doi:10.22100/ijhs.v9i4.1075
Original Article

IJHS 2023;9(4):31-39
ijhs.shmu.ac.ir

IJHS
International Journal of Health Studies

Negative Spontaneous Thoughts and Depression in Adolescents with Suicidal Ideation: Mediating Role of Cognitive Distortion and Cognitive Flexibility

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Received: 28 January 2024
Accepted: 24 February 2024

Abstract

Background: *Suicide is the second leading cause of death for young people between the ages of 10 and 15. Thus, this study aimed to examine how cognitive distortion and cognitive flexibility contribute to the connection between negative spontaneous thoughts and depression among adolescents with thoughts of suicide.*

Methods: *This study constitutes a descriptive-correlational and cross-sectional research design, utilizing Structural Equation Modeling (SEM) as the analytical approach. The target population for this research consists of all teenagers residing in Tehran from September to November 2023 who have previously attempted suicide. For this study, a sample of 214 teenagers with a history of suicide attempts was purposefully selected. The research instruments used in this study consisted of the BDI-II for measuring depression, the ICDS for assessing interpersonal cognitive distortions, the ATQ-30 for evaluating negative spontaneous thoughts, and the CFI questionnaire developed by Dennis and Vander Waal to measure cognitive flexibility. The research data was analyzed using the SPSS version 27 and SmartPLS version 4 software. The bootstrap method with a volume of 5000 was employed to examine the indirect relationships. In the same way, the significance of the mediator variable was examined using Sobel's test.*

Results: *According to the findings, the helplessness component had a noticeable and adverse impact on the cognitive flexibility factor (β=-0.619, Pvalue<0.001). In addition, the cognitive flexibility variable was negatively and significantly influenced by the Individual incompatibility component (β=-0.225, Pvalue<0.001). Similarly, this particular component exhibited a significant effect on depression as well (β=0.159, Pvalue<0.001). The results indicate that there was a significant impact on the cognitive flexibility factor as a result of the low self-esteem component (β=0.377, Pvalue<0.001). Additionally, cognitive flexibility, functioning as a mediating variable, demonstrated a significant and unfavorable influence on depression (β=-0.483, Pvalue<0.001). Out of the various components of the cognitive distortion variable, only the misunderstanding in interpersonal relationships component showed a significant effect as a mediating variable on depression (β=0.186, Pvalue=0.005).*

Conclusions: *The findings of the current research demonstrated the impact of cognitive flexibility and cognitive distortion on mitigating individual incompatibility, negative self-concept expectations, and depression among adolescents with suicidal ideation. Furthermore, cognitive flexibility was found to enhance self-confidence and diminish feelings of helplessness among these teenagers contemplating suicide.*

Keywords: Negative Spontaneous Thoughts, Depression, Adolescents, Suicidal Ideation, Cognitive Distortion, Cognitive Flexibility.
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Please cite this paper as: Naderi H, Alizadeh S, Alipour Z, Mahdizadeh Azdin S, Khalilnezhad M. Negative Spontaneous Thoughts and Depression in Adolescents with Suicidal Ideation: Mediating Role of Cognitive Distortion and Cognitive Flexibility. Int J Health Stud 2023;9(4):31-39.

Introduction

Suicidal behaviors manifest as either direct or indirect consequences of emotional dysregulation or efforts to moderate overwhelming emotional responses[1]. The incidence of suicide attempts surpasses that of actual suicide by approximately tenfold, with these attempts stemming from a myriad of intricate factors, including genetic, environmental, cultural, and psychiatric influences[2]. On this note, research findings have demonstrated a heightened propensity for suicide attempts, thoughts, and planning among young individuals aged 11 to 21 who engage in cannabis consumption[3]. Moreover, comprehensive investigations have revealed that the motivations driving teenage suicide lean more heavily toward interpersonal difficulties rather than financial troubles or illness[2]. Adolescence corresponds to a phase in life that has the potential to be linked with negative thoughts and behaviors. Throughout this stage, adolescents undergo an upsurge in negative thinking, which could potentially result in delinquent conduct and thoughts of self-harm[4]. Negative spontaneous thoughts, negative beliefs, and involuntary responses to circumstances are all rooted in fundamental perceptions regarding oneself or others[5]. Spontaneous negative thoughts, also known as intrusive thoughts, can be regarded as a manifestation of various illnesses, including depression[6]. Within this framework, the results demonstrate that adolescents suffering from depression are particularly susceptible to a cascade of detrimental thought patterns, ultimately culminating in suicidal tendencies[7]. Untreated negative spontaneous thoughts have the potential to engender feelings of anger and depression[5].

