

# Investigating the Relationship between Automatic Negative Thoughts and Experiential Avoidance with Psychological Distress and the Mediating Role of Cognitive Emotion Regulation in Patients with a History of Suicide Attempt

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## Abstract

**Objective:** Automatic negative thoughts have an important role in development of a persistent negative cognitive bias, which may ultimately result in suicidal ideation. The primary objective of the present study was to examine the relationship between automatic negative thoughts and experiential avoidance in relation to psychological distress.

**Method:** The study sample comprised 441 individuals who had attempted suicide. Participants underwent interviews utilizing standardized questionnaires including Automatic Thoughts Questionnaire, Kessler Psychological Distress Scale, Acceptance and Action Questionnaire-II, and Cognitive Emotion Regulation Questionnaire along with its nine subscales. After internal relationships assessment among the research variables, outlier detection was done using the boxplot analysis and standard deviation distance metrics. To analyze the direct and indirect associations between the input and output variables, Structural Equation Modeling (SEM) was employed. In addition, SPSS-28 and Amos 29 software were used to analyze the data.

**Results:** The final model showed that automatic negative thoughts were significantly inversely associated with adaptive cognitive emotion regulation ( $\beta = -0.42, P \leq 0.01$ ) and significantly positively related to both maladaptive cognitive emotion regulation ( $\beta = 0.49, P \leq 0.01$ ) and psychological distress ( $\beta = 0.53, P < 0.01$ ). Additionally, experiential avoidance showed a significant positive relationship with maladaptive cognitive emotion regulation ( $\beta = 0.22, P < 0.01$ ).

**Conclusion:** This research demonstrated that automatic negative thoughts could worsen psychological distress through the regulation of cognitive emotion in those who had a history of suicide. By the clinical management of automatic negative thoughts and shifting individuals' cognitive emotion regulation toward adaptive strategies, there is potential for a substantial reduction in suicidal ideation and attempts which can be evaluated in future clinical trials.

**Key words:** *Emotional Adjustment; Latent Class Analysis; Mental Processes; Psychological Distress; Suicide*

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## Article Information:

Received Date: 2024/07/28, Revised Date: 2024/09/04, Accepted Date: 2024/10/20



**S**uicide as a worldwide public health concern, accounts for more than 700,000 deaths annually worldwide. The seemingly high prevalence of this issue necessitates effective prevention strategies (1). Automatic negative thoughts (ANTs) are recurrent and involuntary pessimistic thoughts about oneself, the external environment, and future prospects. These thoughts play a critical role in the onset and persistence of psychological disorders, particularly anxiety and depression (2). Persistent negative cognitive bias that increases feelings of hopelessness and worthlessness and contributes to suicidal thoughts and attempts results from ANTs (3). According to previous research a correlation exists between ANTs and suicidal ideation (4, 5). Understanding and effectively managing these thoughts is therefore crucial for reducing psychological distress and suicide risk (5).

Experiential avoidance (EA) is the tendency to escape from unwanted internal processes including feelings, thoughts, and bodily sensations. It has been reported that EA is associated with numerous psychological disorders (6). High levels of EA often contribute to maladaptive coping strategies (e.g., substance abuse or self-harm) to escape their distress. This avoidance behavior prevents effective emotional processing and intensifies psychological distress over time, potentially heightening the risk of suicide (7). The literature indicates both direct and indirect relationships between EA and instances of self-harm and suicidal behaviors (8, 9). However, more investigations are required to understand the effect of EA on psychological distress and suicide (10).

Cognitive emotion regulation strategies (CERS) have been defined as strategies that are used to manage emotional responses to stress (11). Nine CERS are classified into adaptive and maladaptive strategies. Adaptive CERS can help people effectively manage their emotions and reduce stress, whereas maladaptive strategies can exacerbate emotional problems and may lead to suicidal ideation (12).

