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Determining the Effect of Emotional Reactivity Mediated by Rumination on Drug Use Tendency

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ABSTRACT

Objective: The present study aimed to determine the effect of emotional reactivity on the tendency to use drugs with the mediating role of rumination in substance-dependent individuals.

Methods: The study was applied in terms of objective, and descriptive-correlational in terms of nature and method, using Structural Equation Modeling (SEM). The statistical population included all 3 (2024/2025). From this population, a sample of 380 individuals was selected using convene men with substance use disorder who were undergoing treatment and rehabilitation in medium-term residential centers (addiction treatment camps) in Karaj city in the year 140nce sampling. The research instruments included the 21-item Emotional Reactivity Scale (ERS) by R. K. Nock et al. (2008), the 22-item Rumination Response Scale (RRS) by Susan Nolen-Hoeksema & J. Marro (1991), and the 16-item Addiction Tendency Questionnaire by Farjad (1385 Iranian calendar year). The bootstrap method was used for data analysis.

Results: The results of the statistical analysis showed that emotional reactivity has a significant effect on the tendency to use drugs. The findings indicate that rumination, as a destructive cognitive mechanism, enhances the effect of emotional sensitivities on the propensity for drug use.

Conclusions: In fact, individuals with high emotional reactivity use drugs as a strategy to alleviate psychological pain due to their inability to manage repetitive thoughts. Therefore, it is suggested that interventions based on reducing rumination and emotion regulation should be prioritized in the treatment programs of drug rehabilitation centers.

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Introduction

Drug addiction is one of the most significant social and individual threats, regarded as one of the four crises of the third millennium. Addiction can be defined as the physical and psychological dependence associated with the repeated use of illicit drugs, and the main characteristic of substance use disorders is that individuals continue their substance use despite numerous associated problems (Arbab, MirzaHosseini, & Monirpour, 2021).

Emotional reactivity plays a role in the onset and continuation of behavioral problems, including addiction, as it is suggested that severe behavioral problems may be an attempt to avoid or escape the strong emotional reactivity associated with aversive experiences (Maghboli Hanzaei, Zanjani, & Omidi, 2020). Emotional reactivity is defined as the degree of emotion an individual experiences in response to emotional stimuli, quantified by the intensity and power of the emotion and the time it takes for the individual to return to baseline (emotional persistence) (Etesamipour & Einollahi Maryan, 2023). Emotional reactivity is an intra-personal component related to an individual's capacity for emotion regulation, enabling them to exhibit an appropriate affective response when interacting with others (Shapiro, Abramson, & Alloy, 2016). Emotional reactivity prepares humans and other species for action, helping them distinguish between positive and negative stimuli and directing them toward behavior relevant to those stimuli. Therefore, this construct is a multi-faceted concept leading to changes in subjective experience, behavior, and central and peripheral physiology (Mauss et al., 2005). Emotional reactivity is involved in the initiation and maintenance of behavioral problems, such that severe behavioral issues may be an effort to avoid or escape the strong emotional reactivity caused by aversive experiences. For instance, mood, anxiety, and eating disorders are attempts to avoid aversive emotional and cognitive states (Nock & Pinstein, 2005). Theoretically, emotional reactivity may contribute to the exacerbation of health anxiety by increasing anxiety arousal and ultimately the bodily sensations associated with arousal. Emotional reactivity can lead to the misinterpretation of certain sensations, causing the individual to perceive them as symptoms of an illness. Furthermore, emotional reactivity can play a role in the desire to reduce this anxiety through reassurance-seeking or avoidance behaviors (Abraian et al., 2017). A study by Vatandoust et al. (2023) on 250 high school students indicated that emotional control mediates the relationship between basic psychological needs and the tendency toward substance use among students. The results of Ebrahimpour et al.'s (2022) study showed a positive and

significant correlation between rumination and addiction tendency, between worry and addiction tendency, and between alexithymia and addiction tendency. Furthermore, difficulty in identifying emotions, difficulty in describing emotions, externally-oriented thinking, general worry, lack of worry, ruminative responses, and distracting responses predict addiction tendency. A study by Mina and Amini Manesh (2021) found a negative and significant correlation coefficient between emotional dysregulation and negative risky behaviors. Mousavinasab and Bahrami's research (2021) indicated a significant and negative correlation between the tendency to use drugs and emotional self-regulation, self-efficacy, and resilience.