Depression is a psychiatric disorder that profoundly restricts psychosocial capacity and diminishes overall well-being, presenting as a major economic burden and a significant medical stressor on a global scale. Furthermore, it amplifies the

vulnerability to substance abuse and suicide[8]. Insight from research indicates a strong correlation between interpersonal harm and compromised social relationships with depression[9]. These studies also establish a clear connection between the severities of a depressive episode, the presence of mental health comorbidities, and deteriorated physical health with an increased risk of suicidal ideation[10]. Cognitive distortions, characterized as errors in cognitive processing and content, serve as a powerful indicator of suicidal tendencies[11]. These distortions pervade various levels of cognitive structure, such as automatic thoughts, consistently leading individuals to misconstrue the world and its stimuli, thereby perpetuating harmful behaviors[12]. Findings from research have demonstrated a noteworthy connection between shifts in cognitive distortions and alterations in emotional symptoms associated with depression[13]. Additionally, a study substantiated a definitive and affirmative relationship between thoughts of suicide, cognitive distortion, and depression[14].

Additionally, the presence of determined processes, such as cognitive impairments, contributes to one's susceptibility to engage in suicidal actions. In particular, deficiencies regarding cognitive adaptability can negatively impact one's capability to adjust to evolving situations and heighten the likelihood of engaging in suicidal behaviors[15]. Cognitive flexibility refers to the ability to smoothly switch between cognitive operations to efficiently adjust one's actions in response to a shift in the environment. Furthermore, limitations in cognitive flexibility serve as a defining characteristic of numerous psychological disorders, including major depressive disorder[16]. According to a study conducted by Park et al. in 2023, it was found that cognitive flexibility plays a vital role in influencing the connection between non-suicidal self-injury methods and suicidal attempts[17]. Furthermore, another research study demonstrated a correlation between psychological flexibility and both depression as well as thoughts and behaviors associated with suicide[18]. It is worth noting that the age group most vulnerable to suicide, with a staggering annual death toll of approximately 800,000 individuals, is adolescence and young adulthood[1].

Due to the importance placed on this specific field, it becomes essential to give it proper attention. Nevertheless, despite the acknowledged importance of this subject matter, a dearth of research endeavors directly addressing the role of cognitive distortion and cognitive flexibility as mediators in the association between negative spontaneous thoughts and depression among adolescents with suicidal ideation is evident. Consequently, a void in the existing body of literature calls for further exploration, thereby positioning the present study as one of the pioneering investigations in this realm. The primary objective of this research endeavor is to elucidate the impact of cognitive distortion and cognitive flexibility on the manifestation of negative spontaneous thoughts and the experiences of depression in adolescents with suicidal intentions. Afterward, the researcher proceeded to explain the fundamental conceptual structure through the portrayal shown in Figure 1.

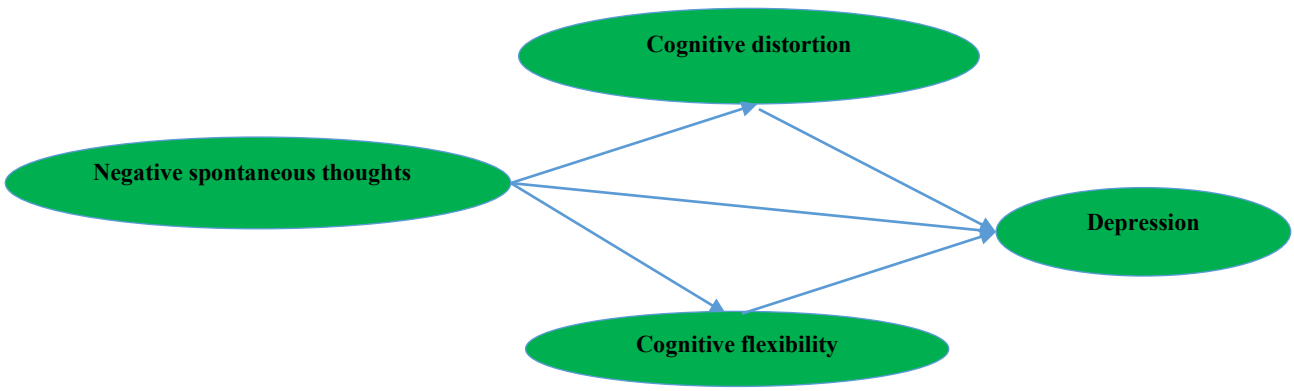

Figure 1. Conceptual framework of the research

Materials and Methods

The study was a descriptive-correlational and cross-sectional research methodology with Structural Equation Modeling (SEM). The target population for this research consisted of adolescents residing in Tehran from September to November 2023 who had previously attempted suicide. The participants in the study consisted of 250 adolescents who had previously shown suicidal tendencies. According to Tabachnick, Fidell, and Ullman (2013), a sample size ranging from 200 to 350 individuals is considered appropriate for testing the suggested model using the structural equation modeling (SEM) approach[19]. As a result, the researcher utilized purposive sampling to choose 250 individuals. The inclusion criteria for the study consisted of having a counseling record related to behaviors associated with suicidal intent, obtaining informed consent from the participants, securing consent from the parents of adolescents to partake in the research, and possessing adequate literacy and comprehension skills to respond to the inquiries.