Based on cognitive-behavioral therapy (CBT) several cognitive mechanisms are involved in the psychopathology of psychological distress. These mechanisms include ANTs and EA which are components of psychological inflexibility (PI) (13). Psychological distress including anxiety and depression is common in subjects with a history of suicide (14). High levels of psychological distress can disrupt coping mechanisms, making it difficult to manage stress and increase the odds of suicidal thoughts and behaviors (15). To develop effective interventions, it is crucial to explore factors associated with psychological distress in people with suicidal ideation or a history of suicide (16). Understanding the interplay between ANTs, EA, and psychological distress with the mediating impact of CERS may provide valuable insights into the psychological mechanisms resulting in suicidal behavior (17). The main aim of present study was to evaluate the

relationship between ANTs and EA in the development of psychological distress and suicidal ideation among patients with a history of suicide. Furthermore, the study aimed to determine whether cognitive emotion regulation mediates this relationship. We hypothesize that such connections exist. Previous studies have assessed the three variables—ANTs, EA, and CERS—either individually or in pairs, in other psychological disorders such as social anxiety disorder, schizophrenia, post-traumatic stress disorder (PTSD), and stuttering (17-23). There has been no prior research investigating such interplay among these variables in the development of suicidal ideation. It can be helpful in the implementation of interventions aimed at reducing suicide risk. Such interventions can be implemented through the addressing of the cognitive and emotional determinants of psychological distress and the promotion of adaptive CERS (24). For example, acceptance and commitment therapy (ACT) and CBT can be utilized to manage negative automatic thoughts (25). Meanwhile, compassion-focused therapy (CFT) and dialectical behavior therapy (DBT) may be employed to alleviate experiential avoidance and cognitive emotion regulation (26, 27). To fill this research gap, we expanded our research perspective to assess the combined influence of these three variables in psychological distress development and suicidal behavior. This cross-sectional survey evaluates the relationship between automatic negative thoughts and experiential avoidance, as well as their association with psychological distress in a clinical sample of subjects with a history of suicide. This investigation was conducted within the context of cognitive emotion regulation, which was considered a mediating factor in the development of suicidal behavior.

## Materials and Methods

### *Study Design and Participants*

The research protocol received approval from the Research Ethics Committee of Shahid Beheshti University of Medical Sciences (SBMU), Tehran, Iran, under the ethics code REC: IR.SBMU.RETECH.REC.1403.046. All procedures complied with the guidelines and regulations established by the SBMU ethics committee. General informed consent was obtained from all hospitalized patients for the anonymous use of data extracted from their medical records for educational and research purposes.

It was suggested that a sample size ranging from 10 to 20 subjects per estimated parameter is deemed adequate in structural equation modeling (SEM) analysis. For SEM analysis, sample sizes of less than 100 subjects, between 100 and 200 subjects, and exceeding 200 subjects are classified as small, medium, and large sample sizes, respectively (28). In this research, 441 subjects were entered into the study which exceeded 200 subjects, classifying it as a large sample size. The inclusion criteria encompass patients aged above 13

years old hospitalized at the poisoning ward of Loghman Hakim Hospital in Tehran, Iran, who have attempted suicide and currently are in the process of recovery. During this recovery phase, patients were able to respond to the inquiries and make an informed consent regarding their participation in the study. The criteria for exclusion were patients who declined to provide consent or decided not to further engage in the research.

### Procedure

The present cross-sectional study, done from February to April 2024, involved interviews with 477 participants who met the inclusion criteria. Participants were informed that the survey aimed to explore variables influencing suicidal behavior and were guaranteed that their responses would remain confidential. The completion time of the interview was estimated to be about forty minutes. Initially, all potential participants completed a demographic questionnaire. Subsequently, the following assessment instruments were administered: The Automatic Thoughts Questionnaire (ATQ), the Acceptance and Action Questionnaire-II (AAQ-2), the Kessler Psychological Distress Scale (K10), and the Cognitive Emotion Regulation Questionnaire (CERQ). The patients were interviewed and asked to complete the above-mentioned questionnaires. As estimated, it approximately took about 40 minutes to complete the interview. The gathered data were analyzed using SPSS-28 and Amos 29 software for statistical evaluation.

### Data Collection

Interviews were started using questionnaires designed to record demographic and clinical data such as age, gender, level of education, comorbidities, marital status, substance abuse history, physical and mental health status, suicide history, etc. Then the variables of interest were assessed using respective instruments as follows.

