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Negative Spontaneous Thoughts as a Mediator Between Rumination, Time Attitudes, and Depression in the Elderly: A Structural Equation Model

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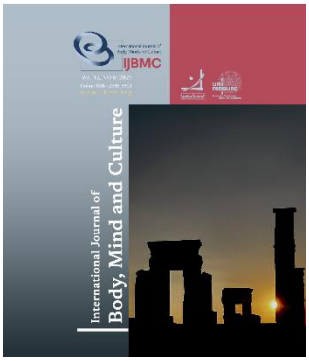

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ABSTRACT

Objective: Objectives: Population aging is a natural occurrence in today's society due to advancements in socio-economic development and is now considered a major challenge globally in the 21st century. This study aims to examine how retrospective thinking (positive/negative past, past acceptance) and rumination contribute to depression in elderlies, with negative spontaneous thoughts playing a mediating role.

Methods and Materials: This study utilized a descriptive-correlational research design and cross-sectional research approach, employing structural modeling. The research focused on elderly individuals in Tehran from July to October 2023 who resided in elderly care centers. A total of 114 elderly participants, including both men and women, were selected through convenience methods. Descriptive statistics were conducted using SPSS version 27, while data analysis and standard coefficients were computed using JASP version 0.18.1 software. The significance level set for the study was 0.05.

Findings: The findings revealed a positive and significant relationship between Rumination and Depression variables when considering the mediating role of negative spontaneous thoughts (β=0.026, p<0.001). Similarly, a positive and significant relationship was observed between Negative past and Depression when considering negative spontaneous thoughts as a mediator (β=0.030, p=0.026). The connection between Positive past and Past acceptance was not significant, with a p-value greater than 0.05. All the model fit indices were confirmed. The SRMR index value was 0.069 and the NFI was 0.796. Similarly, the Q2 values were above zero.

Conclusion: The primary finding from the study suggests that addressing rumination and negative spontaneous thoughts, promoting past acceptance, and fostering positive thoughts can help alleviate depression in the elderly population. This highlights the importance of addressing mental health in the elderly population to improve their overall well-being.

Keywords: Retrospective thinking, Rumination, Negative Spontaneous Thoughts, Depression, Elderly

Introduction

Advances in healthcare and increased life expectancy have led to an unprecedented rise in the aging population worldwide. In 2022, individuals aged 65 and older comprised 17.4% of the global population, a proportion expected to reach 29.9% by 2035 (Park & Kang, 2024). This demographic transition has heightened concerns regarding mental health in older adults, particularly depression, which affects over 280 million people globally (Ren et al., 2024). Given its serious effects on cognition, mood, and suicide risk, late-life depression demands urgent focus. Although depression in older

adults is well studied, the interplay of retrospective thinking, rumination, and negative automatic thoughts remains insufficiently understood. Exploring this gap is key to clarifying cognitive factors behind depression in aging (Park & Kang, 2024). Characterized by symptoms that impair daily functioning, depression is notably more prevalent among those over 50 compared to younger age groups, significantly impacting the mental health of the elderly (Lu et al., 2024). Furthermore, research indicates that older adults living alone or in institutional care report higher levels of depressive symptoms than those residing with family members (Ren et al., 2024).

Elderly individuals with depression often experience distress, guilt, and regret when reflecting on their past, which can foster discomfort and a negative outlook on life (Tanaka, 2020). Although the past is generally seen as more predictable than the future, its fixed nature may cause some to fixate excessively on past events (Zhou et al., 2020). Retrospective thinking—reflecting on life experiences, achievements, and regrets—is common in depression and linked to difficulties in problem-solving and abstract thinking. Those affected tend to ruminate on negative memories, resulting in intrusive thoughts (Cetinkol et al., 2020). Research shows that such reflections, especially when unresolved or negatively evaluated, increase psychological distress in older adults (Warden et al., 2019). Moreover, challenges in accepting the past strongly correlate with depressive symptoms, suggesting impaired past integration as a cognitive vulnerability in late-life depression (Smith et al., 2020).

The presence of stressful events in the lives of elderly individuals plays a significant role in influencing how they typically respond to distress. One common response to distress is rumination, which involves repeatedly thinking about the causes, situational factors, and outcomes of a negative emotional experience (Ji, 2024). Rumination occurs unconsciously, follows a repetitive pattern, and differs from more adaptive, concrete, and specific thinking patterns like problem-solving, emotional processing, or regulation. It often persists even after recovering from a major depressive episode and can predict the severity and duration of depressive episodes in adults (Langenecker et al., 2024). Evidence indicates a bidirectional relationship between depressive symptoms and rumination, where each reinforces the other over time (Li et al., 2024). Furthermore, individuals with depression often demonstrate elevated levels of rumination accompanied by cognitive impairments, suggesting a shared underlying mechanism that exacerbates both affective and cognitive dysfunctions (Szyszkowska & Bala, 2023).

