Journal Website

Article history:
Received 20 July 2024
Revised 15 September 2024
Accepted 13 November 2024
Published online 28 December 2024

Iranian Journal of Neurodevelopmental Disorders

Volume 3, Issue 4, pp 65-78

Journal of Neurodevelopmental Disorder

E-ISSN: 2980-9681

# The Mediating Role of Psychological Flexibility and Emotional Flexibility in the Relationship Between Metacognitions and Emotional Schemas with Rumination

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A r t i c l e  I n f o

**Article type:**
*Original Research*

**How to cite this article:**
Eshghifar, R., Mohammadkhani, S., & Hasani, J. (2024). The Mediating Role of Psychological Flexibility and Emotional Flexibility in the Relationship Between Metacognitions and Emotional Schemas with Rumination. *Iranian Journal of Neurodevelopmental Disorders, 3*(4), 65-78.
https://doi.org/10.61838/kman.jndd.3.4.7

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A B S T R A C T

**Purpose:** The present study aimed to investigate the mediating role of psychological flexibility and emotional flexibility in the relationship between metacognitions and emotional schemas with rumination.

**Methodology**: This research was done in the form of structural equation modeling (SEM). Participants were 578 people from the non-clinical population residents of Tehran who were selected by voluntary sampling method. Then they completed the Ruminative Response Scale, Positive Beliefs about Rumination Scale, Negative Beliefs about Rumination Scale, Emotion Schemas Scale - Persian version, Acceptance and Action Questionnaire II, Emotional Flexibility Scale.

**Findings**: The results of the model evaluation indicated that metacognitions, emotional schemas, psychological flexibility and emotional flexibility directly have a significant effect on rumination. The mediating role of psychological flexibility and emotional flexibility was significant in the relationship between metacognitions and rumination. The mediating role of emotional flexibility in the relationship between emotional schemas and rumination was not significant, but the mediating role of emotional flexibility in the relationship between metacognitions and rumination was significant.

**Conclusion**: Based on the findings of this study, modifying metacognitions along with increasing psychological flexibility and emotional flexibility, as well as modifying maladaptive emotional schemas along with increasing psychological flexibility, can be effective in creating preventive strategies and rumination management.

***Keywords:*** *Rumination, Metacognitions, Emotional schemas, Emotional flexibility, Psychological flexibility.*

## 1. Introduction

Rumination is termed as recurrent and repetitive thinking on symptoms, feelings, problems, upsetting events, and negative aspects of the self, typically with a focus on their causes, circumstances, meanings, and implications. Rumination is one example of repetitive thinking about negative content, along with worry, perseverative cognition, and obsessions (Watkins, 2024). Rumination has multiple negative consequences in clinical and non-clinical populations: exacerbating psychopathology by magnifying and prolonging negative mood states, interfering with problem-solving and instrumental behavior and reducing sensitivity to changing contingencies; interfering with therapy and limiting the efficacy of psychological interventions; exacerbating and maintaining physiological stress responses (Watkins & Roberts, 2020). Rumination as an important trans-diagnostic process is associated with alcohol abuse, anxiety symptoms, generalized anxiety disorder, social anxiety disorder, obsessive-compulsive disorder, post-traumatic stress disorder, schizophrenia, borderline personality disorder, bulimia nervosa, depression, psychosis, insomnia, and impulsive behaviors (Watkins & Roberts, 2020). Therefore, considering the effective role of rumination in creating emotional and cognitive problems in non-clinical population, as well as the effective role of rumination in psychological disorders; examining the variables that play a fundamental role in starting and maintaining rumination, can be useful in create a clearer understanding of this process and prevention, management and its treatment.

Studies indicate that thinking styles in the form of rumination/worry, threat monitoring and unhelpful thinking control strategies are controlled by dysfunctional metacognitive beliefs (Wells & Matthews, 1996, 2015; Wells & Nordahl, 2023). Metacognition is defined as the capacity to monitor and reflect on one's performance and abilities, and it also refers to the awareness of one's thought processes, in other words, the ability to monitor and control one's cognitive processes (Dunlosky & Metcalfe, 2009; Flavell, 1979). Cognitive Attentional Syndrome (CAS), includes increased self-focus, repetitive negative thinking, and maladaptive coping behaviors, which a person uses as an attempt to manage thoughts and feelings of helplessness (Wells, 2009; Wells & Nordahl, 2023), which is a kind of perseverative thinking style in the form of rumination, worry, threat monitoring, thought control strategies, avoidance and seeking reassurance, which play a role in emotional disorders (Wells, 2009; Wells & Matthews, 2015).

On the other hand, people's evaluation of emotions plays a role in confirming negative beliefs about emotions and emotional challenges and using rumination in response to them. (Leahy, 2012, 2016, 2019). The Emotional Schema Model is a social-cognitive model of how individuals perceive, interpret, evaluate, and respond to their emotions and the emotions of others; which proposes that individuals differ in their theories about emotions and emotions regulation and that these psychological theories give rise to problematic strategies to cope with emotion, such as rumination, suppression, avoidance, blaming (Leahy, 2019).

According to the research literature, it seems that in addition to maladaptive evaluations of emotions and cognitive processes, which appear in the form of maladaptive emotional schemas and ineffective metacognitions and become the basis for the creation and continuation of rumination, there is a kind of inflexibility and inability to change negative emotional and psychological and metacognitive states that lead to people get stuck in the rumination cycle. Therefore, the current research has examined this existing gap in the studies, and examined psychological and emotional flexibility as a mediating variable in the relationship between metacognitions and emotional schemas with rumination, which is considered a new model in this field.

Individuals with rumination demonstrate greater inflexibility compared to individuals without rumination, and these effects were unrelated to intelligence and recent depressed mood (Davis & Nolen-Hoeksema, 2000). Psychological flexibility is defined as the ability to fully engage with the present moment as a mindful human, without unnecessary defense mechanisms and by maintaining or changing behavior in line with chosen values in life (Sabucedo, 2017) and accepting and adapting to challenging situations (Burton & Bonanno, 2016). It is also described as the ability to change patterns of behavior and the ability or inclination to engage with emotions, thoughts, or feelings, whether wanted or unwanted (Edwards & Lowe, 2021; Fang & Ding, 2022). Rumination has a negative impact on psychological flexibility (acceptance), and as rumination increases, psychological flexibility decreases (Tekin, 2022).