The ATQ designed by Hollon and Kendall was used to measure automatic negative thoughts. The ATQ is a questionnaire with 30 items, each rated on a 5-point Likert scale from "not at all" to "all the time." This instrument measures the frequency of ANTs associated with psychological disorders. Several cognitive functions can be assessed by the ATQ including low self-esteem and feelings of helplessness, personal maladjustment and wish for change, as well as negative self-concept and expectations. High internal consistency and test-retest reliability of this instrument confirmed its validity and reliability (29). The Persian version of ATQ also has high internal consistency, test-retest reliability, and content validity. Therefore, it is valid and reliable for the evaluation of ANTs among Persian-speaking patients (30). Furthermore, in this study, the reliability of the ATQ was calculated using Cronbach's alpha coefficient, which reached a value of 0.85.

The AAQ-2, established by Bond *et al.*, was utilized to measure EA. The AAQ-2 is a 7-item questionnaire with a 7-point Likert scale ranging from "Never true = 1" to absolute correlation coefficient values between the independent variables were above 0.9. The internal

"Always true = 7". Through assessing patients' unwillingness to experience undesirable emotions and thoughts as well as their inability to take the necessary action in the presence of such experiences, this questionnaire measures psychological inflexibility and experiential avoidance. It has been validated in various populations due to its good construct validity, test-retest reliability, and internal consistency (31). We used the Persian version of the AAQ-2 which has been proven to have acceptable reliability and validity (32). Besides, in the current study, the Cronbach's alpha coefficient of this questionnaire was calculated to be 0.88.

Psychological distress was assessed using the K10, developed by Kessler *et al.* This instrument is a 10-item self-report questionnaire designed to evaluate the frequency of non-specific psychological distress symptoms in the past four weeks. Items were answered on a 5-point Likert scale ranging from "never = 1" to "always = 5." The K10 is designed to measure symptoms such as agitation, depression, fatigue, and anxiety. Reliability and validity of this instrument is well-established across diverse populations (33). The K10 has also been translated and adapted for use in Iran, demonstrating very high test-retest reliability, internal consistency, and content validity (34, 35). Moreover, the Cronbach's alpha coefficient of this questionnaire calculated in the current study resulted in a value of 0.91.

CERS was estimated using the CERQ designed by Garnefski *et al.* The CERQ is designed to measure nine subscales of CERS that are categorized into adaptive strategies and maladaptive strategies. This questionnaire has 36 items and each item is rated using a 5-point Likert scale spanned from "almost never" to "almost always." The CERQ and its translated version in Persian both have satisfactory validity and reliability (36). Additionally, the Cronbach's alpha coefficient calculated in this study yielded a value of 0.81.

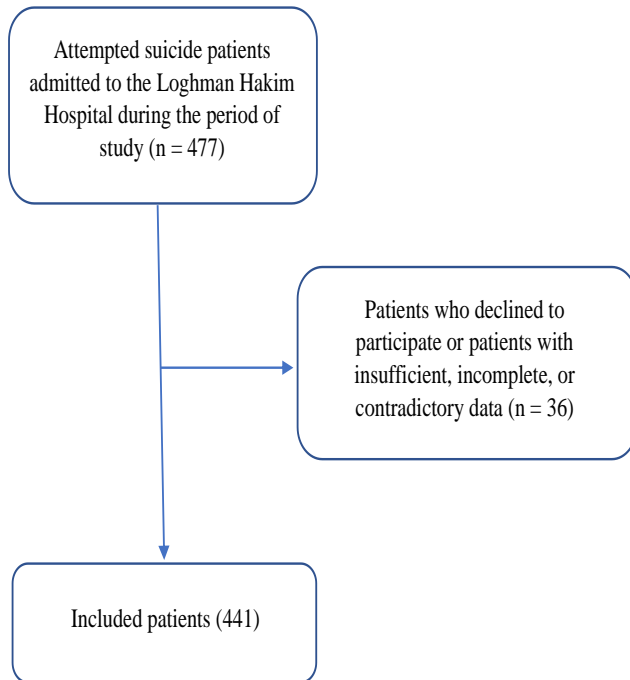
### Analysis Method

Data analysis was performed utilizing SPSS-28 and Amos 29 software. Both univariate and multivariate normality of the data was evaluated in this study. The Kolmogorov-Smirnov test revealed that all variables in this research had a non-normal distribution. Missing data was handled using the multiple imputation and mean substitution methods. Outliers were identified using boxplot analysis and standard deviation distance. In standard deviation distance, values exceeding +3 standard deviations above the mean or falling below -3 standard deviations are classified as outliers in the resultant data. Multivariate normality was assessed using Mahalanobis distances. Pearson's correlation coefficient was employed to determine the internal association between the research variables. The correlations among latent variables were evaluated within the correlation matrix. There was no multicollinearity since none of the consistency of the questionnaires was evaluated through Cronbach's alpha coefficient. Lastly, inferential analysis

was conducted using SEM with AMOS program version 29 to investigate both direct and indirect relationships between the input and output variables.