Suicidal tendencies in individuals are established by observing past behaviors and validating them with the consent

of parents of adolescents. Moreover, the clinic's experts diagnosed and verified the existence of associated disorders before the current investigation, employing a clinical interview method based on the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV-TR). The predetermined requirements for excluding participants from the study consisted of being between the ages of 15 and 19, failing to respond to more than eight questions, and voluntarily withdrawing from the study. The research was conducted using the following procedure: initially, the researcher obtained the required permissions from their university to carry out the investigation. Subsequently, they utilized the convenience sampling method to visit ten counseling clinics in Tehran. The selection of these clinics was based on factors such as ease of coordination, implementation of the research, and the potential for collaboration with the researcher.

Afterward, the researchers visited the clinics that were working together and, upon collaborating with the clinic management, approached families who had an adolescent child with a previous record of suicidal tendencies and had their files stored in the clinic's database, both online and in their networks. A notification was also distributed within the research community, highlighting personal details about the research objectives and adherence to ethical considerations. After obtaining consent from the parents of the adolescents, the research questionnaires were distributed online for the adolescents to complete. Ultimately, a total of 214 questionnaires were included in the final analysis. However, 36 questionnaires had to be excluded from the study because they were either incomplete or deliberately filled out with errors. Gathering 214 questionnaires from ten different counseling clinics spanned one month for each clinic. In adherence to ethical principles, an informed consent form was obtained from the adolescents involved in the study. Essential information was conveyed to the adolescents and their families, emphasizing voluntary and no obligation to continue. Furthermore, the questionnaires did not require any personal identification information.

Beck Depression Inventory-II (BDI-II): Beck Depression Inventory-II BDI-II[20] is a self-report questionnaire including 21 items that measure the severity of depression. Each item reflects 1 of the symptoms of depression scores based on 4 items. It is completed in 5 to 10 minutes and is suitable for people above 13 years old. Students in grades 5 or 6 were able to read and understand the items. BDI-II is scored based on a 4-point Likert scale, from 0 to 3. The total score ranges from 0 to 63. Scores from 0 to 13 indicate no or minimal, 14 to 19 mild, 20 to 28 exact, and 29 to 63 severe depression. A score less than 4 can indicate a possible denial of depression, pretending good and usual, even for healthy people. Very high scores, even among severely depressed individuals, show a possible overstatement of depression, or the probability of the existing hysteric or borderline personality disorders. However, severe depression is also observed in such patients. The cut-off point of 18 can diagnose approximately 92% of patients with severe depression[21]. The researcher obtained the Cronbach's alpha coefficient of the scale equal to 0.941.

Interpersonal Cognitive Distortion Scale (ICDS): The goal of the interpersonal cognitive distortion scale (ICDS) is to measure the overall cognitive distortions that anyone shows in his or her relationships with others. This questionnaire was first developed by Hamachi and Buyukozturk[16] and included 19 questions with a 5-point Likert scale (I strongly disagree=1, disagree=2, no idea=3, I agree=4, and strongly agree=5)[22]. All of the items are scored reversely. The high scores on this scale suggest high interpersonal cognitive distortions and low scores suggest low interpersonal cognitive distortions. The total scores of the questionnaire range from 19 to 95. This scale examines the severity of interpersonal distortions and their dimensions, interpersonal exclusion, interpersonal unrealistic expectations, and interpersonal misunderstandings. In Iran, in research, Cronbach's alpha coefficient for the component of rejection in interpersonal relationships was 0.79, unrealistic expectations were 0.82, and misunderstanding in relationships was 0.81[23]. The researcher obtained Cronbach's alpha coefficient for interpersonal exclusion equal to 0.78, unrealistic expectations 0.80, and misunderstanding in relationships equal to 0.74.

The Automatic Thoughts Questionnaire (ATQ-30): The ATQ is an instrument consisting of 30 items with a 5-point Likert scale that assesses the frequency of negative automatic thoughts experienced during the past week. Hollon & Kendall[24] asked 312 undergraduates to recall dysphoric experiences and to report associated cognitions. Afterward, the authors chose 100 representative cognitions and administered them to a second sample. Through a cross-validation analysis, the authors retained 30 of the 100 original items. These items significantly discriminated between clinical and nonclinical samples[24]. This scale includes four subscales, which include the individual incompatibility subscale, including questions 26-19-22-20-14-10-7, and with a score of 7 to 35, the subscale of my self-concepts including questions 28-25-24-23 -21-9-3-2 with a score of 8 to 40, the low self-esteem subscale includes questions 17-6-5-4-18, 15-16-17, with a score of 8 to 40, and the helplessness subscale includes questions 26-30 -27-1-8-11-12-13-29 with a score of 9 to 45. In Iran, in research, Cronbach's alpha coefficient for the whole scale was 0.74[25]. The researcher obtained Cronbach's alpha coefficient for the individual incompatibility component equal to 0.93, for the negative self-concepts and negative expectations component equal to 0.951, for the low self-esteem component equal to 0.822, and the helplessness component equal to 0.876.