Regarding the relationship between metacognitions and psychological flexibility, research indicates that: Flexibility is primarily associated with cognitive and metacognitive capacities for adaptive thinking and coping strategies in



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response to dynamic and changing situational demands (Coleman & Oliveros, 2020; Dugan, 2023). Attention capacity and psychological flexibility are considered important factors in modifying metacognitions (Wells & Matthews, 1996). Individuals with rumination may lack flexible metacognitive control and allocate attentional resources to self-focused rumination (Papageorgiou & Wells, 2004).

On the other hand, regarding the relationship between emotional schemas and psychological flexibility, studies indicate that, maladaptive emotional schemas indirectly affect psychological distress through the mediating role of resilience and cognitive flexibility. In contrast, adaptive emotional schemas, instead of resilience, have an impact on psychological distress through the mediating role of cognitive flexibility (Mohammadkhani et al., 2022). Individuals with high levels of mindfulness and psychological flexibility demonstrate more adaptive dimensions of emotional schemas, while individuals with lower psychological flexibility and lower levels of mindfulness show less adaptability and more inflexible responses to emotional experiences (Silberstein et al., 2012).

The concept of emotional flexibility has been defined by studies as the ability to regulate emotions flexibly in accordance with the demands of situational and release from the initial emotional responses when the situation changes, thus creating the best possible adaptation to the ever-changing environment (Aldao et al., 2015; Beshai et al., 2018). Emotional inflexibility is associated with a tendency to use rumination in daily life. Lower efficiency in shifting attention from processing emotional aspects to non-emotional aspects of negative items is associated with increased use of rumination in response to unpleasant events in daily life (Genet et al., 2013).

Regarding the relationship between metacognitions and emotional flexibility studies show that, Greater confirmation of positive and negative metacognitive beliefs is associated with more difficulties in emotion regulation and emotional inflexibility in the general population (Akbari, 2017; Salguero et al., 2019). The relationship between metacognition and worry/rumination is mediated by emotional flexibility and emotional styles (Mohammadkhani et al., 2022).

On the other hand, about the relationship between emotional schemas and emotional flexibility studies indicate that, the ability to evaluate and interact with negative emotions in a flexible manner, enables individuals to act based on what is meaningful to them and may increase behavioral flexibility (Bluett et al., 2014). Inflexible or polarized evaluations of negative emotional experiences (such as evaluating events and emotional experiences as all good or all bad) are associated with several maladaptive consequences, including emotional inflexibility and rumination following distressing events (Coifman et al., 2007; Dasch et al., 2010; Pitzer & Bergeman, 2014).

Therefore, rumination as a traumatic thought pattern in clinical and non-clinical population needs more multifaceted investigation. In the research literature, the rumination process and its relationship with disorders have been investigated, but the issue of what factors and variables make people susceptible to getting stuck in the rumination process, also, the role that emotional and psychological inflexibility plays in the relationship between metacognitions and emotional schemas with rumination has been less investigated. Therefore, the present research in the form of a structural equation model has investigated the mediating role of psychological flexibility and emotional flexibility in the relationship between metacognitions and emotional schemas with rumination to fill the gap in the studies.

The hypotheses of this study were as follows: 1) There is a direct relationship between emotional schemas and metacognitions with rumination. 2) There is a direct relationship between psychological flexibility and emotional flexibility with rumination. 3) Psychological flexibility and emotional flexibility play a mediating role in the relationship between emotional schemas and rumination. 4) Psychological flexibility and emotional flexibility play a mediating role in the relationship between metacognitions and rumination.

## 2. Methods and Materials

### *2.1. Study Design and Participants*

The research participants in this study were non-clinical population individuals, including females and males aged 18 to 50, residing in Tehran.This research was done using voluntary sampling method. Questionnaires were placed online on a humanities research website, and people aged 18-50 living in Tehran according to geographic regions (north, south, east and west) who expressed their consent to participate in this study by presenting Gender, education level, age and residential area completed the questionnaires. Participants were assured that the questionnaires and their responses were completely confidential and anonymous. All participants completed the questionnaires simultaneously.



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According to Kline's (2011) recommendation, the minimum sample size for Structural Equation Modelling (SEM) is 200 participants. Additionally, he suggests estimating the number of 5 to 10 participants for each parameter to be estimated (Kline, 2011). Considering the parameters of the research model, the sample size should range between 350 and 700 participants. Therefore, 578 individuals (381 females and 197 males) were recruited as the sample. The average age and standard deviation for males were 28 and 8.52, respectively, and for females, they were 25 and 6.89, respectively.

The sample of the present study consisted of 197 males (34.1%) and 381 females (65.9%). The average age and standard deviation for males were 28 and 8.52, respectively, and for females, they were 25 and 6.89, respectively. In terms of education, 4 people (0.7%) of them have primary education, 14 people (2.4%) have cycle degrees, 115 people (19.9%) have diplomas, 52 people (9.0%) have degrees. Graduates, 252 (43.6%) had a bachelor's degree, 104 (18.0%) had a master's degree, and 37 (6.4%) had a doctorate. Also, in terms of geographical location, 66 people (11.4%) of them are in the south, 108 people (18.7%) in the east, 96 people (16.6%) in the north, 181 people (31.3%) West and 127 people (22%) lived in the center of Tehran.

### *2.2. Measures*

***The Ruminative Response Scale (RRS).*** The Ruminative Response Scale (RRS) is a self-report scale used to assess the trait of rumination. This questionnaire is a subscale of the Response Styles Questionnaire (RSQ) developed by Nolen-Hoeksema and Morrow (1991). The RSQ consists of two subscales: The Rumination Response Scale (RRS) and the Distracting Response Scale (DRS). The RRS questionnaire consists of 22 items, and respondents are asked to rate each item on a Likert scale from 1 (*never*) to 4 (*almost always*) (Nolen-Hoeksema & Morrow, 1991). The total score on the RRS ranges from 22 to 88, with higher scores indicating a greater tendency for rumination. Its Cronbach's alpha and retest reliability coefficients were 0.9 and 0.67, respectively (Yook et al., 2010). The internal consistency of brooding and reflection subscales of the Persian version of RRS were reported to be 0.79 and 0.69, respectively (Mohammadhkani et al., 2013). Additionally, in the current study, the Cronbach's alpha coefficient for the total score of the questionnaire was 0.91.