**Results**

A total of 477 subjects fit with the inclusion criteria for the research study, with 36 patients being excluded from the analysis either because they declined to participate or due to insufficient, incomplete, or contradictory data (Figure 1).



**Figure 1. Flow Chart Describing Patient Selection**

Analysis was conducted on the data obtained from the 441 patients ultimately included in the study. Descriptive statistics for both continuous variables and categorical variables are presented in Table 1. The mean age of the subjects was 26.54 years (SD = 9.77), 51.7% were men and 61.9% were single. The most frequent categories for each categorical variable were as follows: 36.3% high-school diploma, 61.9% had an average economic level, 68.5% of patients had married parents, 59.2% had no history of suicide, 59.2% had no history of substance abuse, 89.6% did not have a physical illness, and 62.1% did not have a psychological illness. Descriptive statistics of ANTs, EA, CERS, and psychological distress are also reported in Table 1.

**Table 1. Demographic and Cognitive Characteristics of Study Subjects (N = 441)**

Variable	Numeric Value
Age, years (mean, SD)	26.54 (9.77)
<b>Sex</b>	
Male (N, %)	228 (51.7%)
Female (N, %)	213 (48.3%)
<b>Marital</b>	
Single (N, %)	273 (61.9%)
Married (N, %)	129 (29.3%)
Divorced (N, %)	36 (8.2%)
Dead wife (N, %)	3 (0.7%)
Previously divorced (N, %)	29 (6.6%)
Without a history of divorce (N, %)	412 (93.4%)
<b>Education</b>	
Elementary school (N, %)	31 (7%)
Middle school (N, %)	145 (32.9%)
Diploma (N, %)	160 (36.3%)
Associate degree (N, %)	25 (5.7%)
Bachelor (N, %)	58 (13.2%)
Master (N, %)	14 (3.2%)
Doctorate (N, %)	8 (1.8%)
<b>Economy</b>	
Weak (N, %)	139 (31.5%)
Average (N, %)	273 (61.9%)
High (N, %)	29 (6.6%)
<b>Parents Marital</b>	
Married (N, %)	302 (68.5%)
Divorced (N, %)	82 (18.6%)
Dead Father (N, %)	35 (7.9%)
Dead Mother (N, %)	7 (1.6%)
Dead Parents (N, %)	15 (3.4%)
<b>Suicide Attempts</b>	
Previously attempted suicide (N, %)	180 (40.8%)
Without a history of suicide (N, %)	261 (59.2%)
<b>Substance Abuse</b>	
Having a history of substance abuse (N, %)	104 (23.6%)
Having no history of substance abuse (N, %)	261 (59.2%)
<b>Physical illness</b>	
Having a physical illness (N, %)	46 (10.4%)
Not having a physical illness (N, %)	395 (89.6%)
<b>Psychological illness</b>	
Having a psychological illness (N, %)	167 (37.9%)
Not having a psychological illness (N, %)	274 (62.1%)
ANTs (mean, SD)	47.72(17.25)
EA (mean, SD)	20.72 (7.84)
Adaptive CERS (mean, SD)	13.73 (4.27)
Maladaptive CERS (mean, SD)	18.91 (5.67)
Psychological distress (mean, SD)	24.46 (8.02)

ANTs: Automatic Negative Thoughts; EA: Experiential Avoidance; CERS: Cognitive Emotion Regulation Strategies

The results of the covariance matrix, illustrated in Table 2, revealed that ANTs, EA, and maladaptive CERS had a significant positive relationship with psychological distress ( $r = 0.75, P \leq 0.01$ ;  $r = 0.23, P \leq 0.01$ ; and  $r = 0.52, P \leq 0.01$ , respectively). By contrast, adaptive CERS had a considerable negative relationship with psychological distress ( $r = -0.68, P \leq 0.01$ ). Additionally,