Cognitive Flexibility Inventory (CFI): The CFI is a 20-item self-report questionnaire developed for aspects of cognitive flexibility that enable people to challenge and replace maladaptive thoughts with more adaptive ones. Items are rated on a 7-point Likert-type scale to define the respondent's approach to challenging situations accurately. We used CFI to assess three features of cognitive flexibility: 1) the person's tendency to identify problematic situations as controllable; 2) the ability to comprehend multiple alternative explanations for life events and human behaviors; and 3) the ability to produce multiple alternative solutions to difficult situations[26]. Dennis and Vander Wall reported that CFI had well to excellent internal consistency, and also test-retest reliability was high for the total CFI score and its subscales. The Iranian version of the CFI has desirable levels of reliability and validity. In this

version, the result of factor analysis indicated three factors revealed 56.02% of the variance: control, alternatives, and alternatives for human behaviors. The test-retest and Cronbach's alpha coefficients for the CFI reliability were 0.71 and 0.90, respectively[27]. In this study, the coefficient alpha was calculated to be 0.87 for the total score of CFI.

Descriptive statistics were conducted using SPSS version 27 software, while path coefficients between variables were analyzed using SmartPLS version 4 software. Additionally, the significance of the mediator variable was assessed using Sobel's test. The normality of the distribution of research variables was evaluated using the Kolmogorov-Smirnov test. The results of this test indicated a significant departure from normality, prompting the utilization of SmartPLS. Moreover, the researcher's sampling method adhered to a random selection process, satisfying the necessary assumption. The sample size, totaling 214 individuals, was deemed sufficient to apply the structural equation model utilizing the partial least squares method. Lastly, a significance level of 0.05 was employed in the conducted tests.

Results

Initially, the researcher examined the descriptive statistics regarding the variables of the study. The adolescents were categorized into three age groups: 15 to 16 years old accounted for 57.9%, 16 to 17 years old comprised 10.7%, and 18 to 19 years old constituted 31.3%. Similarly, the adolescents were segregated by gender, with boys making up 61.7% and girls representing 38.3%. Based on the number of suicide attempts, the participants were divided into three groups: 1 to 2 times accounted for 74.8%, 2 to 3 times amounted to 15.0%, and more than 3 times comprised 10.3% (Table 1).

Table 2 reveals that both cognitive distortion and negative spontaneous thoughts exhibited a positive correlation with depression. Conversely, cognitive flexibility demonstrated a significant and negative association with the depression variable.

According to the findings displayed in Table 4 and Figure 2, it was observed that the helplessness component had a detrimental and notable impact on the cognitive flexibility variable (β=-0.619, Pvalue<0.001). Nevertheless, this component did not significantly affect depression (β=-0.107, Pvalue=0.194). The Individual incompatibility component also showed a negative and significant influence on the cognitive flexibility variable (β=-0.225, Pvalue<0.001). Additionally, this component had a significant effect on depression (β=0.159, Pvalue<0.001). Furthermore, the Individual incompatibility component solely had a significant impact on the misunderstanding in the interpersonal relationships component (β=0.233, Pvalue<0.001). Moreover, the low self-esteem component had a significant effect on the cognitive flexibility variable (β=0.377, Pvalue<0.001), but it did not significantly affect depression (β=0.074, Pvalue=0.314). The low self-esteem component also had a substantial impact on the rejection of interpersonal relationships and unrealistic expectations in relationship components (Pvalue<0.05).

Additionally, according to Table 3, the negative self-concepts and negative expectations component contributed negatively and significantly to the cognitive flexibility variable (β=-0.316, Pvalue=0.001). Similarly, this component had a positive and significant effect on depression (β=0.263, Pvalue=0.001). Furthermore, the component of negative self-concepts and negative expectations had a significant influence on rejection in interpersonal relationships, unrealistic expectations in relationships, and misunderstanding in interpersonal relationships (Pvalue<0.05). Likewise, cognitive flexibility acted as a significant and adverse mediating variable for depression (β=-0.483, Pvalue<0.001). Out of the cognitive distortion variable components, only the misunderstanding in interpersonal relationships component had a significant effect as a mediating variable on depression (β=0.186, Pvalue=0.005). The researcher employed Sobel's test to assess the importance of the research's mediating variables, which was calculated based on the subsequent formula.