In elderly individuals with depressive disorders and rumination, a common symptom is the presence of negative spontaneous thoughts or intrusive thoughts (Wang et al., 2022). Negative spontaneous thoughts, negative beliefs, and automatic responses to situations are rooted in fundamental beliefs about oneself or others (Sudhan & Kumar, 2021). These thoughts may stem from interpretations of present experiences, predictions about future events, and memories of past occurrences. These thoughts contribute to other symptoms of depression, including behavioral, emotional, cognitive, and physical symptoms (Hasani, 2024). Core cognitive vulnerabilities such as negative spontaneous thoughts, dysfunctional thinking patterns, rumination, and thought suppression have been identified as transdiagnostic markers in both depression and anxiety disorders (Yapan et al., 2022). Their consistent association across cultures and clinical settings highlights the central role of negative thinking styles as defining features of depressive pathology (Chahar Mahali et al., 2020).

Concerns regarding the physical and psychological well-being of older adults have intensified due to the high prevalence of depression, cognitive decline, multiple chronic conditions, and unmet healthcare needs. Given the growing importance of mental health in aging populations, it is essential to explore factors that contribute to depression in this demographic. However, despite the relevance of this issue, there is a lack of research examining the combined effects of retrospective thinking and rumination, as well as the potential mediating role of negative automatic thoughts. Drawing on the literature reviewed above, the present study proposes a conceptual framework in which retrospective thinking heightens emotional distress, which in turn leads to increased rumination. This pattern of repetitive negative thinking is believed to give rise to negative automatic thoughts—an established predictor of depressive symptoms in older adults. Accordingly, the present research seeks to investigate this pathway and determine whether negative automatic thoughts mediate the relationship between retrospective thinking, rumination, and depression. This identified

research gap underscores the novelty and importance of the current study, which is among the first to explore these variables in an integrated model.

Methods and Materials

Study Design and Participants

This study utilized a descriptive-correlational research design and cross-sectional research method, incorporating structural modeling. The study focused on the elderly population in Tehran residing in care centers from July to October 2023. A sample of 114 elderly individuals, both male and female, was selected using the convenience technique. To ensure sample adequacy, the research adopted Cohen's formula from 2013 for determining sample size in structural modeling analysis, considering factors such as observed and latent variables, effect size, and desired probability and statistical power levels (Cohen, 2013). The appropriate sample size was determined using this formula for the calculations.

Anticipated effect size: 0.3
Desired statistical power level: 0.8
Number of latent variables: 3
Number of observed variables: 109
Probability level: 0.01

The researcher calculated that there were a total of 156 individuals based on the figures provided. To account for potential dropouts in the sample, the researcher adjusted the number to 170 people to ensure sample size retention. The next stage involved establishing criteria for the research participants' selection process. Inclusion criteria comprised possessing an official record at the elderly care facilities under study, providing informed consent, responding to the survey questions adequately (failure to answer more than eight items resulted in exclusion), and having sufficient comprehension to understand the material. Conversely, exclusion criteria encompassed having physical or mental conditions that hindered participation, not completing all questionnaires, and elderly individuals who declined to partake in the study were also excluded.

The research methodology involved obtaining permits from the university where the researcher was enrolled, followed by the introduction to five elderly care centers in Tehran with the assistance of university professors. The identities of the facilities remained confidential. The reason those facilities were chosen was because they were suitable for conducting the research, and they could also cooperate with the elderly individuals in the community. Subsequently, the researcher approached the management of the care centers to gain permission to conduct the research. After this, the researcher sought participation from the elderly individuals at the centers, providing them with information on the research objectives, ethical considerations, and assurance of confidentiality. The main concern was to ensure that no personal data would be disclosed in the research materials, and older participants had the choice to discontinue their involvement in the study whenever they wanted.

