimental groups compared to the control group were significant.

4. Discussion and Conclusion

The results indicated significant differences among the three groups. This finding also shows that Cognitive Behavioral Therapy and Mindfulness did not have significantly different effectiveness in terms of cognitive avoidance and its components (except for thought substitution). These results align with the prior findings (Saeedmanesh et al., 2020).

In interpreting these findings, it can be noted that in mindfulness therapy, individuals accept experiences as separate elements from themselves, viewing them as transient states subject to change. Therefore, instead of exploring the issue or avoiding cognitive or behavioral experiences, which can be painful, individuals accept these experiences like other neutral experiences without emotional weight, eventually internalizing them. This therapy teaches skills to become more aware of thoughts without judgment and to view positive thoughts as reflections of reality, considering them as temporary mental events, which increases cognitive avoidance. When an individual becomes fully aware of their thoughts and feelings, accepting them without judgment while in a state of calm and focus, mindful individuals perceive internal and external realities freely and without distortion, and have a high capacity to confront a wide range of thoughts, emotions, and experiences (both pleasant and unpleasant) (Koster et al., 2009; MacLeod & Mathews, 2012).

Regarding the effectiveness of Cognitive Bias Modification Therapy, it can be stated that the more negative the interpretation and attention of individuals toward current events and others' behavior, the greater the feeling of negative attitudes. In this context, Tarkhan (2018) showed that cognitive bias plays a determining role in the level of

ineffective attitudes in students with social anxiety. The information processing in explicit and implicit memory creates a bias, causing information congruent with the mood to be more readily recalled. Before the ease or difficulty of tasks can occupy mental capacity, conscious or unconscious processing plays a role (Hertel et al., 2016). The nature of cognitive biases is often automatic and typically uncontrollable, considered mental habits that can be directly and effectively modified through repeated experimental training involving tasks requiring quick processing (Pettit et al., 2020; Saeedmanesh et al., 2020).

The results showed significant differences in the mean ineffective attitudes and their components in the two experimental groups compared to the control group. This finding indicates that Mindfulness-Based Cognitive Behavioral Therapy had significantly different effectiveness in ineffective attitudes and the components of perfectionism and need to please others, with Mindfulness-Based Cognitive Behavioral Therapy being more effective than Cognitive Bias Modification Therapy. In explaining the results, attention must be paid to the nature of Mindfulness-Based Cognitive Therapy. The Mindfulness-Based Cognitive Therapy approach integrates interventions related to cognitive-behavioral therapies based on the principle of "change" with teachings and techniques from Eastern philosophy of mind based on the principle of "acceptance." Thus, it proposes effective intervention methods that are also applicable in group therapy settings. One of the first and most important factors in change in Mindfulness-Based Cognitive Therapy is fundamental mindfulness. Fundamental mindfulness, grounded in the acceptance of pleasant thoughts and various emotional states, significantly enhances an individual's ability to control the influence of thoughts and emotions, allowing them to experience a wide range of thoughts and emotions without emotional disturbance (Teasdale et al., 2002). It also appears that mindfulness-based cognitive therapy exercises, by increasing awareness of the present moment through techniques like focusing on breathing and body sensations, and increasing attention to the here and now, have beneficial effects on cognitive systems and information processing,

leading to a reduction in anxiety symptoms in students (Hansen et al., 2018).

In explaining how attention bias modification reduces ineffective attitudes, we can use classical conditioning theory. In assessing attention bias using the dot-probe task, the point randomly appears after an emotional stimulus (anxiety-related images) and neutral images, but in attention bias modification, a conditioning occurs between neutral images and the point. The individual learns that the point appears below neutral images, leading to attention being drawn to neutral images. This learning occurs implicitly, as none of the participants realized that the point always appeared behind neutral images in the bias modification task when asked about the difference between bias modification and bias assessment. As a result, attention is unconsciously and implicitly shifted from emotional images to neutral images (MacLeod & Mathews, 2012). Given that cognitive bias modification enhances attention control by purposefully presenting the probe following neutral facial images, attention control processes are improved, reducing vigilance towards threats and consequently reducing attention bias towards threats in students with social anxiety.

5. Limitations & Suggestions

The limitations of this study must be considered for caution in generalizing the results. These limitations include conducting the study using only self-report tools instead of behavioral studies, which are susceptible to social desirability bias and recall errors, and the lack of studies conducted in real-life situations. These tools might offer more insights if used to measure variables in actual scenarios through different means. Moreover, the sample, limited to university students, makes the generalization and interpretation of the results requiring special caution. A significant limitation of this research pertains to its temporal and spatial scope, as it was conducted on Farhangian University students in Shiraz during the spring of 2023. Therefore, the findings cannot be generalized to other individuals or cities without caution. Based on the study results, it is recommended that similar studies be conducted in other cities and cultures to compare findings and address the limitations of this research.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed in this article.

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