$$Z - value = \frac{a * b}{\sqrt{(b^2 * s_a^2) + (a^2 * s_b^2) + (s_a^2 * s_b^2)}}$$

If the Z value in the Sobel test exceeds 1.96, it indicates that the mediating effect of a variable is statistically significant at the 95% confidence level. The Z value for the misunderstanding in the interpersonal relationships component, acting as a mediator between Individual incompatibility and depression variables, was 2.3855. Therefore, based on the results of the Sobel test, it can be inferred that this mediating variable is significant. Similarly, the Z value for the misunderstanding in interpersonal relationships component, mediating between negative self-concepts and negative expectations variables and depression, was 2.2885, leading to the conclusion that this mediating variable is also significant. However, the Z value for the misunderstanding in interpersonal relationships component, acting as a mediator between low self-esteem and depression variables, was only 0.5953, indicating that this mediating variable is not significant. Likewise, the Z value for the misunderstanding in interpersonal relationships component, mediating between helplessness and depression variables, was 0.1040, suggesting that this mediating variable is not significant either. On the other hand, the Z value for the cognitive flexibility component, as a mediator between Individual incompatibility and depression variables, was 4.1163, indicating that this mediating variable is significant. Similarly, the Z value for the cognitive flexibility component, mediating between Negative self-concepts and negative expectations variables and depression was 3.1315, leading to the conclusion that this mediating variable is also significant. Furthermore, the Z value for the cognitive flexibility component, acting as a mediator between low self-esteem and depression variables, was -4.2875, suggesting that this mediating variable is significant as well. Additionally, the Z value for the cognitive flexibility component, mediating between helplessness and depression variables, was 5.52741, indicating that this mediating variable is significant. Therefore, based on the results of the Sobel test, it can be concluded that the mediating variables in this research are significant.

Table 4 provides evident confirmation of the model's reliability and validity. The variables' Cronbach's alpha reliability exceeds 0.7, while the combined reliability surpasses the same threshold. Likewise, the model's validity has been assessed using the average variance extracted index, with values above 0.5 for the research variables. Consequently, we can confidently assert the model's validity. Additionally, the fit of the model was thoroughly examined, revealing confirmation across all fit indices. Notably, the SRMR, or Standardized Root Mean Square Residual Index, quantifies the disparity between the observed correlation and the correlation matrix of the structural model. The model's SRMR registers at 0.100, the NFI at 0.800, and the chi at 309.992.

Table 1. The mean and standard deviation of the research variables

Variables	Mean± SD	Max	Min	N	Skewness	Kurtosis
Depression	18.58±9.504	40	5	214	0.687	-0.855
Individual incompatibility	20.54±6.630	30	7	214	-0.564	-0.961
Negative self-concepts and negative expectations	25.27±8.588	38	11	214	-0.109	-1.287
Low self-esteem	27.01±8.106	38	11	214	-0.411	-0.981
Helplessness	29.37±10.115	42	11	214	-0.388	-1.33
Cognitive flexibility	79.18±19.729	108	40	214	-0.206	-1.234
Unrealistic expectations in relationships	22.08±7.488	37	12	214	0.607	-0.989
Rejection in interpersonal relationships	21.56±7.275	37	12	214	0.734	-0.785
Misunderstanding in interpersonal relationships	21.99±12.039	44	11	214	0.778	-1.167

Table 2. Pearson's correlation coefficient

Variables	1	2	3	4	5	6	7	8	9	P-value
Depression	-									**<0.001**
Individual incompatibility	0.568	-								**<0.001**
Negative self-concepts and negative expectations	0.732	0.453	-							**<0.001**
Low self-esteem	0.597	0.448	0.774	-						**<0.001**
Helplessness	0.630	0.346	0.795	0.805	-					**<0.001**
Cognitive flexibility	-0.789	-0.413	-0.618	-0.467	-0.644	-				**<0.001**
Unrealistic expectations in relationships	0.373	0.247	0.491	0.478	0.412	-0.261	-			**<0.001**
Rejection in interpersonal relationships	0.360	0.206	0.460	0.460	0.406	-0.278	0.892	-		**<0.001**
Misunderstanding in interpersonal relationships	0.693	0.471	0.617	0.529	0.503	-0.575	0.339	0.355	-	**<0.001**