Furthermore, a fundamental underlying factor involved in self-harming behaviors is the presence of rumination regarding the harm. This is because rumination pathologically alters an individual's cognitive foundation and is directly related to poor psychological adjustment and increased negative emotions such as anger and psychological distress (Reinz et al., 2017). Rumination is a maladaptive cognitive-emotional regulation strategy that individuals exhibit in response to experiencing negative affect (Pigniotti et al., 2022). Rumination is characterized as persistent and recurrent thoughts that revolve around a particular theme. These thoughts involuntarily enter consciousness and distract attention from current concerns and goals (Cron et al., 2022). Rumination includes cognitive processes and products such as negative automatic thoughts, self-focused attention, personal self-awareness, and worry, which are seen as a response to prevent the intensification of anxiety and depression symptoms in individuals. It is known as the constant preoccupation with a thought or topic and thinking about it, increasing the likelihood of the onset of psychological pathology symptoms and leading to or exacerbating mood disorders, including anxiety and depression (Masses et al., 2020).

The findings of Hazratbagi et al.'s study (2022) showed that the effect of spiritual intelligence on internet addiction tendency was significantly mediated by rumination. The study by Torkaman et al. (2022) on individuals with Post-Traumatic Stress Disorder (PTSD) showed a positive and significant relationship between substance misuse tendency, childhood trauma, and rumination, and a negative and significant relationship with cognitive flexibility. Moreover, childhood trauma was positively and significantly related to rumination and negatively related to flexibility. Path analysis results further indicated that rumination and cognitive flexibility mediate the relationship between childhood trauma and substance use tendency. The findings of Haeri Meybodi et al.

(2021) demonstrated a positive and significant relationship between relapse into addiction and referential thinking (repetitive negative thoughts, perceived inefficacy, and mental resource preoccupation). Chamani and Sajjadian's research (2019) showed that the impact coefficients of anxiety, neglect, peer relationship problems, bullying, and rumination on addiction proneness were significant.

The issue of narcotics and addiction, as one of the four crises of the 21st century, is a mental and social health problem and the most significant factor in creating high-risk behaviors that involve all societies, considered a public health issue across the globe and in all countries (Moghadam, 2022). The very serious consequences of addiction significantly impact not only individual and family health but also the growth of economic, social, and cultural security of society. Therefore, investigating the effective causes leading to addiction tendency is necessary and essential. On the other hand, a review of previous research shows that no direct study has been conducted on the relationship between these variables in the target population. Thus, the present study was conducted to determine the effect of emotional reactivity mediated by rumination on the tendency to use drugs.

Material and Methods

Research Method

This research is applied in terms of objective and descriptive-correlational in terms of nature and method, utilizing Structural Equation Modeling (SEM) to examine the mediating relationships.

Statistical Population

The statistical population of this study included all men diagnosed with substance use disorder who were undergoing treatment and rehabilitation in medium-term residential centers (addiction treatment camps) in Karaj city during the year 1403 (2024/2025).

Sample Size

Given the formulas for determining sample size in Structural Equation Modeling (which typically suggest 5 to 10 times the number of questionnaire items, or based on the Krejcie & Morgan table), a sample size of 300 individuals was selected to enhance the accuracy of the bootstrap test.

Sampling Method

Convenience sampling was employed. Several active camps in Karaj were randomly selected, and questionnaires were distributed among eligible individuals.