The participants were presented with the questions from the questionnaires and were requested to provide answers. Since most individuals either struggled to respond independently or were unwilling to read the questions, the researcher and his colleagues read the questions aloud to each person and recorded their responses. Primarily, the researcher recorded the majority of the answers. Subsequently, 56 elderly individuals were excluded from the study because they either failed to answer more than eight questions from the questionnaires or opted out of the research, resulting in the analysis of data from 114 participants. All participants completed four variables about retrospective thinking, rumination, negative spontaneous thoughts, and depression. All elderly participants completing the questionnaires themselves posed a limitation, causing the research and questionnaire completion process to last four months. As a precursor to distributing the questionnaires, a consent form was obtained from the participants to ensure adherence to ethical principles, emphasizing voluntary participation and the right to withdraw from the study at any time. Additionally, participants were informed that the tests did not request identity information.

Instruments

Ruminative Response Scale (RRS): The questionnaire was developed in 2003 by Nolen-Hoeksema and her colleagues (Treynor et al., 2003). It assesses the level of rumination in individuals. There are 22 questions in this questionnaire, each answered on a four-point Likert scale ranging from never (1) to always (4). The

questionnaire consists of three components: expression (questions 7, 11, 12, 20, 21), deep thinking (questions 5, 10, 13, 15, 16), and depression (questions 1-4, 6-9, 14, 17-22). Scores range from a minimum of 22 to a maximum of 88. A score of 22-33 denotes low levels of reflection, 33-55 signifies moderate levels of reflection, and scores exceeding 55 point to high levels of reflection. In a research conducted in Iran, Cronbach's alpha coefficient for this particular scale was recorded at 0.78. Another study found that the Cronbach's alpha coefficient for the same scale was 0.784.

Negative Spontaneous Thoughts Questionnaire (ATQ-30): In 1980, Kendall and Hallon created a questionnaire to assess negative spontaneous thoughts in individuals (Hollon & Kendall, 1980). The questionnaire consists of 30 questions, each rated on a scale from 1 to 5 (ranging from never to always). It includes four subscales: Individual incompatibility (questions 26-19-22-20-14-10-7, scores 7-35), Negative self-concepts (questions 28-25-24-23-21-9-3-2, scores 8-40), Low self-esteem (questions 17-6-5-4-18-15-16-17, scores 8-40), and Helplessness (questions 26-30-27-1-8-11-12-13-29, scores 9-45). A study in Iran reported a Cronbach's alpha coefficient of 0.74 for the entire scale (MahmoudiTabar et al., 2022). The researcher found Cronbach's alpha coefficients of 0.826 for Individual incompatibility, 0.761 for Negative self-concepts, 0.838 for Low self-esteem, and 0.929 for Helplessness.

Beck's Depression Inventory (BDI-II) :Beck Depression Questionnaire - Second Edition: Becket al. developed a questionnaire in 1996 to assess depression and its symptoms in individuals (Beak et al., 1996). The questionnaire consists of 21 questions, each scored from 0 to 3. Scores from 0 to 13 indicate mild depression, 14 to 19 indicate moderate depression, 20 to 28 indicate severe depression and 29 to 63 indicate very severe depression. The total score of the questionnaire ranges from 0 to 63. Becket al. reported a concurrent validity of 0.79 and a test-retest validity of 0.67 for the questionnaire. In a study conducted in Iran, Cronbach's alpha coefficient was found to be 0.92 (Hamidi et al., 2015). The researcher also calculated a Cronbach's alpha coefficient of 0.846 for the scale.

Time Attitude Questionnaire (TAQ): Time Attitude Questionnaire: In 2018, Khezria Azar and her colleagues developed a questionnaire aimed at assessing attitudes toward time (Khezria Azar et al., 2018). The questionnaire consists of 34 items scored on a five-point Likert scale ranging from completely disagree to agree. It includes eight dimensions of time attitude: positive future (5 items), negative future (4 items), negative present (4 items), hedonism present (5 items), futuristic present (4 items), negative past (4 items), past acceptance (4 items), and positive past (4 items). The current research focused on three dimensions of the questionnaire, which are negative past (regret, dissatisfaction, past suppression, and seeking compensation in the past), past acceptance (not regretting the past, making peace with the past, and accepting both positive and negative past events), and positive past (satisfaction with the past, lack of stress and worry about the past, a comfortable past, and positive evaluation of past challenges). The original questionnaire was assessed for reliability and found to have Cronbach's alpha values ranging from 0.79 to 0.82. In the current research, Cronbach's alpha coefficients for the Negative past, Positive past, and past acceptance dimensions were calculated as 0.687, 0.789, and 0.728, respectively.

Data Analysis

The researchers utilized SPSS version 27 for conducting descriptive statistics and JASP version 0.18.1 for analyzing data and standard coefficients. The normality of the distribution of research variables was assessed using the Kolmogorov-Smirnov test. The sample size of the study, consisting of 114 individuals, was deemed adequate for implementing the structural equation model. The study considered a significance level of 0.05 to be suitable.