Table 3. Standard research coefficients in general

Result of the hypothesis	Path coefficient	Standard deviation	P-value	T-value	Result
Helplessness -> Cognitive flexibility	-0.619	0.09	<0.001	6.851	**confirmation**
Helplessness -> Depression	-0.107	0.082	0.194	1.3	**rejection**
Helplessness -> Misunderstanding in interpersonal relationships	0.01	0.096	0.919	0.102	**rejection**
Helplessness -> Rejection in interpersonal relationships	-0.039	0.121	0.748	0.322	**rejection**
Helplessness -> Unrealistic expectations in relationships	-0.091	0.113	0.422	0.803	**rejection**
Individual incompatibility -> Cognitive flexibility	-0.225	0.049	<0.001	4.609	**confirmation**
Individual incompatibility -> Depression	0.159	0.04	<0.001	3.981	**confirmation**
Individual incompatibility -> Misunderstanding in interpersonal relationships	0.233	0.052	<0.001	4.46	**confirmation**
Individual incompatibility -> Rejection in interpersonal relationships	-0.039	0.063	0.534	0.622	**rejection**
Individual incompatibility -> Unrealistic expectations in relationships	-0.007	0.06	0.913	0.109	**rejection**
Low self-esteem -> Cognitive flexibility	0.377	0.078	<0.001	4.864	**confirmation**
Low self-esteem -> Depression	0.074	0.073	0.314	1.007	**rejection**
Low self-esteem -> Misunderstanding in interpersonal relationships	0.067	0.11	0.544	0.607	**rejection**
Low self-esteem -> Rejection in interpersonal relationships	0.287	0.131	0.029	2.188	**confirmation**
Low self-esteem -> Unrealistic expectations in relationships	0.288	0.125	0.022	2.3	**confirmation**
Negative self-concepts and negative expectations -> Cognitive flexibility	-0.316	0.095	0.001	3.33	**confirmation**
Negative self-concepts and negative expectations -> Depression	0.263	0.079	0.001	3.313	**confirmation**
Negative self-concepts and negative expectations -> Misunderstanding in interpersonal relationships	0.451	0.115	<0.001	3.932	**confirmation**
Negative self-concepts and negative expectations -> Rejection in interpersonal relationships	0.286	0.134	0.033	2.129	**confirmation**
Negative self-concepts and negative expectations -> Unrealistic expectations in relationships	0.344	0.117	0.003	2.926	**confirmation**
Rejection in interpersonal relationships -> Depression	-0.032	0.084	0.699	0.387	**rejection**
Unrealistic expectations in relationships -> Depression	0.054	0.084	0.522	0.641	**rejection**
Misunderstanding in interpersonal relationships -> Depression	0.186	0.066	0.005	2.83	**confirmation**
Cognitive flexibility -> Depression	-0.483	0.052	<0.001	9.21	**confirmation**

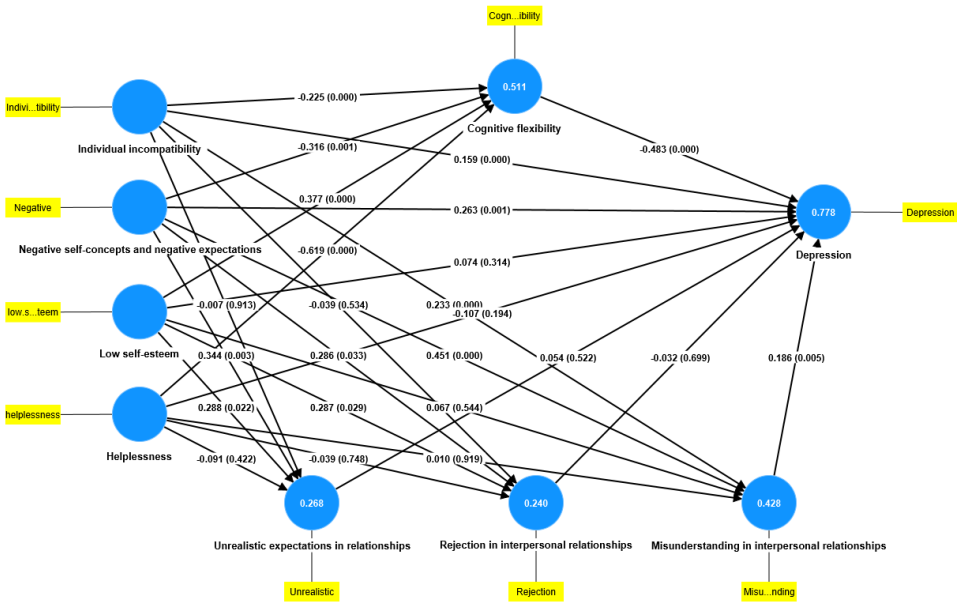

Figure 2. Path coefficients between variables and significance level

Table 4. Reliability and validity of the model

Variables	Cronbach's Alpha	Composite Reliability	AVE
Depression	0.941	0.948	0.578
Individual incompatibility	0.93	0.938	0.532
Negative self-concepts and negative expectations	0.951	0.962	0.561
Low self-esteem	0.822	0.841	0.65
Helplessness	0.876	0.899	0.659
Cognitive flexibility	0.774	0.847	0.627
Unrealistic expectations in relationships	0.807	0.862	0.613
Rejection in interpersonal relationships	0.782	0.847	0.781
Misunderstanding in interpersonal relationships	0.749	0.833	0.501

Discussion

The current research was carried out to examine the mediating role of cognitive distortion and cognitive flexibility in the connection between negative spontaneous thoughts and depression in adolescents experiencing suicidal thoughts. According to the findings, cognitive flexibility was adversely affected by the helplessness aspect, leading to a decrease in cognitive flexibility. However, this aspect did not have a significant impact on depression.