Research Instruments

Emotional Reactivity Scale (ERS)

This is a 21-item, single-factor instrument developed by Nock et al. (2008) that measures an individual's experience of emotional reactivity across three dimensions: sensitivity, intensity, and persistence of emotion. Each item is scored on a 4-point scale from 0 to 4, yielding a minimum score of 0 and a maximum score of 84. Items 18, 16, 15, 14, 13, 12, 9, 7, 5, and 2 measure the **sensitivity** dimension; items 21, 20, 19, 17, 6, and 3 measure the **intensity** dimension; and items 11, 10, and 18 measure the **persistence** dimension. Convergent and divergent validity for this instrument has been reported as satisfactory through correlations with the Behavioral Inhibition/Activation Questionnaire and the Temperament Questionnaire, and criterion validity was established through its relationship with self-harming thoughts and behaviors. The reliability of this instrument, assessed by Cronbach's Alpha, was reported as $\alpha = 0.94$. Furthermore, in Iran, Sajjadinejad and Vakbari (2022) reported adequate convergent and discriminant validity for this instrument and confirmed its factor structure through Confirmatory and Exploratory Factor Analysis. They reported the scale's reliability using internal consistency, split-half, and test-retest methods as $\alpha = 0.91$, $r = 0.87$, and $r = 0.86$, respectively.

Rumination Response Scale (RRS)

Nolen-Hoeksema and Marro (1991) developed a self-report questionnaire that assesses four different styles of responding to negative moods. The Response Styles Questionnaire consists of two subscales: the Rumination Response Scale and the Distraction Response Scale. The **Rumination Subscale** has 22 items, where respondents are asked to rate each item on a scale from 1 (Never) to 4 (Almost Always). Nolen-Hoeksema and Marro (1991) evaluated the internal consistency of this scale as good ($\alpha = 0.89$). The test-retest reliability in foreign samples ranged from 0.48 to 0.80; Lotfinia (2007) calculated its reliability coefficients by administering it to 54 students with a three-week interval as $r = 0.82$.

Addiction Tendency Questionnaire

This 16-item questionnaire was constructed by Farchad (2006) and its overall purpose is to examine the degree of inclination toward addiction across three dimensions: social, individual, and

environmental, in different individuals. The response format is a Likert scale (Very Low: 1 to Very High: 5). Items 1 to 5 measure the **environmental** dimension, items 6 to 9 measure the **individual** dimension, and items 10 to 16 measure the **social** dimension. To obtain the total score for the questionnaire, the scores of all items are summed up. This total score ranges from 16 to 80, where a higher score indicates a greater tendency toward addiction in the respondent, and vice versa. The questionnaire's validity was assessed via content validity under the supervision of advisory professors, and the final reliability coefficient obtained using Cronbach's Alpha was calculated as $\alpha = 0.79$(Mir Hesami, 2009).

Ethical Considerations

Before participation, informed consent was obtained from all individuals. Participants were fully informed about the objectives of the study, their right to withdraw from the research at any time without penalty, and the voluntary nature of their participation. Anonymity and confidentiality of all collected data were strictly ensured; names or identifying information were not recorded. The research protocol adhered to the ethical guidelines for research involving human subjects, and it was conducted with the approval of the Islamic Azad University ethics committee

Results

Table 1 presents the descriptive statistics for the Emotional Reactivity variable, including skewness and kurtosis alongside the mean and standard deviation of the scores. Based on the data obtained, the mean for Sensitivity is 14.97, Intensity is 12.63, Emotional Persistence is 13.46, and the overall mean score for Emotional Reactivity is 41.06. Furthermore, since the values for skewness and kurtosis are between +2 and -2, the data are considered to follow a normal distribution at the $\alpha = 0.05$level.

Table 1. Descriptive Statistics for Emotional Reactivity Scores

Statistical Index	Skewness	Kurtosis	Mean	Standard Deviation
Sensitivity	-0.562	-0.233	14.97	4.084
Intensity	-0.612	1.293	12.63	3.245
Emotional Persistence	-0.686	0.658	13.46	3.650
Emotional Reactivity (Total)	-0.768	1.633	41.06	8.211

Table 2 presents the descriptive statistics for the Rumination variable, including skewness and kurtosis alongside the mean and standard deviation of the scores. Based on the information obtained, the mean for Ruminative Responses is 22.74, Distracting Responses is 26.27, and the overall mean score for Rumination is 49.01. Additionally, since the values for skewness and kurtosis are between +2 and -2, the data are considered to follow a normal distribution at the $\alpha = 0.05$level.