Findings and Results

Initially, the researcher examined the demographic variables of the study by analyzing descriptive statistics. The participants were categorized based on age into three groups: 50-65 years old (17.54%), 66-75 years old (33.33%), and 76 years old and above (49.12%). Similarly, about gender, the participants were divided into male (78.070%) and female (21.930%) groups. The number of children was also considered, with participants categorized into groups: 1-2 children (7.018%), 3-4 children (61.404%), and more than five children (31.579%).

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Table 1

Description of the demographic variables

Variables	Groups	Frequency	%	Sample size	Median
Gender	Man	89	78.070	114	1
	Female	25	21.930		
Age	50 to 65 years old	20	17.544	114	2
	66 to 75 years old	38	33.333		
	76 and above	56	49.123		
Education	Illiterate	18	15.789	114	2
	High school	48	42.105		
	Diploma	36	31.579		
	Associate Degree	12	10.526		
Number of children	1-2	8	7.018	114	2
	3-4	70	61.404		
	+5	36	31.579		

Table 2 shows the mean and standard deviation of the research variables.

Table 2

Description of the main research Variables

Variables	N	Missing	Mean	SD	Skewness	Kurtosis	Min	Max
Depression	114	0	22.798	6.643	0.691	-0.628	14.000	38.000
Rumination	114	0	41.614	7.987	0.479	-0.473	29.000	65.000
Negative past	114	0	11.904	2.990	0.313	-0.819	6.000	18.000
Positive past	114	0	12.535	3.112	0.099	-1.202	6.000	18.000
Past acceptance	114	0	10.719	2.033	-0.285	-0.673	6.000	14.000
Individual incompatibility	114	0	17.202	6.147	1.306	1.071	10.000	33.000
Negative self-concepts	114	0	19.298	7.032	0.957	0.092	10.000	36.000
Low self-esteem	114	0	20.316	9.126	0.788	-0.992	10.000	40.000
Helplessness	114	0	15.912	7.006	2.157	3.934	10.000	41.000

Table 3 shows the correlation between research variables based on Pearson's correlation coefficient.

Table 3

Pearson's Correlations

Variable		1	2	3	4	5	6	7	8	9
1. Depression	Pearson's r	—								
2. Rumination	Pearson's r	0.754	—							
3. Negative past	Pearson's r	0.504	0.463	—						
4. Positive past	Pearson's r	-0.559	-0.465	-0.436	—					
5. Past acceptance	Pearson's r	-0.542	-0.535	-0.344	0.316	—				
6. Individual incompatibility	Pearson's r	0.758	0.629	0.470	-0.472	-0.415	—			
7. Negative self-concepts	Pearson's r	0.589	0.566	0.438	-0.496	-0.500	0.715	—		
8. Low self-esteem	Pearson's r	0.610	0.640	0.331	-0.424	-0.580	0.593	0.633	—	
9. Helplessness	Pearson's r	0.287	0.319	0.104	-0.214	-0.466	0.457	0.434	0.562	—

Notes: The variables Negative past, Positive past and Past acceptance are based on the TAQ scale. The variables Negative self-concepts, Individual incompatibility, Low self-esteem and Helplessness are based on the ATQ scale.

Based on the findings in Table 3, it was observed that the Rumination variable and the factors of Negative past, Individual incompatibility, Negative self-concepts, Low self-esteem, and Helplessness had a positive and significant association with Depression ($p < 0.05$). However, the factors of Positive past and Past acceptance showed a significant negative association with Depression ($p < 0.001$). Following the analysis, the researcher examined the path coefficients and significance levels among the research variables in Table 4. 95% Confidence Interval