***Negative Beliefs about Rumination Scale (NBRS).*** This scale, designed by Papageorgiou and Wells (2001a), consists of 13 items rated on a Likert scale from 4 = (strongly agree) to 1 (strongly disagree). It also includes two subscales that measure negative metacognitive beliefs related to rumination. These subscales assess metacognitive beliefs about the uncontrollability and vulnerability of rumination and its social and interpersonal consequences. The total score of this scale is derived from the sum of these two factors and ranges from 13 to 52. The Cronbach's alpha coefficients for each of the subscales were calculated as 0.81 and 0.87, respectively (Papageorgiou & Wells, 2001b). In Iran, the internal consistency of this scale is 0.83 (Yousefi, 2005). In the present study, the Cronbach's alpha coefficient for this scale was 0.90, and for the subscales related to positive metacognitive beliefs, it was 0.92, while for the subscales related to uncontrollability and vulnerability of rumination and its social and interpersonal consequences, it was 0.84 and 0.87, respectively.

***Positive Beliefs about Rumination Scale (PBRS).*** The PBRS questionnaire, developed by Papageorgiou and Wells (2001b), consists of 9 items rated on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). This scale is used to assess the attitudes of individuals with depression towards the usefulness of rumination. PBRS has high internal consistency (0.83). Its reliability over six weeks was found to be 0.85 (Papageorgiou & Wells, 2001a). Another study reported an internal consistency of 92% for this scale (Roelofs et al., 2010). The score range is from 9 to 36, with higher scores indicating a stronger belief in the effectiveness of rumination. In Iran, the internal consistency of this test is reported to be 0.89, and its reliability is 0.85 (Yousefi, 2005). In the present study, Cronbach's alpha coefficient for this scale was 0.91.

***Emotion Schemas Scale - Persian version (ESS-P).*** Leahy (2002) prepared the scale of emotional schemas (LESS) to measure fourteen emotional schemas and reported the reliability of this scale as 0.81 using Cronbach's alpha coefficient (Leahy, 2002). The Persian version of this questionnaire was prepared by Khanzadeh et al. (2012) including 13 emotional schemas and 37 items. 13 subscales, including emotional self-awareness, validation by others, comprehensibility, controllability, simplistic view of emotions, higher values, guilt, demands rationality, consensus, acceptance of feelings, rumination, expression of feeling, and blame. Each item is scored on a 5-point Likert scale ranging from 0 (*completely disagree*) to 4 (*completely agree*). The score range for this questionnaire is between 0 and 148. A higher score indicates a higher level of emotional schemas and vice versa. The internal consistency coefficient,



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measured using Cronbach's alpha, was 0.82 for the total scale and ranged from 0.59 to 0.73 for the subscales (Khanzadeh et al., 2013). In the present study, Cronbach's alpha coefficient for the total Emotional Schema Scale was found to be 0.84; for the subscales, it ranged from 0.66 to 0.89.

***Acceptance and Action Questionnaire - II (AAQ-II).*** This questionnaire, used to measure psychological flexibility, was developed by Bond et al. (2011) and is a 10-item version of the original Acceptance and Action Questionnaire (AAQ-I) created by Hayes et al. (2004). This questionnaire measures constructs such as diversity acceptance, experiential avoidance, and psychological inflexibility. The average Cronbach's alpha coefficient was 0.84, and its reliability at 3- and 12-month intervals was 0.81 and 0.79, respectively (Bond et al., 2011). In Iran, Abasi et al. (2012) standardized this questionnaire and reported an internal consistency of 0.89 (Abasi et al., 2012). In the present study, the Cronbach's alpha coefficient for this scale was 0.73.

***Emotional Flexibility Scale (EFS).*** To measure emotional flexibility, individuals visiting healthcare centers in Hamedan were administered the Emotional Flexibility Scale (EFS), a scale developed by Rashid and Bayat (2019). This scale comprises 24 items. A 6-point Likert scale, ranging from 1 (*strongly disagree*) to 6 (*strongly agree*) was used for scoring the scale. The minimum score on this scale is 24, and the maximum score is 144. The higher the individual's agreement with the items, the higher their score on the Emotional Flexibility Scale. Exploratory factor analysis identified three subscales for emotional flexibility: positive emotion regulation, negative emotion regulation, and emotional communication. Cronbach's alpha coefficient for the overall scale was found to be 0.866, indicating the high reliability of the Emotional Flexibility Scale (Rashid & Bayat, 2019). The current study's Cronbach's alpha coefficient for the Emotional Flexibility Scale was 0.88. Positive emotion regulation, negative emotion regulation, and emotional communication were 0.80, 0.73, and 0.74, respectively.

### *2.3. Data Analysis*

A two-step approach to structural equation modeling proposed by (Anderson & Gerbing, 1988) was used to evaluate the conceptual model. In this model, the validity and reliability of the research measures were first examined using confirmatory factor analysis (CFA). Then, the proposed conceptual model in this study was tested using structural equation modeling with the LISREL 8.85 software. To analyze the structural model of the research, were considered the latent variables of emotional schemas and metacognitions as exogenous variables, the latent variable of emotional flexibility and psychological flexibility as the intermediate dependent variable or mediating variable, and the latent variable of rumination as the endogenous or final dependent variable. It has been assumed that the variables of emotional schemas and metacognitions affect rumination both directly and indirectly through the mediating variables of emotional flexibility and psychological flexibility.

## 3. Findings and Results

After setting up the structural equations, the desired model was tested using the maximum likelihood estimation (MLE) method. The fit of the model was examined based on fit indices. The following criteria are commonly used to assess model fit: the chi-square index (χ^2), the root mean square error of approximation (RMSEA; good fit: ≤ 0.08), the standardized root mean square residual (SRMR; good fit: ≤ 0.08), the goodness-of-fit index (GFI; good fit: ≥ 0.90), the comparative fit index (CFI; good fit: ≥ 0.90), the normed fit index (NFI; good fit: ≥ 0.90), and the incremental fit index (IFI; good fit: ≥ 0.90; Table 1).

