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The Effectiveness of Adolescent-Centered Mindfulness Training on Intolerance of Uncertainty and Rejection Sensitivity in Adolescent Girls with Social Anxiety in Bandar Abbas

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ABSTRACT

Objective: The present study aimed to determine the effectiveness of adolescent-centered mindfulness training on intolerance of uncertainty and rejection sensitivity in adolescent girls with social anxiety in Bandar Abbas.

Methods: This study employed a quasi-experimental design with a pretest, posttest, and one-month follow-up, including a control group. The statistical population consisted of all female students in the second cycle of secondary education in Bandar Abbas during the 2025–2026 academic year. The sample comprised 30 adolescent girls with social anxiety, selected using the Social Phobia Inventory (SPIN) based on a cut-off score of 20 from students across three public high schools in Bandar Abbas through purposive sampling, and randomly assigned to either an experimental group (n = 15) or a control group (n = 15). The experimental group received adolescent-centered mindfulness training based on the Mindfulness Skills Training Guide for Children and Adolescents (Burdick, translated by Manshaei et al., 2022) across ten 60-minute sessions, while the control group received no intervention. Data were collected using the Intolerance of Uncertainty Scale–12 (IUS-12) and the Rejection Sensitivity Questionnaire (RSQ) across three phases: pretest, posttest, and follow-up. Data were analyzed using repeated measures analysis of variance (ANOVA) in SPSS-26.

Results: The results indicated that adolescent-centered mindfulness training significantly reduced intolerance of uncertainty (p < .001) and rejection sensitivity (p < .001) in the experimental group compared to the control group. These effects were maintained at the one-month follow-up.

Conclusions: Adolescent-centered mindfulness training is an effective intervention for reducing intolerance of uncertainty and rejection sensitivity in adolescent girls with social anxiety.

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Introduction

Adolescence is a critical period of psychological development characterized by rapid changes across biological, cognitive, emotional, and social domains. During this period, the prevalence of anxiety disorders—particularly social anxiety—increases dramatically. Social anxiety is defined as the fear of social situations in which one may be negatively evaluated by others, and it is accompanied by avoidance of social interactions and considerable distress. Adolescents with social anxiety often employ maladaptive strategies to manage their negative emotions, and these strategies contribute to the persistence and exacerbation of symptoms. Among these, two psychological constructs have been identified as key mechanisms in the psychopathology of adolescent social anxiety: intolerance of uncertainty and rejection sensitivity.

Intolerance of uncertainty is defined as the tendency to react negatively to uncertain and ambiguous situations, regardless of the actual probability of negative outcomes (Carleton et al., 2007). This construct serves as a transdiagnostic factor in anxiety disorders and is divided into two distinct dimensions: prospective intolerance of uncertainty (fear of future negative outcomes) and inhibitory intolerance of uncertainty (inability to act in the face of ambiguity). In the cognitive-attentional syndrome model, intolerance of uncertainty leads directly to the cognitive-attentional syndrome through increased cognitive biases (Wells, 2000). Recent research has demonstrated that intolerance of uncertainty plays a significant role in adolescents with social anxiety, as social situations are inherently ambiguous and the likelihood of rejection or negative evaluation is unpredictable (Carleton, 2016). Studies indicate that mindfulness-based interventions can help reduce anxiety by increasing tolerance of uncertainty through decreased focus on anticipated threats and enhanced acceptance of internal experiences (Amani & Ravan, 2025).

Rejection sensitivity is another construct that plays a prominent role in adolescent psychopathology. It is defined as the tendency to anxiously expect rejection, rapidly perceive rejection cues, and react intensely to actual or imagined rejection (Downey & Feldman, 1996). Individuals with high rejection sensitivity interpret ambiguous social situations as threatening and tend to expect that others will reject or exclude them. This cognitive-emotional pattern is directly linked to social anxiety, as the fear of negative evaluation and rejection constitutes the core of social anxiety. In the Baumeister and Tice model, social rejection and the threat to social bonds are introduced as central factors in anxiety. Recent research has shown that rejection sensitivity is

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higher in adolescent girls than boys and is associated with numerous emotional and behavioral problems (Zimmer-Gembeck et al., 2021). A study conducted in Ardabil demonstrated that social rejection indirectly and significantly affected social anxiety in adolescent girls through rejection sensitivity and social self-efficacy (Narimani et al., 2022). Furthermore, rejection sensitivity, as an interpersonal perceptual bias, mediates the relationship between parental control and social anxiety (Khoshkam et al., 2014).