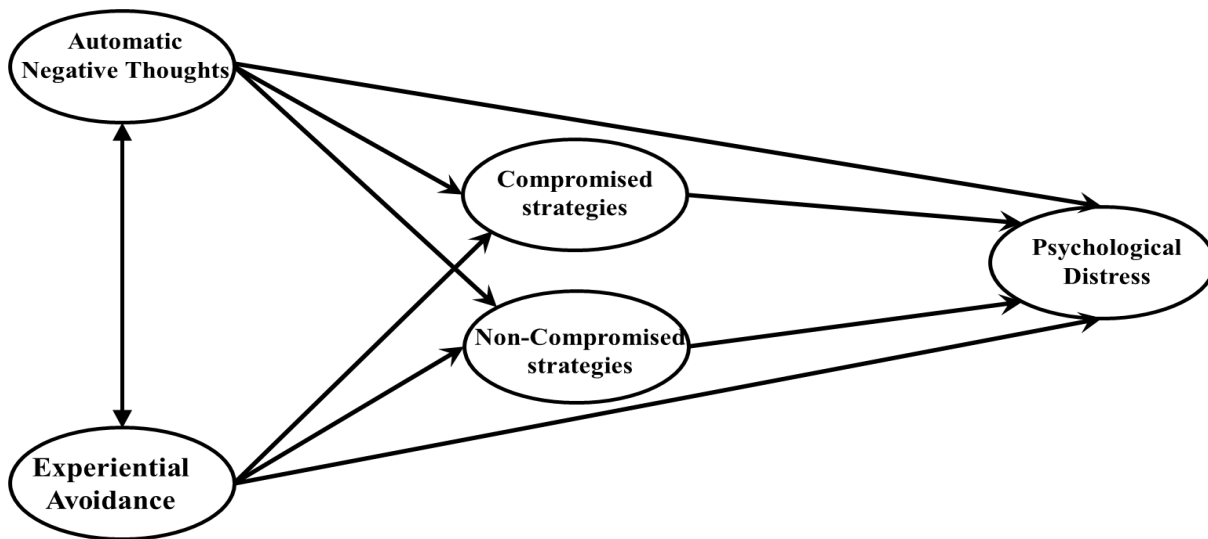
ANTs had a significant inverse relationship with adaptive CERS ( $r = -0.53, P \leq 0.01$ ) and a significant positive relationship with maladaptive CERS ( $r = 0.68, P \leq 0.01$ ). Moreover, EA had a notable inverse relationship with adaptive CERS ( $r = -0.15, P \leq 0.01$ ) and a significant positive relationship with maladaptive CERS ( $r = 0.39, P \leq 0.01$ ).

**Table 2. Total Sample Covariance Matrix and Intraclass Correlations of the Variables**

	Psychological Distress	ANTs	EA
Psychological distress	-	-	-
ANTs	0.75**	-	-
EA	0.23**	0.40**	-
Adaptive CERS	-0.68**	-0.53**	-0.15**
Maladaptive CERS	0.52**	0.68**	0.39**

ANTs: Automatic Negative Thoughts; EA: Experiential Avoidance; CERS: Cognitive Emotion Regulation Strategies; \*  $P < 0.05$ , \*\*  $P < 0.01$

These relationships suggest that ANTs, EA, and CERS may contribute to increased psychological distress in patients who have attempted suicide (Figure 2).



**Figure 2. The Proposed Structural Equation Modeling of Four Components of Psychological Distress Development in Patients with a History of Suicide.**

**Overall Model Fit and Structural Model Evaluation**

The proposed model for the impact of ANTs, EA, and CERS on the occurrence of psychological distress among suicide attempters is depicted in Figure 2. The chi-square goodness of fit index for the proposed model was statistically significant ( $\chi^2 = 1003.01, P \leq 0.01$ ), which typically indicates that the fit of the proposed model is not good. Given that the sample size and model complexity can affect chi-square statistic, and

considering the current sample size of 441 participants, alternative fit indices were utilized to evaluate the model's goodness of fit. According to the results, the Goodness of Fit Index (GFI) was 0.88, the Comparative Fit Index (CFI) was 0.89, and the Normed Fit Index (NFI) was 0.87. Since all of the mentioned indices were below the threshold of 0.90, the proposed structural equation model did not exhibit a good fit (Table 3).