**Table 1**

*Fit indices for Measurement Model and Structural Model*

| Fit indices | Acceptable domain | Value |
|---|---|---|
| $\chi^2$ | - | 1096.92 |
| DF | - | 290 |
| χ/df | Less than | 3.78 |
| NFI | Larger than 0.90 | 0.91 |
| CFI | Larger than 0.90 | 0.92 |
| IFI | Larger than 0.90 | 0.92 |
| GFI | Larger than 0.90 | 0.89 |
| RMSEA | Less than 0.08 | 0.071 |
| SRMR | Less than 0.08 | 0.067 |

*Note*. DF: The degree of freedom, NFI: Normative Falling Index, CFI: Adaptive Talented Index, IFI: Increasing grace index, GFI: The goodness of fit index, RMSEA: The Root Mean Square Error of Approximation, SRMR: Standardized Root Mean Squared Residual



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The fit indices presented in Table 1 demonstrate an appropriate measurement model fit. Therefore, except for the GFI index, which falls within the range of close acceptance, the remaining indices are within the acceptable range. However, it should be noted that the GFI index is heavily influenced by sample size and, therefore, cannot be a reliable index for the model's conclusion. Overall, it can be concluded that the observed variables can measure the respective latent variables.

Since the structural equation modeling is based on the correlation between variables, to determine the relationship between the research variables, first, the correlation matrix between the existing variables is reported in Table 2. Additionally, their means, standard deviations, skewness, and kurtosis are displayed in Table 3. These data show that all correlations include a moderate value ($0.540 \geq r \geq 0.513$).

**Table 2**

*Descriptive statistics and correlation matrix of research variables*

| Row | Variables | 1 | 2 | 3 | 4 | 5 | Means | Standard Deviation |
|---|---|---|---|---|---|---|---|---|
| 1 | Emotional Schemas | 1 | | | | | 73.16 | 15.23 |
| 2 | Metacognitions | $^{**}$0.291 | 1 | | | | 46.28 | 12.64 |
| 3 | Emotional Flexibility | $^{**}$-0.234 | $^{**}$-0.301 | 1 | | | 92.26 | 17.22 |
| 4 | Psychological Flexibility | $^{**}$-0.521 | $^{**}$-0.375 | 0.068 | 1 | | 33.05 | 8.47 |
| 5 | Rumination | $^{**}$-0.396 | $^{**}$0.466 | $^{**}$-0.122 | $^{**}$-0.496 | 1 | 44.47 | 10.10 |

*Note*. $^{**}P < 0.01$ $^{*}P < 0.05$

As shown in Table 2, there is a significant positive relationship between emotional schemas and rumination. There is also a significant negative relationship between emotional schemas and emotional flexibility, as well as psychological flexibility. Furthermore, there is a significant negative relationship between metacognition, emotional flexibility, and psychological flexibility. On the other hand, there is a significant positive relationship between metacognition and rumination. Finally, a significant negative relationship exists between emotional flexibility and psychological flexibility with rumination.

Before conducting structural equation modeling, appropriate indicators for the latent variables of the current study need to be selected. In this study, a confirmatory factor analysis (CFA) was used to assess the adequacy of the indicators for measuring the underlying latent variables.

The components of the scales for rumination, positive and negative metacognitions, psychological flexibility, and emotional flexibility were assessed through CFA. Since all the components of these scales had factor loadings above 0.30, they were selected as observable variables. However, in the emotional schemas scale, the components (expression of emotions, validation by others, and comprehensibility) with factor loadings below 0.30 were removed in the final analysis, and the remaining components with factor loadings above 0.30 were selected as observable variables for emotional schemas.

Before evaluating the structural model, assumptions of structural equation modeling (sample size, univariate, and multivariate normality) were examined. The fulfillment of these assumptions validated the use of this statistical method for the current study. Typically, the univariate normality is assessed by examining the skewness and kurtosis of the observed variables. In the conceptual model, the skewness of the observable variables ranged from -0.488 to 0.884, and the kurtosis ranged from -0.838 to 0.554 (Table 3). Chou & Bentler (1995) state that a cutoff of ±3 is appropriate for skewness. For kurtosis, values greater than ±10 are generally problematic in structural equation modeling.

Additionally, multivariate normality was examined by calculating the relative multivariate kurtosis index, which yielded a value of 1.387 for the conceptual model. Chou & Bentler (1995) suggest that multivariate normality is achieved if this index is less than 3. The examination of the correlation matrix among the observed variables indicated no multicollinearity among them. The current study's hypothetical model's correlation coefficients ranged from 0.565 to 0.692. Correlation coefficients above 0.85 can cause multicollinearity issues and hinder accurate estimation of the model. Thus, the assumption of no multicollinearity was also met. Furthermore, Mahalanobis distance was calculated for



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each participant to identify multivariate outliers, excluding 7 participants from the analysis.

**Table 3**

*Descriptive indices of research variables*

| Variable | Components | Min | Max | skewness | kurtosis |
|---|---|---|---|---|---|
| Emotional Schemas | Rumination | 3 | 16 | 0.008 | -0.190 |
| | Emotional self-awareness | ۰ | 12 | -0.104 | -0.431 |
| | Guilt | ۰ | 12 | 0.057 | -0.520 |
| | Expression of emotions | ۰ | 8 | -0.353 | -0.435 |
| | Controllability | ۰ | 12 | 0.011 | -0.614 |
| | Validation by others | ۰ | 8 | 0.108 | 0.055 |
| | Comprehensibility | ۰ | 12 | 0.508 | -0.508 |
| | Blame | ۰ | 8 | -0.085 | -0.431 |
| | Demands rationality | ۰ | 16 | -0.097 | -0.720 |
| | Simplistic view of emotions | ۰ | 8 | -0.075 | -0.651 |
| | Higher values | ۰ | 12 | -0.188 | 0.554 |
| | Acceptance of emotions | ۰ | 12 | 0.378 | -0.126 |
| | Consensus | 0 | 8 | -0.013 | -0.287 |
| | Total Score | 36 | 120 | 0.214 | -0.124 |
| Metacognitions | Positive belief | 9 | 36 | 0.147 | -0.838 |
| | Lack of control and damage | 8 | 32 | 0.240 | -0.654 |
| | Social consequences | 5 | 20 | 0.884 | -0.271 |
| | Total Score | 22 | 79 | 0.371 | -0.644 |
| Emotional Flexibility | Regulation of negative emotions | 11 | 47 | -0.319 | -0.146 |
| | Regulation of positive emotions | 18 | 60 | -0.083 | -0.267 |
| | Emotion connections | 6 | 36 | -0.488 | 0.119 |
| | Total Scores | 38 | 132 | -0.604 | 0.199 |
| Psychological Flexibility | AAQ 1 | 4 | 28 | -0.445 | -0.135 |
| | AAQ 2 | 3 | 21 | -0.524 | -0.281 |
| | Total Scores | 9 | 47 | -0.503 | -0.150 |
| Rumination | Depression-related rumination | 10 | 40 | 0.201 | -0.332 |
| | Reflection and Brooding | 9 | 33 | 0.057 | -0.439 |
| | Total Scores | 19 | 69 | 0.059 | -0.311 |