Table 2. Descriptive Statistics for Rumination Scores

Statistical Index	Skewness	Kurtosis	Mean	Standard Deviation
Ruminative Responses	-0.192	-0.057	22.74	3.890
Distracting Responses	-0.181	0.702	26.27	5.293
Rumination (Total)	-0.115	0.469	49.01	8.424

Table 3 presents the descriptive statistics for the Drug Use Tendency variable, including skewness and kurtosis alongside the mean and standard deviation of the scores. Based on the data obtained, the mean for the Social dimension is 15.90, the Individual dimension is 11.04, the Environmental dimension is 19.98, and the overall mean score for Drug Use Tendency is 46.92. Furthermore, since the values for skewness and kurtosis are between +2 and -2, the data are considered to follow a normal distribution at the $\alpha = 0.05$level.

Table 3. Descriptive Statistics for Drug Use Tendency Scores

Statistical Index	Skewness	Kurtosis	Mean	Standard Deviation
Social	-0.487	0.353	15.90	2.646
Individual	-0.310	0.061	11.04	1.907
Environmental	-0.202	0.599	19.98	3.925
Drug Use Tendency (Total)	-0.272	0.472	46.92	7.233

Subsequently, the bootstrap method was used to determine the statistical significance of the indirect effect of Emotional Reactivity, mediated by Rumination, on Drug Use Tendency. The resulting outcomes are presented below.

Table 4. Indirect Path Coefficient of Emotional Reactivity on Drug Use Tendency via Rumination

Path	Unstandardized Coefficient	Standardized Coefficient	Significance Level
Emotional Reactivity →Rumination →Drug Use Tendency	0.236	0.208	$p < 0.01$

Based on the results obtained, the coefficient for the indirect effect of Emotional Reactivity on Drug Use Tendency through the mediating variable of Rumination is significant at the $\alpha = 0.01$level ($p < 0.01$). Therefore, the indirect effect of Emotional Reactivity on Drug Use Tendency, mediated by Rumination, is confirmed.

Discussion

Based on the results obtained, the indirect effect of Emotional Reactivity on Drug Use Tendency, mediated by the variable of Rumination, is statistically significant. Specifically, an increase in emotional reactivity leads to an increase in rumination, which in turn elevates the tendency for drug use.

While no study has directly investigated this specific mediating pathway in isolation, the findings can be interpreted through existing theoretical frameworks. Individuals with low levels of self-regulation, characterized notably by high emotional reactivity, tend to pay less attention to the consequences of their behaviors and strive for immediate gratification of their desires. Consequently, such individuals often fail to consider the long-term negative consequences of drug use. Instead, their primary motivation is to experience immediate pleasure derived from substance consumption.

Furthermore, rumination involves repetitive, cyclic, self-focused, and depressive thoughts that play a fundamental role in depression. This cognitive process fosters maladaptive emotion regulation and sustains negative affect regarding existing problems, thereby increasing susceptibility to substance use. In other words, in substance users, the generation of recurring or ruminative thoughts often triggers self-harming behaviors. Given that controlling these thoughts is difficult for individuals and they tend to persist over long periods, they generate numerous emotional problems over time. To alleviate the distressing and chaotic nature of these intrusive thoughts, individuals engage in behaviors that dampen the unpleasant emotions stemming from these negative thoughts. In this way, they essentially vent their emotional turmoil through self-

harm or substance use. As noted by Cheung and Cheung (2008), self-harmful behaviors often serve as emotion-regulating mechanisms for the distress caused by rumination.

Limitations and Future Directions

It is important to note that this study was conducted specifically on drug users in rehabilitation camps. Therefore, caution should be exercised when generalizing these results to other populations or groups. Finally, it is recommended that future research be conducted on other vulnerable or affected groups to further validate and expand upon these findings.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the ethics committee of Islamic Azad University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection, and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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