Table 4

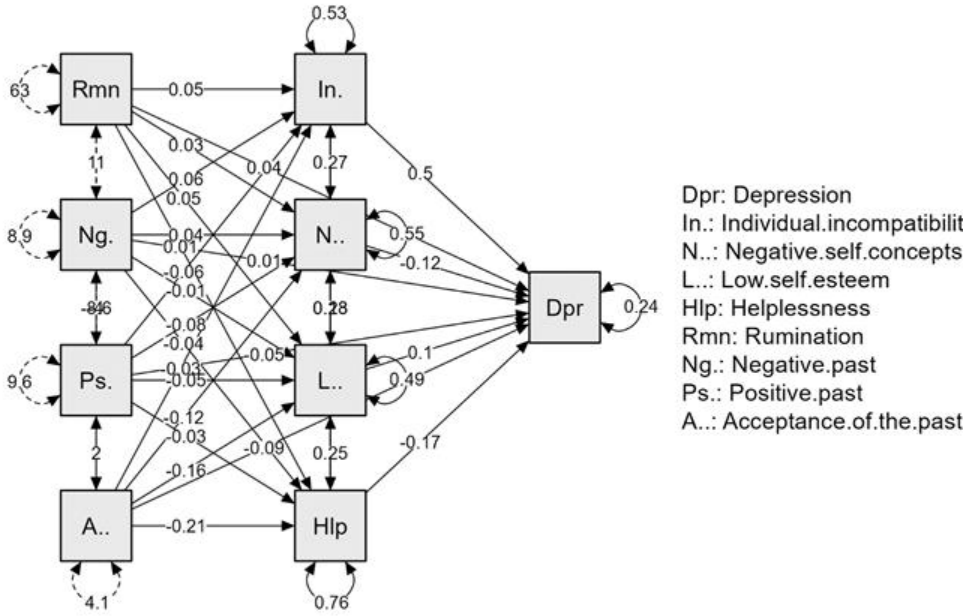
Path coefficients

	Standardized Beta (β)	STDEV	Z-value	P-value	Lower	Upper
Individual incompatibility →Depression	0.501	0.075	6.636	< 0.001	0.331	0.673
Negative self-concepts →Depression	-0.119	0.074	-1.619	0.105	-0.285	0.060
Low self-esteem →Depression	0.097	0.074	1.312	0.190	-0.057	0.224
Helplessness →Depression	-0.169	0.060	-2.806	0.005	-0.310	-0.044
Rumination →Depression	0.039	0.009	4.377	< 0.001	0.019	0.061
Negative past →Depression	0.009	0.019	0.490	0.624	-0.026	0.046
Positive past →Depression	-0.052	0.018	-2.845	0.004	-0.086	-0.013
Past acceptance →Depression	-0.094	0.030	-3.099	0.002	-0.148	-0.038
Rumination →Individual incompatibility	0.054	0.011	4.776	< 0.001	0.029	0.077
Negative past →Individual incompatibility	0.057	0.027	2.091	0.037	-0.002	0.112
Positive past →Individual incompatibility	-0.057	0.026	-2.176	0.030	-0.100	-0.020
Past acceptance →Individual incompatibility	-0.034	0.040	-0.850	0.395	-0.109	0.049
Rumination →Negative self-concepts	0.034	0.011	2.937	0.003	0.012	0.056
Negative past →Negative self-concepts	0.043	0.028	1.542	0.123	-0.012	0.104
Positive past →Negative self-concepts	-0.077	0.026	-2.927	0.003	-0.126	-0.032
Past acceptance →Negative self-concepts	-0.116	0.041	-2.827	0.005	-0.199	-0.025
Rumination →Low self-esteem	0.052	0.011	4.800	< 0.001	0.031	0.073
Negative past →Low self-esteem	-0.012	0.026	-0.455	0.649	-0.069	0.042
Positive past →Low self-esteem	-0.046	0.025	-1.846	0.065	-0.088	-0.003
Past acceptance →Low self-esteem	-0.159	0.039	-4.103	< 0.001	-0.245	-0.069
Rumination →Helplessness	0.014	0.013	1.050	0.294	-0.009	0.039
Negative past →Helplessness	-0.044	0.032	-1.346	0.178	-0.115	0.028
Positive past →Helplessness	-0.027	0.031	-0.871	0.384	-0.084	0.031
Past acceptance →Helplessness	-0.208	0.048	-4.331	< 0.001	-0.322	-0.085
Indirect effects						
Rumination→Individual incompatibility→ Depression	0.027	0.007	3.877	< .001	0.014	0.041
Rumination→ Negative self concepts→ Depression	-0.004	0.003	-1.418	0.156	-0.012	9.432×10^{-4}
Rumination→ Low self esteem→ Depression	0.005	0.004	1.266	0.206	-0.002	0.013
Rumination→ Helplessness→ Depression	-0.002	0.002	-0.984	0.325	-0.009	0.001
Negative past→ Individual incompatibility→ Depression	0.028	0.014	1.994	0.046	-5.10×10^{-4}	0.066
Negative past→ Negative self concepts→ Depression	-0.005	0.005	-1.117	0.264	-0.024	0.002
Negative past→ Low self esteem→ Depression	-0.001	0.003	-0.430	0.667	-0.011	0.004
Negative past→ Helplessness→ Depression	0.007	0.006	1.214	0.225	-0.002	0.027
Positive past→ Individual incompatibility→ Depression	-0.028	0.014	-2.067	0.039	-0.051	-0.010
Positive past→ Negative self concepts→ Depression	0.009	0.006	1.417	0.157	-0.003	0.027
Positive past→ Low self esteem→ Depression	-0.004	0.004	-1.070	0.285	-0.017	9.93×10^{-4}
Positive past→ Helplessness→ Depression	0.005	0.005	0.832	0.405	-0.004	0.020
Acceptance of the past→ Individual incompatibility→ Depression	-0.017	0.020	-0.843	0.399	-0.062	0.026
Acceptance of the past→ Negative self concepts→ Depression	0.014	0.010	1.405	0.160	-0.003	0.044
Acceptance of the past→ Low self esteem→ Depression	-0.015	0.012	-1.250	0.211	-0.043	0.006
Acceptance of the past→ Helplessness→ Depression	0.035	0.015	2.355	0.019	0.008	0.084