As shown in Table 3, for both quality of life and health self-efficacy, there is a significant difference between the pre-test and post-test, the pre-test and follow-up, and the post-test and follow-up. This indicates that quality of life and health self-efficacy increased from the pre-test phase to the post-test and follow-up phases, as well as from the post-test to the follow-up phase.

At the group level, a significant difference was observed between the integrated spiritual self-care training and mindfulness-based cognitive therapy groups compared to the control group ($p < .01$). However, no significant difference was found between the two intervention groups regarding their effectiveness on quality of life and health self-efficacy. This finding suggests that both educational and therapeutic approaches were equally effective in improving quality of life and health self-efficacy.

After selecting indicators related to the study's conceptual model and conducting separate confirmatory factor analyses on each variable, an overall confirmatory factor analysis was finally performed on all research variables. This allowed for assessing the adequacy of the selected measurement model for the current variables by examining the fit indices of the confirmatory factor analysis (Figure 1).

**Figure 1**

*Research measurement model with standard coefficients*



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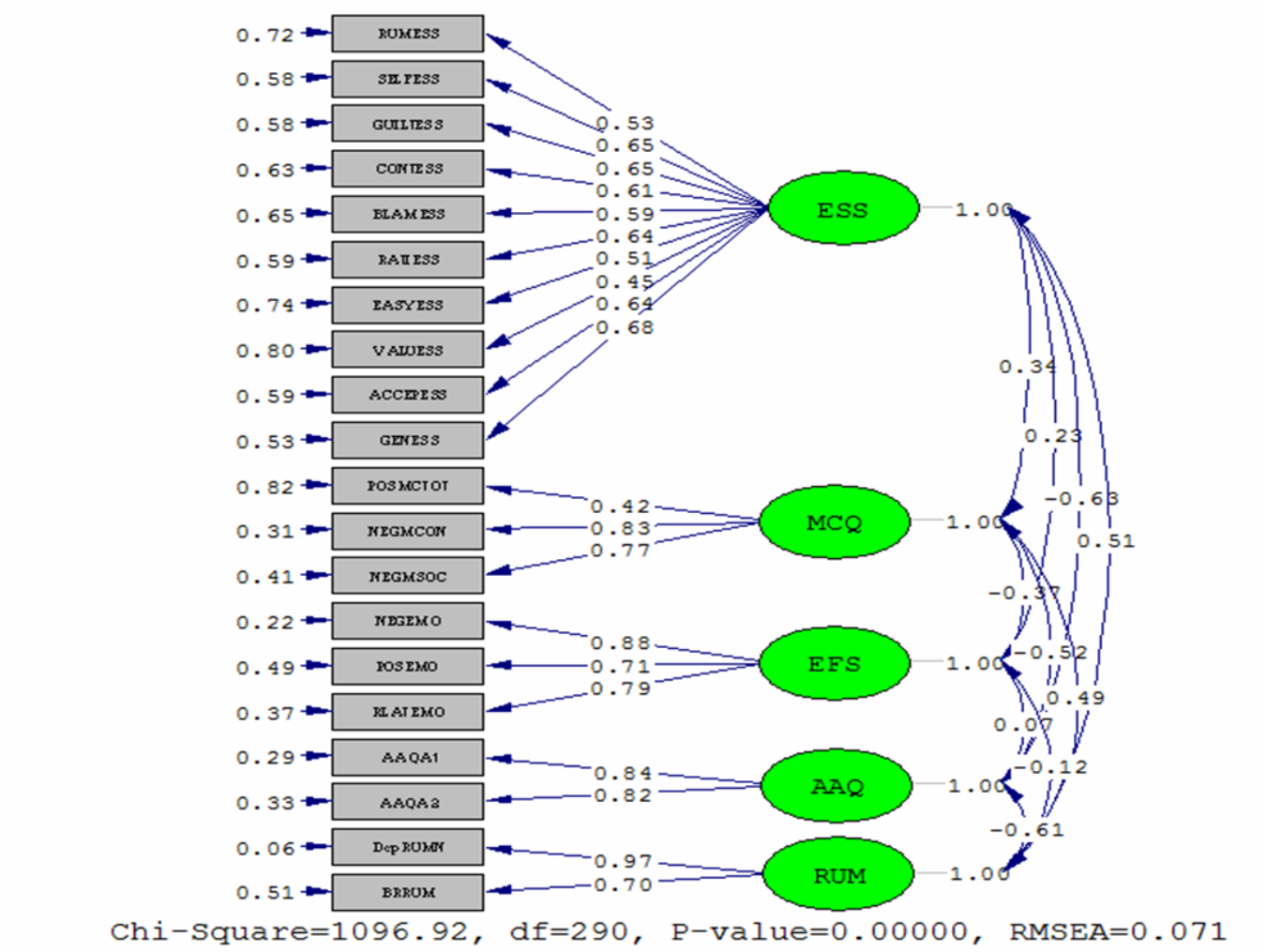


*Note*. ESS: Emotion Schemas Scale - Persian version; MCQ: Meta Cognition Scale; EFS: Emotional Flexibility Scale; AAQ: Acceptance and Action Questionnaire; RUM: The Ruminative Response Scale