The results of the present study support the previous research on the detrimental impact of the helplessness component on cognitive flexibility[16,28]. A study found that psychological flexibility moderates the relationship between learned helplessness and depressive symptoms[28]. Additionally, another study highlighted that cognitive flexibility is impaired in various psychiatric disorders, including depression[16]. When explaining this discovery, it should be noted that a lack of cognitive adaptability can significantly impact a person's ability to adjust to changing demands and conditions, ultimately increasing their susceptibility to suicidal behavior[15]. Learned helplessness is characterized by the development of a belief that one is incapable of dealing with challenging situations. This belief is formed through repeated exposure to unfavorable events that are perceived as unavoidable or inevitable, resulting in a sense of powerlessness over the outcomes. As a result, individuals learn to believe that attempting to alter the situation is futile, even in new circumstances where their actions could yield positive outcomes. Individuals with limited psychological adaptability are unable to objectively perceive learned helplessness as a product of their personal experiences and consequently struggle to distance themselves from this mindset (cognitive extinction) to engage in more meaningful activities[28].

Another discovery from the current research indicates that the element of individual incompatibility exerts a detrimental and notable influence on cognitive flexibility, resulting in its decline. Furthermore, it has a positive impact on depression and the element of misunderstanding in interpersonal relationships. This finding stands out as the first investigation of its kind, and no prior literature addressing this issue was found, whether aligned or non-aligned. Nevertheless, the

outcomes of this study align with previous research on the association between negative spontaneous thoughts and psychological problems. For instance, one study found that an increase in maladaptive attitudes correlates with a decrease in psychological well-being[29]. Additionally, another study revealed that negative automatic thoughts serve as a significant mediator between depression and suicidal behavior[7]. Furthermore, research suggests that spontaneous negative thoughts can be indicative of depression[6].

It can be stated in the preceding explanation that dysfunctional attitudes are rigid and restrictive, leading to irrational and extreme attributions. Consequently, individuals are unable to handle their emotions in a logical, adaptive, and flexible manner when faced with emotional situations. This inability to regulate emotions effectively is caused by the aforementioned inefficient attitudes. Consequently, individuals experience tension and worry in various life situations that are evaluated and monitored, and they struggle to manage the excitement generated by such circumstances. This lack of control over tension ultimately leads to a decline in their overall health and well-being[29]. "To provide further details, depression is strongly associated with increased levels of automatic negative thinking." If left unaddressed, these automatic negative thoughts can contribute to depression, self-doubt, anger, and anxiety[5]. Furthermore, the results of this study align with previous research[30-32] and suggest that low self-esteem has a positive impact on cognitive flexibility, rejection in interpersonal relationships, and unrealistic expectations in relationships. Peng et al. (2021) found that parental rejection and excessive parental support negatively affect the mental well-being of adolescents as it decreases self-esteem and increases psychological inflexibility[30]. Another study discovered that individuals with low self-esteem consistently anticipate that others will not like them and are reluctant to revise these expectations when confronted with social prediction errors[31]. Moreover, the findings of a separate study indicated that the association between low self-esteem and depression in adolescents may be explained by their heightened sensitivity to rejection and feelings of loneliness[32].

Self-esteem plays a crucial role in safeguarding mental health, which is supported by this finding. Self-esteem can be defined as an individual's perception and feelings regarding their value and significance. It encompasses the emotional aspect of self-concept, and it is akin to self-respect, self-evaluation, and self-worth. When self-esteem interacts with stress, it influences the development of psychopathology. High self-esteem acts as a safeguard against the detrimental effects of stress, whereas low self-esteem heightens vulnerability to stress[30]. Furthermore, individuals with low self-esteem generally possess a negative perception of their worth and exhibit cognitive biases that contribute to maintaining a negative self-image. Those with low self-esteem anticipate negative judgment from others, and their self-worth is particularly influenced by social feedback. Ultimately, these persistent negative views and fluctuating self-worth are associated with the onset and persistence of psychiatric disorders, such as depression, anxiety, and psychosis[31].