Significance level between variables

Figure 1

Final Model of the Study



The outcomes indicated in Table 4 and Figure 1 revealed that Individual incompatibility and Helplessness had a notable influence on Depression, whereas Negative self-concepts and Low self-esteem did not display a significant impact (p>0.05). The variable of Rumination was positively and significantly related to Depression (β = 0.039, p < 0.001). Positive past and Past acceptance had a negative and significant impact on depression (p<0.05), whereas the negative past component did not show a significant effect (β=0.009, p=0.624). Similarly, Rumination had a significant positive indirect effect on Depression through Individual incompatibility (β= 0.027, p <0.001). Negative past had a significant positive indirect effect on Depression through Individual incompatibility (β= 0.028, p <0.05). Negative past had a significant positive indirect effect on Depression through Individual incompatibility (β= 0.028, p <0.05). However, Positive past had a significant negative indirect effect on Depression through Individual incompatibility (β= -0.028, p <0.05). Also, Acceptance of the past had a significant positive indirect effect on Depression through Helplessness (β= 0.035, p =0.019). The researcher used the bootstrap method to analyze how the research variables indirectly affect depression by influencing negative spontaneous thoughts. In this research, the researcher determined a bootstrap value of 5000.

Table 5

Total Indirect effects between research variables

					95% Confidence Interval	
	Estimate	SE	Z-value	P-value	Lower	Upper
Rumination →Depression	0.026	0.007	3.818	<0.001	0.013	0.041
Negative past →Depression	0.030	0.013	2.231	0.026	0.003	0.063
Positive past →Depression	-0.019	0.013	-1.507	0.132	-0.044	0.002
Past acceptance →Depression	0.016	0.023	0.719	0.472	-0.032	0.070

The results of the bootstrap analysis presented in Table 5 demonstrated a significant and positive relationship between Rumination and Depression variables when the mediating factor of negative spontaneous thoughts was included (β=0.026, p<0.001). The discovery backs the concept that rumination, facilitated by negative spontaneous thoughts, can contribute to higher rates of depression in the elderly.

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Despite the statistical significance of this relationship, the impact is likely to be modest. Similarly, the analysis revealed a significant and positive association between Negative past and Depression variables when mediated by negative spontaneous thoughts (β=0.030, p=0.026), suggesting that negative past experiences can contribute to depression in the elderly through negative spontaneous thoughts. The relationship between the variables is anticipated to have a minimal effect size. On the other hand, the indirect impact of Positive past and past Acceptance on Depression did not show statistical significance. Finally, the researcher examined the R-squared values obtained from the model.

Table 6

R-squared in the model

Variables	R^2
Depression	0.760
Individual incompatibility	0.463
Negative self-concepts	0.445
Low self-esteem	0.504
Helplessness	0.238

The research model indicated that the R^2 value for the Depression variable was 0.760. In Table 7, the researcher assessed the reliability and validity of the variables used in the study.