**Table 4**

*Non-standard coefficients, standard coefficients, and T values of variables evident in the measurement model*

| Variable | Components | Non-standard coefficient | standard coefficient (factorial load) | T value |
|---|---|---|---|---|
| Emotional Schemas | Rumination | 1.27 | 0.53 | 12.80 |
| | Emotional self-awareness | 1.76 | 0.65 | 16.55 |
| | Guilt | 1.81 | 0.65 | 16.40 |
| | Controllability | 1.69 | 0.61 | 15.12 |
| | Blame | 1.06 | 0.59 | 14.77 |
| | Demands rationality | 2.08 | 0.64 | 16.31 |
| | Simplistic view of emotions | 0.89 | 0.51 | 12.37 |
| | Higher values | 0.81 | 0.45 | 10.71 |
| | Acceptance of emotions | 1.28 | 0.64 | 16.19 |
| | Consensus | 1.24 | 0.68 | 17.63 |
| Metacognitions | Positive belief | 2.86 | 0.42 | 9.61 |
| | Lack of control and damage | 4.54 | 0.83 | 20.57 |
| | Social consequences | 3.00 | 0.77 | 18.97 |
| Emotional Flexibility | Regulation of negative emotions | 5.77 | 0.88 | 24.33 |
| | Regulation of positive emotions | 5.83 | 0.71 | 18.50 |
| | Emotion connections | 4.12 | 0.79 | 21.08 |
| Psychological Flexibility | AAQ 1 | 4.25 | 0.84 | 22.28 |
| | AAQ 2 | 3.42 | 0.82 | 21.45 |
| Rumination | Depression-related rumination | 4.99 | 0.97 | 23.85 |
| | Reflection and Brooding | 3.66 | 0.70 | 16.97 |



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According to the results (Table 4), the selected indicators for each current variable have factor loadings above 0.30, indicating their ability to measure the relevant variables.

**Figure 2**

*The conceptual model of the research with standard coefficients*

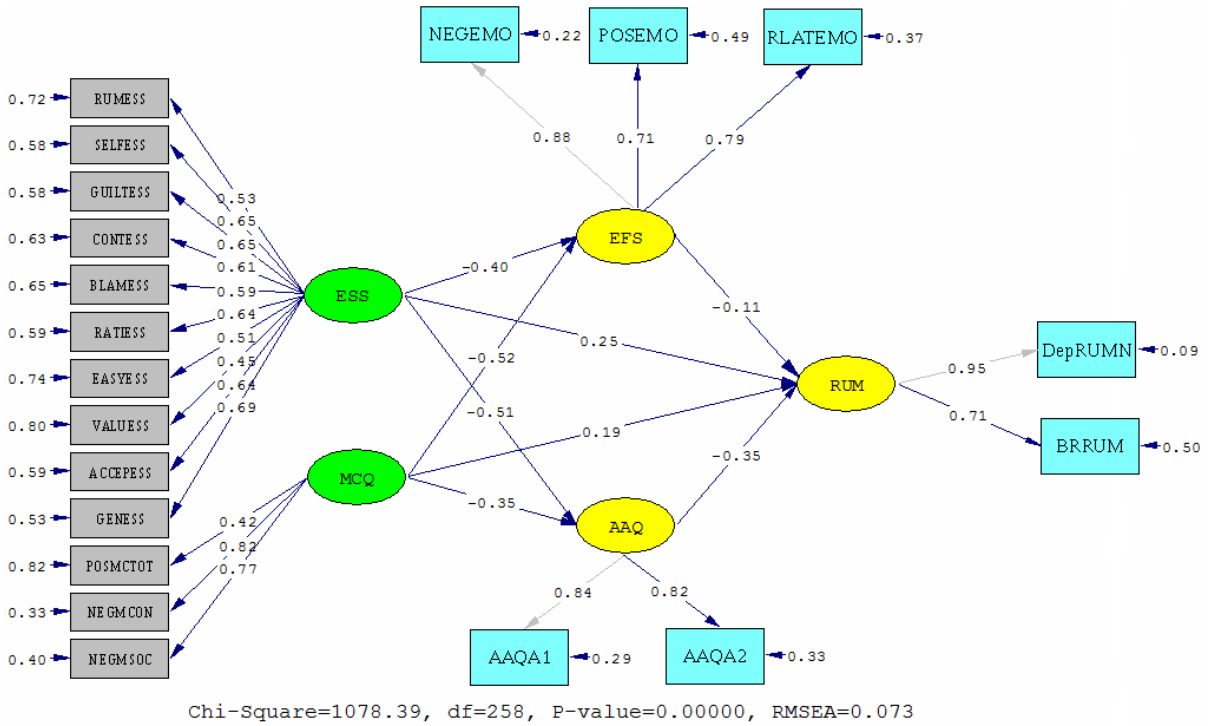
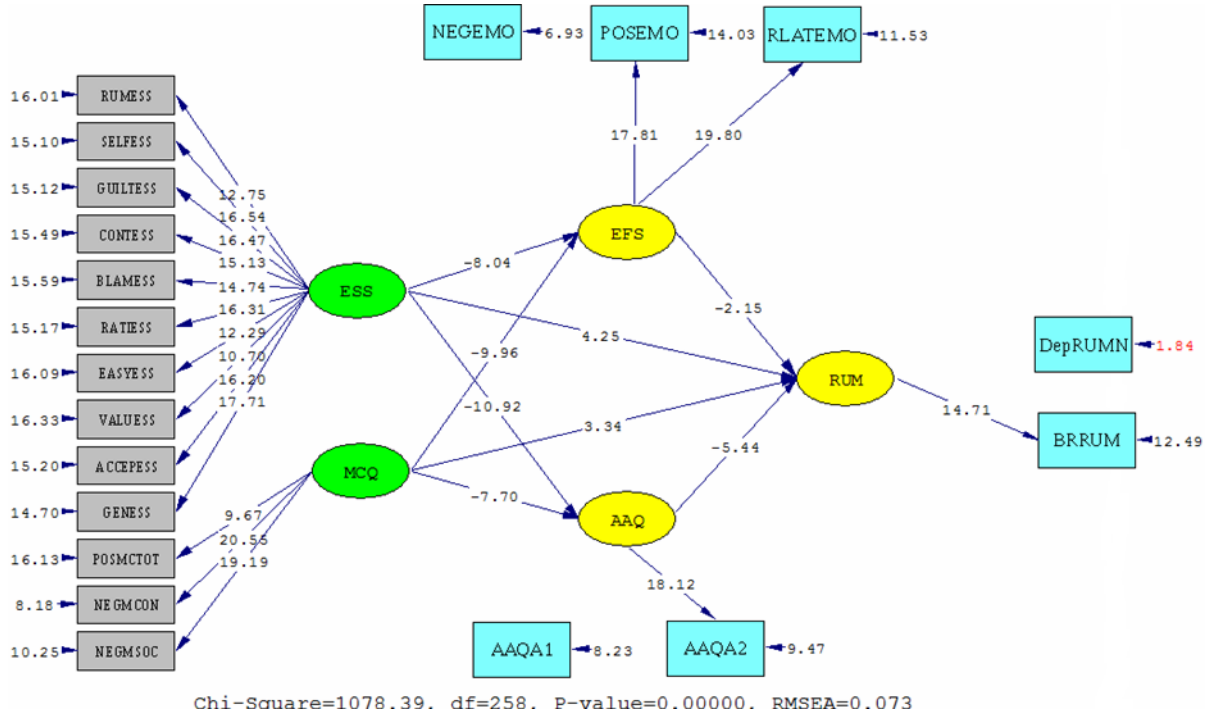