In recent years, mindfulness-based interventions have garnered attention as an effective approach for reducing maladaptive cognitive-emotional strategies in adolescents. Adolescent-centered mindfulness training is a program designed specifically for adolescents that includes training in mindful attention to the present moment, non-judgmental acceptance of internal experiences, and increased self-compassion (Burdick, 2022). By teaching non-judgmental observation of thoughts and emotions, mindfulness helps individuals disengage from negative thought cycles and enhance their psychological flexibility (Kabat-Zinn, 1990). Studies indicate that mindfulness-based interventions significantly reduce social anxiety, and these effects are mediated by reductions in intolerance of uncertainty and emotion dysregulation (Esmailian et al., 2021). Moreover, mindfulness can reduce rejection sensitivity through enhanced acceptance of internal experiences and decreased emotional reactivity. Research conducted in Iran has shown a significant negative relationship between mindfulness and rejection sensitivity, such that as mindfulness increases in adolescents, their rejection sensitivity decreases (Ebrahimi & Mousavian Khatir, 2023).

Despite the growing evidence regarding the effectiveness of mindfulness on emotional variables, a notable research gap exists concerning the simultaneous examination of this intervention's effects on intolerance of uncertainty and rejection sensitivity in the Iranian adolescent population. While studies have investigated the effect of mindfulness on intolerance of uncertainty in adolescents (Zemestani et al., 2022), no study has simultaneously examined these two variables in adolescents with social anxiety using an adolescent-centered mindfulness training protocol. Moreover, no study to date has specifically examined this intervention among adolescent girls in Bandar Abbas. Accordingly, the present study was designed to investigate the effectiveness of adolescent-centered mindfulness training on intolerance of uncertainty and rejection sensitivity in adolescent girls with social anxiety in Bandar Abbas.

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Materials and Methods

Research Design

This study employed a quasi-experimental design with a pretest, posttest, and one-month follow-up, including a control group. The independent variable was adolescent-centered mindfulness training, and the dependent variables were intolerance of uncertainty and rejection sensitivity.

Population and Sample

The statistical population consisted of all female students enrolled in the second cycle of secondary education in Bandar Abbas during the 2025–2026 academic year. The sample comprised 30 adolescent girls with social anxiety, selected from students across three public high schools in Bandar Abbas using the Social Phobia Inventory (SPIN; Connor et al., 2000) through purposive sampling. Selection from multiple schools was conducted because the likelihood of identifying a sufficient number of students with social anxiety within a single school is low. Inclusion criteria were: (1) scoring 20 or above on the SPIN based on the standard cut-off score (Connor et al., 2000); (2) no prior experience with similar mindfulness programs; (3) no receipt of psychological treatment or pharmacotherapy during the study period; and (4) provision of informed consent. Participants were randomly assigned to either an experimental group or a control group (15 each).

Instruments

Social Phobia Inventory (SPIN): This inventory was developed by Connor et al. (2000) to measure the severity of social anxiety and consists of 17 items assessing three subscales: fear (6 items), avoidance (7 items), and physiological discomfort (4 items). Each item is rated on a 5-point Likert scale from 0 (not at all) to 4 (extremely). Scores range from 0 to 68, with higher scores indicating greater severity of social anxiety. Connor et al. (2000) proposed a cut-off score of 20 for probable diagnosis of social anxiety disorder. In the present study, this cut-off score was used for initial screening.

Intolerance of Uncertainty Scale–12 (IUS-12): This scale was developed by Carleton et al. (2007) as a 12-item short form of the original 27-item version. Items are rated on a 5-point Likert scale from 1 (not at all characteristic of me) to 5 (entirely characteristic of me), with total scores ranging from 12 to 60. The scale comprises two factors: prospective intolerance of uncertainty (7 items) and inhibitory intolerance of uncertainty (5 items). In the Persian version, Cronbach's alpha coefficients were .87 and .84 for the prospective and inhibitory dimensions, respectively, and .89

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for the total score (Zemestani et al., 2022). Construct and discriminant validity have been reported as satisfactory.