Table 7

Reliability and validity of the model

Variables	Cronbach's Alpha	Composite Reliability	AVE
1. Depression	0.846	0.836	0.534
2. Rumination	0.784	0.753	0.436
3. Negative past	0.687	0.686	0.482
4. Positive past	0.789	0.785	0.492
5. Past acceptance	0.728	0.725	0.469
6. Individual incompatibility	0.826	0.815	0.455
7. Negative self -concepts	0.761	0.764	0.459
8. Low self-esteem	0.838	0.835	0.523
9. Helplessness	0.929	0.931	0.816

Table 7 demonstrates that the model has been deemed reliable and valid. The Cronbach's alpha reliability for the variables exceeds 0.6. Additionally, the combined reliability of these variables also surpasses 0.6. The validity of the model was evaluated by utilizing the mean-variance extracted index, with results indicating values exceeding 0.5 for the research variables. In conclusion, the model is both reliable and valid. The researcher also examined the model fit. All the model fit indices were confirmed. If the SRMR index value is less than 0.8, it indicates a good fit of the model. The SRMR value for the model was 0.069. Similarly, the NFI was 0.796. The blindfolding method was used to assess the reliability of the model in predicting the research variable. Q^2 values above zero indicate that the data are accurately reconstructed and the model can make accurate predictions. The model fit was confirmed.

Discussion and Conclusion

The primary objective of this study was to explore how retrospective thinking and rumination, along with the mediating influence of negative spontaneous thoughts, contribute to depression in elderly individuals. The findings revealed that while low self-esteem and negative self-concepts do not significantly impact depression, individual incompatibility, helplessness, and rumination are associated with higher levels of depression in the elderly. Conversely, positive past and

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past acceptance are linked to lower depression. Furthermore, rumination and a negative view of the past, together with negative spontaneous thoughts, showed significant associations with depression. However, given the correlational nature of the data, causal or mediational conclusions should be drawn with caution.

Recent research indicates that individual incompatibility, helplessness, and rumination show significant correlations with depression, consistent with the results reported (Ayhan & Kavak Budak, 2021; Chahar Mahali et al., 2020; Li et al., 2024; Szyszkowska & Bala, 2023) Negative thoughts are consistently associated with depression globally, as noted in a study by (Chahar Mahali et al., 2020). Additionally, depressed individuals tend to have more negative spontaneous thoughts, according to (Ayhan & Kavak Budak, 2021; Li et al., 2024) also found a bidirectional relationship between depressive symptoms and rumination. Another study revealed that individuals with depression exhibit higher levels of rumination (Szyszkowska & Bala, 2023).

It is important to note that negative spontaneous thoughts can flow through the mind rapidly in specific circumstances, without the individual being able to control them in the moment. These thoughts are typically rigid, extreme, inefficient, and resistant to change, dominating a person's cognitive processes. Consequently, elderly individuals harboring such negative spontaneous thoughts may have an accurate and realistic view of the world around them, as these thoughts can overshadow their cognitive system.26 While these thoughts may lead to long-term psychological issues, short-term low self-esteem or negative self-concepts might not significantly contribute to depression. Negative spontaneous thoughts often stem from interpretations of current situations, predictions about future events, and memories of past occurrences, which in turn can manifest as various symptoms of depression, including behavioral (decrease in activity levels, withdrawal), motivational (apathy, lethargy), emotional (anxiety, guilt), cognitive (concentration disorders, lack of decision-making power), and physical symptoms (anorexia and insomnia) (Hasani, 2024).

"Rumination, characterized by repetitive focus on negative thoughts, is linked to increased activity in the brain's default mode network (DMN), especially in regions involved in self-referential thinking (Zhou et al., 2020). This neural pattern may reinforce negative thought cycles, interfere with problem-solving, perpetuate feelings of sadness, and thus contribute to the worsening and persistence of depressive symptoms, particularly in older adults.7-5"

The current study found that positive past experiences and past acceptance are negatively correlated with depression, aligning with the findings of (Cetinkol et al., 2020; Hallford et al., 2024; Smith et al., 2020) A study investigating the correlation between past acceptance, hopelessness, death anxiety, and depressive symptoms in adults found that accepting the past is crucial for maintaining ego integrity in the elderly.6 Additionally, research has shown that difficulties in past acceptance are consistently connected with higher levels of depressive symptoms.8 Hallford et al. (2024) also highlighted that recalling positive memories with guidance can enhance the anticipation of pleasure and psychological resources while reducing depressive symptoms (Hallford et al., 2024).

As individuals transition from young adulthood to middle adulthood, they tend to place greater emphasis on past experiences and may engage in more rumination on past events. Older individuals who struggle to come to terms with their interpersonal history are more inclined to dwell on past encounters and experiences, which can contribute to worsening symptoms of depression. Conversely, seniors who view their past in a positive light or have accepted their past are less likely to experience feelings of regret and sadness when reflecting on past experiences (Etherson et al., 2024).