**Figure 3**

*Conceptual Model of Research with Critical T-Values*



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The conceptual mediation structural model was tested using the LISREL software. After adjusting the structural equations, the desired model was examined using the maximum likelihood estimation method, and the model fit was assessed at two levels. At the first level, the model's overall fit was examined based on the fit indices (Table 1). Therefore, using empirical data, the structural model shows a satisfactory fit in investigating the mediating role of emotional flexibility and psychological flexibility in the relationship between emotional schemas and metacognitions with rumination. At the second level, the fit of the research structural model was examined based on the significance of path coefficients (structural coefficients). The model's path coefficients and the endogenous variables' determination coefficients are shown above.

The results presented in the figures above show that all paths in the model have significant coefficients. The determination coefficients of the endogenous variables are also at an acceptable level. These results suggest that the current model can explain 44% of rumination. Additionally, the independent variables can explain 28% of emotional flexibility and 51% of psychological flexibility, respectively, indicating a satisfactory fit of the research structural model. As shown above, emotional schemas and metacognitions as exogenous variables significantly affect the mediating variable of emotional flexibility with standardized coefficients of -0.40 and -0.52 and t-values of -8.04 and -9.96, respectively.

On the other hand, emotional schemas and metacognitions as exogenous variables significantly affect the mediating variable of psychological flexibility with standardized coefficients of -0.51 and -0.35 and t-values of -10.92 and -7.70, respectively. Furthermore, emotional schemas and metacognitions as exogenous variables significantly affect the dependent variable of rumination with standardized coefficients of 0.25 and 0.19 and t-values of 4.25 and 3.34, respectively. Additionally, the mediating variables of emotional flexibility and psychological flexibility have significant effects on the dependent variable of rumination with standardized coefficients of -0.11 and -0.35 and t-values of -2.15 and -5.44, respectively.

The bootstrap test was employed in the present study to evaluate the mediating relationships. Bootstrap analysis provides the most potent and logical method for assessing indirect effects. The significance of these relationships can be examined through two approaches: the first involves examining significance levels, and the second involves examining confidence intervals. If both the upper and lower limits, with a 95% confidence interval, for the mediating path have the same sign (both positive or both negative) and zero is not within the range between these two bounds the path of interest is considered statistically significant at $p < 0.05$.

**Table 5**

*Bootstrap test results for mediating effects*

| Independent Variable | Mediating Variable | Dependent Variable | standard coefficient | standard error | confidence interval below 95% | confidence interval above 95% | p |
|---|---|---|---|---|---|---|---|
| Emotional Schemas | Emotional Flexibility | Rumination | 0.044 | 0.023 | -0.073 | 0.004 | 0.140 |
| Metacognitions | Emotional Flexibility | Rumination | 0.057 | 0.029 | 0.023 | 0.189 | 0.043 |
| Total sum of indirect coefficients | | | 0.101 | 0.051 | 0.058 | 0.227 | 0.006 |
| Emotional Schemas | Psychological Flexibility | Rumination | 0.178 | 0.042 | 0.107 | 0.246 | 0.001 |
| Metacognitions | Psychological Flexibility | Rumination | 0.122 | 0.034 | 0.067 | 0.179 | 0.001 |
| Total sum of indirect coefficients | | | 0.309 | 0.045 | 0.094 | 0.242 | 0.001 |

As indicated in the results (Table 5), the path of emotional schema to rumination is not significant with the mediation of emotional flexibility with standard coefficients of 0.044 at $p < 0.05$ level. Therefore, based on the bootstrap test results, emotional schemas with the mediation of emotional flexibility do not have a significant effect on rumination.

While the path of metacognitions to rumination is significant with the mediation of emotional flexibility with a standard coefficient of 0.057 at $p < 0.05$ level. Therefore, metacognitions have a significant effect on rumination by mediating emotional flexibility.

On the other hand, the path of emotional schemas and metacognitions to rumination with the mediation of



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psychological flexibility is significant with standard coefficients of 0.178 and 0.122 at $p < 0.01$ level respectively. Therefore, based on the bootstrap test results, emotional schemas and metacognitions have a significant effect on rumination through the mediation of psychological flexibility.

Moreover, emotional schemas and metacognitions have a significant effect on rumination through the mediation of emotional flexibility with a standard coefficient of 0.101 at $p < 0.01$ level.

Also, emotional schemas and meta-cognitions have a significant effect on rumination through the mediation of psychological flexibility with a standard coefficient of 0.309 at $p < 0.01$ level.