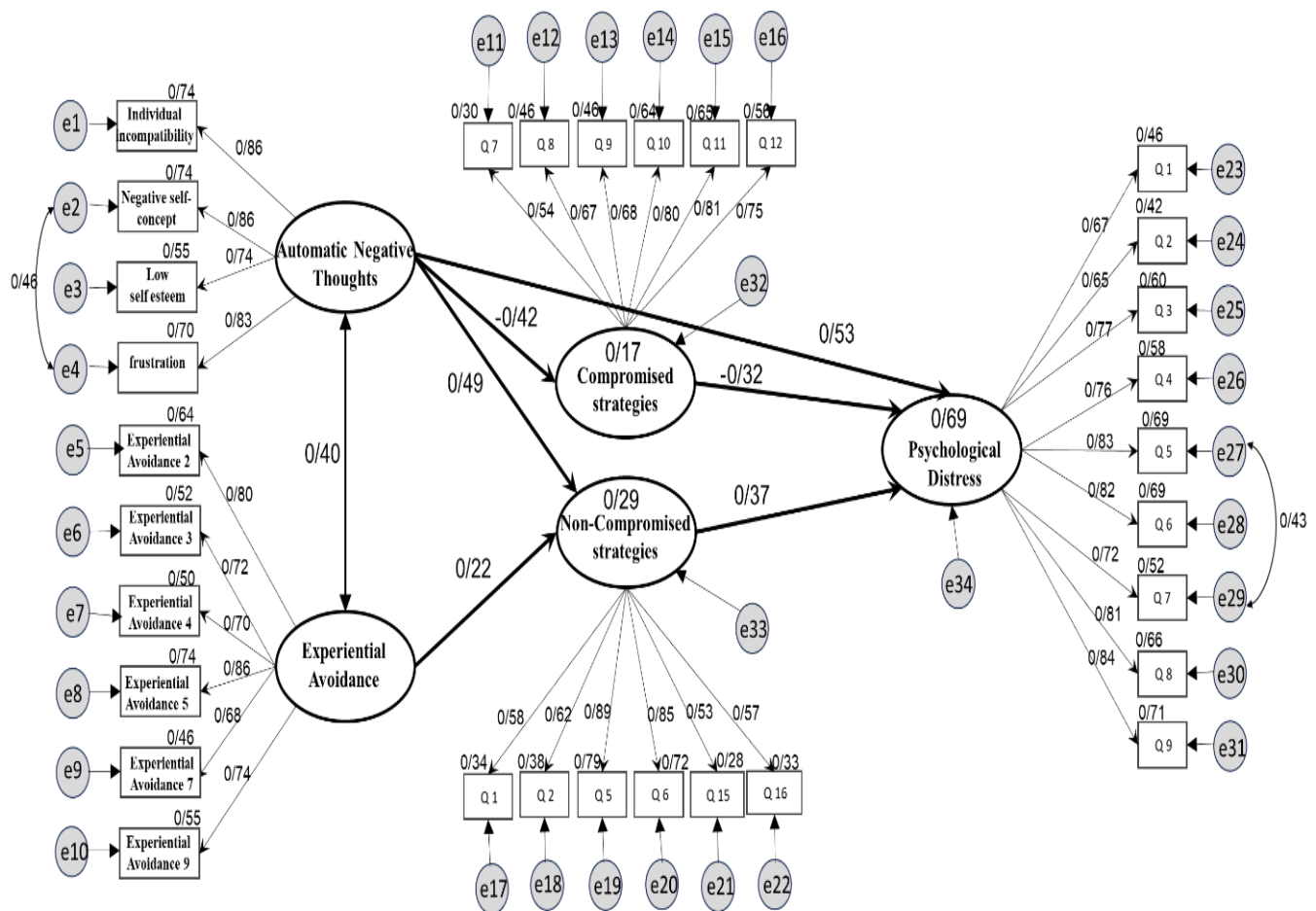
**Table 3. Goodness of Fit Indices of the Proposed and the Revised Structural Equation Modeling (SEM)**

Model	$\chi^2$	df	P	$\chi^2/df$	NFI	CFI	GFI	RMSEA
Proposed model	1003.01	425	0.0001	2.36	0.87	0.89	0.88	0.11
Revised model	1064.03	425	0.0001	2.51	0.93	0.96	0.91	0.07