Elderly individuals who can healthily process their past experiences can recall them without overwhelming negative emotions, thus enabling them to effectively deal with life's challenges and recover from them, ultimately reducing feelings of depression (Smith et al., 2020). Elderly individuals reflect on both the positive and negative aspects of their past experiences. Reflecting on life is connected to how individuals find significance in their previous experiences. Elderly individuals who accept their past for what it is and ascribe a positive meaning to it can protect themselves from the difficulties that come with aging. Past acceptance involves having a positive outlook on one's past by internalizing it, essentially accepting all past experiences (Zhou et al., 2020).

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Another finding of the study indicated that rumination and dwelling on negative past experiences are associated with negative spontaneous thoughts, which in turn are correlated with slightly higher levels of depression in elderly individuals. This finding is consistent with previous studies conducted by (Cano-López et al., 2022; Carpenter et al., 2022; Pirbaglou et al., 2013; Yapan et al., 2022). Carpenter et al. (2022) demonstrated that rumination and negative past experiences are predictive of depressive symptoms (Carpenter et al., 2022). Cano-López et al. (2022) also observed a correlation between negative beliefs, rumination, and depression (Cano-López et al., 2022). Furthermore, Pirbaglou et al. (2013) highlighted the role of negative spontaneous thoughts in connecting anxiety symptoms to depressive distress (Pirbaglou et al., 2013). Yapan et al. (2022) found that negative spontaneous thoughts, dysfunctional thinking patterns, rumination, and thought suppression are all significant factors in depression and anxiety (Yapan et al., 2022).

Negative beliefs in elderly individuals lead to the perception that rumination is uncontrollable and harmful, contributing to increased exposure to negative information (like emotion and negative thoughts) and reinforcing depressive symptoms. Rumination impacts depression through various mechanisms: enhancing negative thoughts stemming from a depressive state, heightening pessimism which hinders problem-solving abilities, impeding conditioned behavior leading to increased stress, and reducing social support in the elderly, thereby worsening depressive symptoms, prolonging depressive episodes, and elevating the likelihood of relapse (Zhang et al., 2020).

Elderly individuals who tend to focus more on their past may experience negative emotions such as increased recollection of negative events and negative spontaneous thoughts. This emphasis on the negative past can result in significant psychological symptoms in later life, with depression being the most common outcome (Wang et al., 2021).

Beliefs regarding depression in elderly individuals suffering from depression can encompass spiritual distress that reflects personality traits, including experiences of loss and challenges associated with aging. Elderly individuals who harbor negative thoughts and beliefs such as guilt, regret, pessimism, and skepticism about treatment are more likely to experience heightened levels of depression.4

This study has several limitations that should be acknowledged to clarify the findings and guide future research. First, the sample was drawn from institutionalized elderly individuals in Tehran's care centers, which may introduce sampling bias and limit the generalizability of the results to the broader elderly population. Convenience sampling in a selective context further restricts external validity. Additionally, the cross-sectional design does not allow for temporal measurement, which limits causal inferences and the ability to distinguish rumination as a stable trait versus a temporary state. Data collection relied solely on self-report questionnaires, raising concerns about common method bias and self-report bias, especially given the advanced age and varying literacy levels of participants. Future studies should consider incorporating alternative assessment methods, such as interviews, to reduce bias and improve measurement accuracy. Relevant control variables such as age, gender, and education were not included in the analyses, although these factors are known to influence geriatric depression. Moreover, the potential overlap between constructs like rumination and negative spontaneous thoughts was not explicitly addressed, which may affect construct validity. Alternative explanations and the possibility of reverse causality were not explored and should be considered in future research. Finally, certain psychosocial and health-related factors impacting depression in the elderly (e.g., chronic illnesses, sleep disturbances, loneliness, physical activity) were beyond the scope of this study but warrant further investigation.

The main finding from the study suggests that decreasing rumination and negative spontaneous thoughts while increasing past acceptance and fostering a positive outlook on past experiences among the elderly can lead to a reduction in depression levels. The study indicates several areas in existing literature that require further exploration, emphasizing the need for future research to address these gaps. Recommendations include implementing educational programs aimed at enhancing the well-being of elderly individuals, promoting positive thinking, and reducing rumination, as well as developing community-wide initiatives to combat depression. It is also advised to institutionalize a culture of positivity and provide education to elderly

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individuals and their families while highlighting the importance of integrating strategies for addressing depression in the overall planning for improving the elderly' quality of life.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations in this study were that participation was entirely optional. This study has been approved by the Ethics Committee of Central Tehran Brach, Islami University of Medical Sciences (code number: IR.CTB. REC.1403.316).

Transparency of Data

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

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