## 4. Discussion and Conclusion

This research was conducted in order to investigate components that play a role in the creation, continuation and maintenance of rumination and affect a person's tendency to rumination. Hence the structural and multifaceted relationships of the variables that play a direct and mediating role in the rumination process were investigated, in the form of a structural equation model (SEM), which, considering the harmful role of rumination in clinical and non-clinical populations, can be effective in clear explaining and managing of rumination.

Mental preoccupation with thoughts arising from positive metacognitive beliefs about the usefulness of repetitive thinking processes and negative metacognitive beliefs about the uncontrollability and danger of repetitive thinking (Wells, 2009) leads to increased cognitive activity towards maintaining negative thinking processes such as rumination and worry, while reducing attentional resources (Wells, 2019). In line with other studies, the results of this study regarding the direct effect of variables showed that the increasing positive and negative metacognitions is associated with an increase in the probability of engaging in rumination.

Emotional schemas have a fundamental function in guiding emotional processes; Individuals' evaluation of maladaptive emotional schemas is associated with a greater tendency to adopt avoidance-based coping strategies and rumination that distance the individual from emotional experiences and situations (Edwards & Lowe, 2021). The present study's results align with the results of studies conducted in this field, which shows increasing negative and maladaptive emotional schemas lead to increased rumination.

Acceptance and experiential avoidance are examples of psychological flexibility and inflexibility, respectively, which focus on how people react to complex thoughts and emotions, so psychological inflexibility plays a fundamental role in the rumination process (Bond et al., 2011). Therefore, the result of the present study, in line with other studies, indicates that decreasing psychological flexibility increases the likelihood of rumination.

People with emotional flexibility do not get stuck in negative emotions and can get rid of them faster and less likely to engage in rumination (Coifman & Bonanno, 2010). Maladaptive rumination may be caused by a defect in emotional flexibility and a change in processing mode when faced with negative emotional information (Watkins, 2024). Therefore, the result of the present research is in line with other studies that show decreasing emotional flexibility is associated with an increased likelihood of engaging in rumination.

The results of studies show a negative correlation between psychological flexibility, ineffective metacognition, and poor mental health (Aydin & Kaynak, 2021). Inefficient metacognitions lead to a decrease in psychological flexibility (Wells, 2019). The present research findings are considered a new finding in this field which states, increasing dysfunctional metacognitions leads to a decreasing psychological flexibility and increases the possibility of rumination. Therefore psychological flexibility mediates the relationship between metacognitions and rumination. So, it can be concluded that metacognitive beliefs determine the evaluation and control of attention and cognition, the processing of thoughts, and how one responds to thoughts. Thus, increasing positive and negative metacognitive beliefs about rumination (such as the utility and uncontrollability of rumination) can lead to a reduction in psychological flexibility, and this inflexibility, through deficits in inhibition or changes in coping responses, can trap individuals in the process of rumination.

Emotional schemas may be associated with a tendency to experiential avoidance of inner reality (psychological inflexibility), self-rejection, shame, and self-criticism, which may disrupt the regulation of psychological needs (Faustino, 2021). Psychological flexibility is associated with positive emotional schemas, and specifically, maladaptive emotional schemas such as lack of consensus, lack of high-level value, and incomprehensibility are associated with low psychological flexibility (Leahy, 2012). The present



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research also shows a new finding that increasing maladaptive emotional schemas leads to a decrease in psychological flexibility, thereby increasing the likelihood of engaging in rumination. Therefore, psychological flexibility mediates the relationship between emotional schemas and rumination. Therefore, it can be inferred that with an increase in maladaptive emotional schemas, the ability to engage with negative emotions and as well as the ability to observe without judgment and openness to experience, decreases, and leading to experiential avoidance of unpleasant experiences and psychological inflexibility. Psychological inflexibility causes difficulties in identifying and adapting to various situational demands and makes it difficult to change mental propositions. Thus, the individual becomes trapped in perseverative thinking, and increases the possibility of engaging in rumination.

The findings of this study indicated that emotional flexibility does not mediate the relationship between emotional schemas and rumination. So, current study's results did not confirm this hypothesis. One possible reason for this is that emotional flexibility, in combination with other variables in the structural model, did not have a significant role in this relationship, and this issue requires a separate investigation.

With the activation of dysfunctional metacognitive beliefs, negative emotional experiences become uncontrollable emotions and pathological in the form of (emotional inflexibility); therefore, metacognitions likely exert their influence through negative biases toward emotions (Ellis & Hudson, 2010). Metacognitive beliefs are associated with emotion regulation difficulties (Mansueto et al., 2022). The current research findings are considered a new finding in this regard that increasing dysfunctional metacognitive beliefs leads to a decrease in emotional flexibility, thereby increasing the likelihood of engaging in rumination. Therefore, emotional flexibility mediates the relationship between metacognitions and rumination. Therefore, increasing positive and negative metacognitive beliefs leads, Inability to control negative emotions according to situational demands and emotional inflexibility. Therefore, decreases person's capacity to change negative and incompatible emotions and create appropriate emotional responses; As a result, increases the probability of get stuck in negative emotions and using rumination as a coping strategy.

Based on the current research findings and existing literature on the variables under study, it can be concluded that modifying metacognitive beliefs along with increasing psychological flexibility and emotional flexibility, as well as modifying maladaptive emotional schemas along with increasing psychological flexibility, can be effective in preventing and managing of rumination.

This study had certain limitations that should be considered when interpreting the findings. Firstly, the sampling method used in this study was non-random. Secondly, the higher proportion of women compared to men in the sample could impact the generalizability of the results. Thirdly, the participants were non-clinical individuals, which may limit the generalizability of the findings to clinical populations and also the use of the findings in the treatment of rumination

Therefore, it is suggested that future research includes longitudinal studies using clinical samples and employs random sampling methods to enhance the generalizability of the findings and its use in the treatment methods of disorders in which rumination plays a role. Also, putting factors such as other emotional and cognitive variables related to rumination in the majority of a structural equation model can be useful in clarifying the process of rumination, its management and treatment, and related disorders.

## Authors' Contributions

All authors significantly contributed to this study.

## Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

## Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

## Acknowledgments

We hereby thank all individuals for participating and cooperating us in this study.

## Declaration of Interest

The authors report no conflict of interest.

## Funding

According to the authors, this article has no financial support.



E-ISSN: 2980-9681

## Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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