$\chi^2$ : Chi-square; df: degree of freedom; NFI: Normed Fit Index; CFI: Comparative Fit Index; GFI: Goodness of Fit Index; RMSEA: Root Mean Square Error of Approximation

Since the initial model lacked adequate fit, the revision of the model was necessary. After evaluating the factor loading of predictor, mediator, and criterion variables, paths with weak and non-significant factor loading were eliminated. After this revision, the goodness of fit of the revised model was acceptable as the GFI was 0.91, the CFI was 0.96, and the NFI was 0.93. Furthermore, the Root Mean Square Error of Approximation (RMSEA)

was calculated at 0.07, below the threshold of 0.08, demonstrating a favorable fit for the revised structural equation model. Coefficients and explained variances of variables within the research model are reported in Figure 3. Standardized beta coefficients are shown on the arrows and explained variances are shown within the ovals.



**Figure 3. The Revised Structural Equation Modeling for Psychological Distress Development in Subjects with a History of Suicide Based on Automatic Negative Thoughts, Experiential Avoidance, and Cognitive Emotion Regulation Strategies. Standardized Beta Coefficients are Denoted on the Arrows and Explained Variances are Denoted within the Ovals.**

The findings from SEM revealed that ANTs were significantly inversely correlated with adaptive CERS ( $\beta = -0.42, P \leq 0.01$ ) and significantly positively associated

with both maladaptive CERS ( $\beta = 0.49, P \leq 0.01$ ) and psychological distress ( $\beta = 0.53, P < 0.01$ ). Therefore, ANTs had both direct and indirect relationships with

psychological distress occurrence in individuals with a history of suicide. The indirect relationship was mediated by both adaptive and maladaptive CERS. Moreover, a considerable positive relationship was observed between EA and maladaptive CERS ( $\beta = 0.22$ ,  $P < 0.01$ ). Conversely, no significant correlation was found between EA and adaptive CERS or psychological distress. Therefore, EA has a significant indirect positive relationship with psychological distress ( $\beta = 0.37$ ,  $P <$

0.01), mediated solely by maladaptive CERS. Notably, a negative relationship was noted between adaptive CERS and psychological distress ( $\beta = -0.32$ ,  $P < 0.01$ ), while a positive relationship was found between maladaptive CERS and psychological distress ( $\beta = 0.37$ ,  $P < 0.01$ ). Overall, the combined direct and indirect effects of ANTs, EA, and CERS may explain 69% of the variance in psychological distress occurrence among patients who have attempted suicide ( $R^2 = 0.69$ ) (Table 4).

**Table 4. Direct, Indirect and Total Effect of the Cognitive Processes on Psychological Distress among Study Participants**

Routes in the Model	Effects			P-value	R <sup>2</sup>
	Direct effects	Indirect effects	Total effects		
ANTs → Adaptive CERS	-0.42	-	-0.42	0.0001**	0.69
ANTs → Maladaptive CERS	0.49	-	0.49	0.0001**	
ANTs → Psychological Distress	0.53	0.20	0.73	0.0001**	
EA → Maladaptive CERS	0.22	-	0.22	0.001**	
EA → Psychological Distress	-	0.37	0.37	0.0001**	
Adaptive CERS → Psychological Distress	-0.32	-	-0.32	0.0001**	
Maladaptive CERS → Psychological Distress	0.37	-	0.37	0.0001**	

**Discussion**

The results of this investigation give a valuable understanding of the relationship between ANTs, EA, CERS, and psychological distress in patients with a history of suicide attempts. Our results align with prior research that reports the detrimental effect of ANTs on psychological distress (37, 38). ANTs cause feelings of hopelessness and worthlessness and contribute to suicidal behavior (39). It has also been reported that ANTs mediate the association between depression and suicidal tendencies among at-risk adolescents. This suggests that cognitive distortion, as an automatic thought, may result in the tendency of depressed adolescents to attempt suicide and heighten the risk of self-harming behaviors. Furthermore, patients experiencing depression may inadvertently experience specific ANTs through persistent rumination on negative past events, which can subsequently lead to suicidal ideation and behaviors (40). Therefore, it is important to consider ANTs in interventions for reducing psychological distress and suicide risk (41). Positive interpretation of negative life events, facilitated by an enhanced attribution style, may decrease depressive symptoms and suicidal ideation. Consequently, prevention strategies for managing negative and maladaptive cognitive processes are essential for improving cognitive functioning within at-risk populations (40).