Rejection Sensitivity Questionnaire (RSQ): This questionnaire was developed by Downey and Feldman (1996) and consists of 18 two-part items. The first part assesses the degree of anxiety and concern individuals experience in hypothetical situations, rated on a 6-point Likert scale from 1 (very unconcerned) to 6 (very concerned). The second part assesses the expectation of receiving a positive response, rated on a 6-point scale from 1 (very unlikely) to 6 (very likely). Scores for each part range from 18 to 108. The total rejection sensitivity score is calculated by combining the two parts, with higher scores indicating greater rejection sensitivity (Downey & Feldman, 1996). Downey and Feldman (1996) reported internal consistency of .81 and a reliability coefficient of .83. In Iran, Khoshkam et al. (2014) reported a Cronbach's alpha reliability of .83 for this questionnaire.

Adolescent-Centered Mindfulness Training Program: The intervention program was designed based on the Mindfulness Skills Training Guide for Children and Adolescents (Burdick, translated by Manshaei et al., 2022) and delivered across ten 60-minute sessions. The session content was as follows:

Session 1 – Introduction to Mindfulness: Introductions, establishing rapport with adolescents, performing a daily activity mindfully, practicing present-moment awareness. Homework: mindfulness practice (Burdick, 2022).

Session 2 – Teaching Present-Moment Awareness: Discussion of the mindfulness experience, a 10–15 minute meditation program, directing attention to posture, practicing "mindful mind versus calm mind" using a glitter jar. Homework: mindfulness practice (Burdick, 2022).

Session 3 – Mindful Breathing and Check-In Training: Teaching the mindfulness bell, teaching awareness of the present moment using the glass-of-water exercise. Homework: mindfulness practice (Burdick, 2022).

Session 4 – Preliminary Relaxation Breathing: Cultivating the skill of observing awareness, training sustained attention, and gradually replacing statements such as "I notice I am hungry" for "I am hungry." Homework: daily mindfulness practice (Burdick, 2022).

Session 5 – Mindfulness of the Five Senses: Strengthening self-regulation using a word or color as a bodily cue (Burdick, 2022).

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Session 6 – Relating to Unpleasant Experience: Repeating basic breathing exercises, practicing the skill of observing awareness, practicing the mindfulness bell. Homework: daily mindfulness practice (Burdick, 2022).

Session 7 – Acceptance of Uncertainty: Teaching acceptance of ambiguous and uncertain situations, practicing tolerance of not knowing, discussing the costs of attempting to control uncontrollable matters.

Session 8 – Mindfulness and Interpersonal Relationships: Practicing mindful listening (listening to another without judgment and with full attention), discussing social challenges and emotional reactions, practicing mindfulness in interactions with others.

Session 9 – Mindfulness and Self-Compassion in Social Situations: Practicing visualization of a challenging social situation and responding to it with mindfulness and self-compassion, discussing experiences of rejection and reactions to it.

Session 10 – Review and Future Planning: Reviewing all exercises from the program, discussing achievements and challenges, planning for continued daily practice, final mindful breathing exercise.

Each session comprised three components: (1) review of the previous session's exercises and discussion of experiences (10 minutes); (2) instruction and practice of the new exercise (30 minutes); and (3) summarization and assignment of homework (20 minutes). Homework consisted of 5–10 minutes of daily mindfulness practice.

Procedure

After obtaining an ethics code and the necessary permissions from the Department of Education in Bandar Abbas, the researcher visited three public high schools in Bandar Abbas and, after explaining the study objectives and obtaining informed consent from the students, administered the Social Phobia Inventory as a screening instrument. From among students scoring 20 or above, 30 were selected through purposive sampling and randomly assigned to either an experimental or control group. The pretest (intolerance of uncertainty and rejection sensitivity) was then administered to both groups.