According to the research, it was found that having negative self-concepts and negative expectations has a detrimental impact on cognitive flexibility and a positive impact on unrealistic expectations in relationships. No previous studies were discovered that specifically addressed this issue. However, this finding is consistent with previous research that suggests a positive relationship between negative self-concepts and negative expectations and outcomes such as depression, rejection in interpersonal relationships, and misperception in interpersonal relationships[33-34]. Another study revealed that individuals with depression tend to anticipate negative events or experiences [33]. Furthermore, a separate study indicated that a higher self-concept strengthens the link between self-esteem and interpersonal problems while decreasing the overall levels of interpersonal problems [34].

To explain this discovery, it is important to note that expectations play a crucial role in predicting the future accurately and guiding behavior and decision-making. However, when expectations prove to be inaccurate, individuals must find ways to cope and minimize the discrepancy. This coping process becomes especially vital when expectations impact significant areas of life, such as an adolescent's self-concept. Expectations can be seen as personal assessments of the likelihood of different outcomes in a given situation. Holding negative expectations can lead to increased stress, physical and mental illnesses, and a reduced drive for exploration and innovation. Moreover, having pessimistic beliefs and expectations about oneself and the future can have a detrimental impact on one's self-concept, and experiencing events that are worse than anticipated (negative capacity) can further darken one's self-perception [35]. Furthermore, cognitive distortions and ineffective attitudes toward a given situation are pivotal contributors to the development of psychological damage, such as depression. Dysfunctional attitudes, either directly or in conjunction with stressful environmental conditions, are considered a fundamental element in the onset of psychological injuries [29]. Individuals experiencing depression exhibit dysfunctional attitudes towards their surroundings and circumstances, often displaying a tendency to disregard or negatively assess positive information that contradicts their diverse expectations. Negative beliefs are strengthened, and the learning process becomes distorted as a result. Depressive symptoms are consistently related to different forms of expectations [33].

Additionally, this research confirms the beneficial role of the misunderstanding aspect in interpersonal relationships as a mediating factor between individual incompatibility factors and depression. It has been found that this aspect also acts as a positive mediator between negative self-perceptions, negative expectations, and depression, which is consistent with previous studies [8-9, 13]. According to Zeng et al. (2023), adolescent depressive symptoms can be predicted by interpersonal relationships [8]. Furthermore, a study revealed a significant association between interpersonal harm, weakened interpersonal relationships, and depression [9]. Moreover, the research results suggest that changes in cognitive distortions can foretell changes in the emotional symptoms of depression[13]. Positive and healthy relationships between individuals play a significant role in enhancing social

adjustment and overall well-being. Conversely, negative interpersonal relationships, particularly those characterized by hostility and danger, can lead to negative cognitive schemas and self-evaluations, putting individuals at a higher risk of experiencing psychological crises. People who frequently encounter rejection and conflict in their relationships often develop negative self-perceptions and may be susceptible to depression[8].This not only affects their academic and social performance but also increases the likelihood of substance abuse and suicide. Hence, interpersonal trauma among adolescents should be prioritized as a crucial public health issue, as it can result in depression and subsequently lead to adverse mental health outcomes[9].

The research also revealed that cognitive flexibility, as a mediator, hurts the relationship between individual incompatibility and depression, as well as between negative self-concepts and negative expectations and depression; it plays a mediating and mitigating role in these relationships. Additionally, cognitive flexibility acts as a mediating and reducing factor in the relationship between low self-esteem and depression, and it also has a diminishing mediating role in the relationship between helplessness and depression. These findings are consistent with previous studies [16, 29, 18]. Torrado Pacheco et al. (2023) mentioned in their research that cognitive flexibility disorders are a prominent characteristic of various psychiatric disorders, including major depression [16]. Another study demonstrated that psychological flexibility moderates the connection between learned helplessness and depressive symptoms[28]. Furthermore, research findings indicated that depression and suicidal thoughts and behaviors are linked to psychological flexibility [18]. The reason behind this finding can be explained by the fact that effective emotional regulation and overall mental health in healthy adults are linked to cognitive flexibility. On the other hand, cognitive rigidity is a symptom of depression and is associated with cognitive processes like rumination and all-or-nothing thinking. It has been observed that enhancing cognitive flexibility can have a positive impact on reducing depression symptoms[16]. Individuals who possess higher psychological flexibility are less likely to experience depressive symptoms, especially if they have higher levels of learned helplessness. Those who struggle with learned helplessness are the ones who could potentially benefit the most from an intervention targeting psychological resilience to improve depressive symptoms [28].

Ethical Considerations

This article examined all the ethical guidelines. Ethical principles of research were received Islamic Azad University, South Tehran Branch (IR.IAU.STB.REC.1402.221). The individuals participating were informed of the purpose and methodology behind the research. The participants were assured that their data would be kept confidential, and they had the option to withdraw from the study.

Acknowledgment

We extend our appreciation to all the individuals who took part in this study.

Conflict of Interest

The authors stated no personal or financial conflicts would affect their work.

Funding

Without relying on external sources of income or funding.

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