Consistent with the existing literature (22), our study demonstrated that EA may worsen psychological distress among subjects with a history of suicide. The tendency to avoid unwanted internal experiences is associated with maladaptive coping strategies, such as substance

use or self-harm, which further intensify distress over time (42). Interventions targeting EA may be beneficial for disrupting this cycle of psychological distress and reducing suicide risk (43). EA is an important factor in the occurrence of suicidal ideation. Patients with reduced EA had higher levels of psychological flexibility and lower suicidal ideation scores throughout treatment. Notably, depression and hopelessness are not involved in this relationship, suggesting that reductions in suicidal behavior were not solely attributable to improvements in mood or decreases in feelings of hopelessness. These findings indicate that the management of psychological disorders, even when effective in improving symptoms, may not mitigate the risk of concurrent suicidal thoughts unless underlying cognitive impairments, such as EA, are also taken into consideration (44).

According to our findings, CERS had a significant role in the emergence of psychological distress. Align with previous studies, adaptive CERS such as positive refocusing, positive reappraisal, and acceptance, seem to be protective factors against psychological distress (45, 46). Conversely, maladaptive CERS including rumination, catastrophizing, and self-blame, exacerbate psychological distress (47, 48). Therefore, strengthening adaptive CERS and reducing maladaptive CERS is important for mitigating psychological distress and suicide risk among vulnerable populations (49). Research indicates that a heightened behavioral inhibition system (BIS), which is related to the noradrenergic and serotonergic systems in the hippocampus, is linked to inhibition and avoidance behaviors. It was suggested that such behaviors have an indirect relationship with suicidal ideation through the

maladaptive CERS. Patients with elevated levels of BIS are more likely to be affected by maladaptive CERS, potentially contributing to the suicidal behavior within this population. Therapeutic interventions, such as CBT, could be beneficial in instructing individuals at risk for suicide to use adaptive CERS while reducing the use of maladaptive ones. Furthermore, practices focusing on acceptance and mindfulness can alleviate the impact of BIS on the onset and persistence of psychological distress (50).

Structural equation modeling evaluated the relationships between the studied variables including ANTs, EA, CERS, and psychological distress. This model offers possible underlying mechanisms for psychological distress development among people with a history of suicide attempts. While ANTs directly impact distress levels, their effects are also mediated by both adaptive and maladaptive CERS through an indirect path. EA indirectly influences psychological distress solely through maladaptive CERS. In accordance with previous studies, these findings revealed the complex relationships between cognitive processes underlying psychological distress among this population (51).

### Limitation

There are several limitations in the present study to be discussed. First, because of the cross-sectional and observational design of this study, results cannot confirm a clear causal or temporal association among variables. Second, since subjects under the study had cognitive impairment, the dependence on self-report measures may result in bias. Third, this investigation focused exclusively on patients who had previously attempted suicide, thereby limiting the generalizability of the findings to subjects who had no history of suicide or to other populations. Future investigations with multicenter longitudinal designs and objective assessment methods alongside additional analyses regarding the robustness of the findings or potential confounding variables could yield a more robust understanding of the association between ANTs, EA, CERS, and psychological distress in people with a history of suicide attempts.

### Conclusion

In summary, this research investigated the association between cognitive processes and psychological distress in subjects with a history of suicide attempts. The study reveals that ANTs are correlated with psychological distress in both direct and indirect manner by reducing adaptive CERS while increasing maladaptive CERS. Furthermore, EA is shown to indirectly influence psychological distress by increasing maladaptive CERS. While this research does not establish causal or temporal relationships among these variables, the findings may indicate potential mechanisms through which these cognitive processes contribute to psychological distress and suicidality. By determining the functional relationship between ANTs, EA, and CERS in

developing psychological distress, our findings may offer guidance for the development of targeted interventions for preventing suicidal behavior. Furthermore, these results may have broader suggestions for essential policy and practice in suicide prevention.

### Acknowledgment

First of all, thanks to the all patients that participated in the study. The authors acknowledge the Toxicological Research Center, Loghman Hakim Hospital, and Shahid Beheshti University of Medical Sciences for their support.

### Conflict of Interest

None.

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