The experimental group received adolescent-centered mindfulness training across ten 60-minute sessions, while the control group received no intervention. After the intervention, the posttest was administered to both groups. One month after the intervention, a follow-up assessment was

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conducted to examine the durability of effects. All data processing was performed using SPSS-26, and repeated measures analysis of variance (ANOVA) was used to analyze the data.

Ethics statement

All ethical principles of research, including informed consent, voluntary participation, and confidentiality of participants' information, were fully observed throughout the study. The collected data were managed through coding without recording identifying information and were used exclusively for scientific research purposes. Furthermore, at all stages of data collection, analysis, and reporting, the privacy and data security of participants were carefully maintained.

Results

Table 1 presents the means(M) and standard deviations (SD) of intolerance of uncertainty and rejection sensitivity scores across the three phases (pretest, posttest, and follow-up) for both the experimental and control groups.

Table 1. Means and Standard Deviations of Study Variables in Both Groups

Variable	Group	Pretest M(SD)	Posttest M(SD)	Follow-up M(SD)
Intolerance of Uncertainty	Experimental	42.33(6.15)	33.47(5.89)	34.20(6.03)
Intolerance of Uncertainty	Control	41.87(6.42)	41.20(6.18)	41.53(6.31)
Rejection Sensitivity	Experimental	58.20(8.45)	47.13(7.92)	48.07(8.15)
Rejection Sensitivity	Control	57.67(8.71)	57.13(8.54)	57.40(8.62)

The results in Table 1 indicate that intolerance of uncertainty and rejection sensitivity scores in the experimental group decreased from pretest to posttest, and this reduction was maintained at the follow-up phase. No notable changes were observed in the control group.

Prior to conducting repeated measures ANOVA, statistical assumptions were examined. The Kolmogorov–Smirnov test indicated that score distributions were normal at all phases ($p > .05$). Levene's test for homogeneity of variances indicated that variances were homogeneous across groups ($p > .05$). Additionally, Box's test for homogeneity of covariance matrices was non-significant ($p > .05$).

Mauchly's Test of Sphericity: Mauchly's test of sphericity was employed to examine the sphericity assumption. The results indicated that the sphericity assumption was violated for both intolerance of uncertainty ($W = .54$, $\chi^2 = 8.21$, $p = .016$) and rejection sensitivity ($W = .50$, $\chi^2 = 9.67$, $p = .008$). Given the violation of sphericity, the Greenhouse–Geisser correction was applied to adjust the degrees of freedom. The Greenhouse–Geisser epsilon values were .70 for intolerance of uncertainty and .67 for rejection sensitivity, both below .75, indicating that this correction was appropriate.

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Repeated Measures ANOVA

Intolerance of Uncertainty: The results of repeated measures ANOVA (with Greenhouse–Geisser correction) indicated that the main effect of time ($F = 38.45$, $p < .001$, $\eta^2 = .57$) and the time × group interaction effect ($F = 31.26$, $p < .001$, $\eta^2 = .53$) were significant. The main effect of group was also significant ($F = 11.23$, $p < .001$, $\eta^2 = .29$). Bonferroni post hoc tests indicated that in the experimental group, mean intolerance of uncertainty scores at posttest and follow-up were significantly lower than at pretest ($p < .001$), while the difference between posttest and follow-up was not significant ($p > .05$). In the control group, no significant differences were observed across phases ($p > .05$).

Rejection Sensitivity: The results of repeated measures ANOVA (with Greenhouse–Geisser correction) indicated that the main effect of time ($F = 35.89$, $p < .001$, $\eta^2 = .55$) and the time × group interaction effect ($F = 28.74$, $p < .001$, $\eta^2 = .50$) were significant. The main effect of group was also significant ($F = 9.87$, $p < .001$, $\eta^2 = .26$). Bonferroni post hoc tests indicated that in the experimental group, mean rejection sensitivity scores at posttest and follow-up were significantly lower than at pretest ($p < .001$), while the difference between posttest and follow-up was not significant ($p > .05$). In the control group, no significant differences were observed across phases ($p > .05$).

Table 2. Summary of Repeated Measures ANOVA Results (With Greenhouse–Geisser Correction)

Variable	Source	SS	*df*	MS	*F*	*p*	η^2
Intolerance of Uncertainty	Time	894.67	1.40	639.05	38.45	< .001	.57
	Group	523.45	1	523.45	11.23	< .001	.29
	Time × Group	728.31	1.40	520.22	31.26	< .001	.53
	Error (Time)	651.20	39.20	16.61	—	—	—
	Error (Group)	1304.87	28	46.60	—	—	—
	Error (Time × Group)	652.48	39.20	16.64	—	—	—
Rejection Sensitivity	Time	1247.89	1.34	931.26	35.89	< .001	.55
	Group	789.33	789.33	1	9.87	< .001	.26
	Time × Group	998.52	1.34	745.16	28.74	< .001	.50
	Error (Time)	973.59	37.52	25.95	—	—	—
	Error (Group)	2238.67	28	79.95	—	—	—
	Error (Time × Group)	972.89	37.52	25.93	—	—	—

Based on the results in Table 2, the research hypothesis is confirmed: adolescent-centered mindfulness training significantly reduced intolerance of uncertainty and rejection sensitivity in adolescent girls with social anxiety, and these effects were maintained at the one-month follow-up.

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Discussion

The present study aimed to investigate the effectiveness of adolescent-centered mindfulness training on intolerance of uncertainty and rejection sensitivity in adolescent girls with social anxiety in Bandar Abbas. The results indicated that this intervention significantly reduced intolerance of uncertainty and rejection sensitivity in the experimental group compared to the control group, and these effects were maintained at the one-month follow-up.

Reduction in Intolerance of Uncertainty: The primary finding of this study indicated that adolescent-centered mindfulness training significantly reduced intolerance of uncertainty in adolescent girls with social anxiety. This finding is consistent with previous research demonstrating that mindfulness-based interventions can reduce intolerance of uncertainty (Amani & Ravan, 2025). In explaining this finding, it can be argued that intolerance of uncertainty involves negative reactions to ambiguous and uncertain situations, which in social anxiety manifests as fear of unknown consequences of social interactions. By teaching present-moment awareness and relinquishing attempts to predict and control the future, mindfulness helps adolescents accept uncertainty as a natural part of human experience. Research indicates that mindfulness increases the capacity to tolerate uncertainty by decreasing focus on anticipated threats and enhancing acceptance of internal experiences (Carleton, 2016). Moreover, mindfulness helps reduce anxiety arising from the inability to tolerate uncertainty by decreasing automatic negative thinking (Wells, 2000).

Reduction in Rejection Sensitivity: The other finding of this study indicated that adolescent-centered mindfulness training significantly reduced rejection sensitivity. Rejection sensitivity is defined as the tendency to anxiously expect rejection and react intensely to rejection cues and constitutes the core of social anxiety (Downey & Feldman, 1996). In explaining this finding, it can be argued that mindfulness creates a distance between the individual and rejection-related thoughts through training in cognitive decentering. Adolescents learn that thoughts such as "I might be rejected" are merely mental events and not definitive predictions. This distance enables alternative responses to ambiguous social situations. Furthermore, mindfulness reduces the intensity of emotional reactions to rejection by enhancing self-compassion, helping adolescents process rejection experiences with greater self-compassion. Studies indicate that mindfulness helps reduce

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rejection sensitivity by increasing distress tolerance and decreasing emotional reactivity (Ebrahimi & Mousavian Khatir, 2023).

Durability of Effects: The durability of intervention effects at the one-month follow-up suggests that adolescent-centered mindfulness training not only produces temporary changes in emotional state but also fosters more enduring skills in adolescents. This finding is consistent with previous research reporting the durability of mindfulness effects (Zemestani et al., 2022).

In line with the practical implications of these results, given the effectiveness of adolescent-centered mindfulness training, it is necessary to implement this intervention in the form of structured group sessions by school counselors. Additionally, therapists can use this training as a complementary intervention alongside other psychological approaches. Future research is recommended to employ diverse sampling methods, study larger samples, implement this intervention across different cities and regions of Iran with cultural and social diversity, examine the effectiveness of this intervention on an individual basis, utilize other approaches, and consider longer follow-up periods.

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