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Modeling Substance Use Temptation in Addicts with Relapse History Based on Attention Bias, Emotional Processing Styles, Mediated by Social Support

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A B S T R A C T

Objective: The aim of this study was to present a model of temptation and likelihood of substance use in dependent individuals with a history of relapse based on attention bias and emotional processing styles, with the mediating role of social support.

Methods and Materials: The research method was descriptive and correlational. The statistical population included addicted individuals referred to addiction treatment centers (residential camps) in the city of Rasht. A simple random sampling method was used, and based on the Morgan table, 201 individuals were selected. Data were collected using the following standardized questionnaires: Post-Addiction Temptation to Use Substance Questionnaire, Shostrom Attention Bias Questionnaire (translated by Rezvani), Baker's Emotional Processing Styles Questionnaire, and Wax's Social Support Questionnaire. For statistical data analysis, structural equation modeling and LISREL software were used.

Findings: The results indicated that all the paths in the overall sample were statistically significant. In the final research model, the relationship between variables of temptation and likelihood of substance use in dependent individuals with a history of relapse, based on attention bias and emotional processing styles, with the mediating role of social support, was significant. The highest coefficient (-0.76) was related to the path of social support, while the weakest coefficient (-0.39) was related to the path of attention bias. Therefore, all direct paths were significant ($p < 0.50$). In the proposed research model, there were two indirect or mediating paths, and to determine the significance of mediating relationships and the indirect effect of the independent variable on the dependent variable through the mediator, the bootstrap method was used ($p < 0.01$).

Conclusion: It can be concluded that the model has good fitness. Based on the standard coefficients, the direct and indirect paths of the proposed model were significant.

Keywords: *Social Support, Likelihood of Substance Use, Addiction Relapse, Cognitive Emotion Regulation, Temptation, Attention Bias, Dependency.*

1. Introduction

Addiction as one of the four major crises of the twenty-first century has affected all societies. Addiction is a physical, psychological, social, and spiritual disease, characterized as a chronic and recurrent disorder with profound social, psychological, physical, and economic impacts (Mohammadkhani et al., 2011). Addiction is a condition where a person becomes physically and psychologically dependent on a substance, has a strong and compulsive need to continue using that substance, and cannot quit it at will. Gradually, their tolerance decreases (Atadokht et al., 2015).

During the treatment process, after reaching a state of abstinence, patients often experience a strong desire to re-experience the effects of the substance. One of the experiences of substance dependence is temptation, which plays a key role in the continuation of dependence, substance abuse, and relapse (Evans & Cahill, 2016). Hormes and Rozin (2010) define temptation as a very strong feeling and wanting of something, making it impossible to concentrate on anything other than the desired object. According to this definition, addicted individuals constantly have the image of substance use in their minds. Studies have shown that temptation disrupts attention in dependent individuals (Weiss et al., 2013). Temptations, by creating biases in attention and selective information processing through association with cues and relatively more attractive processing of related information, can influence relapse by increasing distraction from non-stimulating factors, reducing the ability to focus, enhancing awareness of the individual's inner states, and slowing perception and passage of time. Temptations are influenced by two factors: stimuli and high-risk situations. Non-stimulating factors lead to thoughts of the substance, which in turn bring about temptation and ultimately result in substance use. In high-risk situations and tempting conditions that evoke the experience of substance use, these factors remind the patient of the substance and activate habitual temptations, leading to relapse. Relapse is an issue that makes the phenomenon of addiction more complex and challenging. Despite advancements in treating alcohol and other types of addiction, relapse and the resumption of substance use remain serious problems, often occurring in a short time, with signs of returning to substance use beginning and leading to a desire for substances (Yang et al., 2018).

Attention bias is considered a cognitive component of temptation or may be responsible for temptation. Given the relationship between emotions (temptation) and cognition (attention bias), it can be said that emotional states can modulate focus and attention, and attention processes can also modulate emotional processes. Furthermore, attention bias towards substance-related cues moderates relapse and temptation (Mayer et al., 2016). Attention bias may interfere with substance use and relapse in three ways. First, the stability of habitual behaviors may result from increased awareness of the presence of substance-related cues in the environment. This automatic process makes these cues processed sooner. Second, when substance-related cues are present in the environment, they are automatically processed, and it is difficult to divert attention from these cues. Third, the limitation of attention capacity and automatic focus on substance-related cues result in impaired processing of other cues in the environment (Christiansen et al., 2015; Rosenberg, 2009).

Another variable that is disrupted in substance-dependent individuals is emotional processing. Emotional processing refers to the return to non-pathological behavior after reducing emotional turmoil. Research results show that individuals who choose ineffective styles during emotional processing are more vulnerable to emotional problems (Rinck et al., 2018). Thomas et al. (2007) categorized emotional processing into three levels: detection and experience, control and expression, and inadequate processing, and believed that emotional processing at each of these levels could face deficiencies (Razaghi et al., 2020). Studies have shown that worry in stressful situations hinders emotional processing in individuals (Mehrinejad et al., 2016; Razaghi et al., 2020).

Among the factors that can play a special role in maintaining abstinence in substance-dependent individuals is social support. Given that addiction requires more support compared to physical illnesses, in addition to receiving medical and therapeutic services, the process of social and psychological support should also focus on the individual's family and surroundings. Social support should be considered not only after the treatment period but also from the beginning of the treatment process, alongside other methods such as medication therapy. Society should provide conditions in which individuals are easily accepted after recovery (Cao et al., 2020; Wu et al., 2016). The process of stopping substance abuse and ending relationships with substance-using peers is highly stressful and requires social resources and support. Therefore, abstinence from substance use is positively related to receiving social support (Farnam, 2019). Social support can be considered as an individual's

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perception or experience of being loved, cared for, respected, and valued by family, friends, and others, and having a supportive source when facing stress (Razaghi et al., 2020). Individuals with poor social interaction skills often feel lonely in their lives. Loneliness is an unpleasant state that involves negative emotional responses and social dissatisfaction in one's social relationships, leading to cognitive, emotional, and behavioral maladjustments (Yang et al., 2018). In this regard, Rezaghi et al. (2020) concluded that social support plays an effective role in preventing relapse in substance-dependent individuals undergoing treatment (Razaghi et al., 2020). Given the studies conducted and the importance of addiction, the research question is: Does the model of temptation and likelihood of substance use in dependent individuals with a history of relapse, based on attention bias and emotional processing styles, with the mediating role of social support, have good fitness?

2. Methods and Materials

2.1. Study Design and Participants

The present study design is descriptive and correlational, based on structural equation modeling. The statistical population of this study includes substance-dependent individuals referred to addiction treatment centers in Gilan province. Fifty individuals per variable, totaling 201 individuals, were selected through simple random sampling.

For this study, coordination with addiction treatment centers in Gilan province was conducted, and necessary explanations were provided about the research. The researcher explained the completion process of the questionnaires to the addicts.

2.2. Measures

2.2.1. Post-Addiction Substance Use Temptation

This questionnaire, developed and validated by Fedardi et al. (2008), consists of 20 items designed to measure the level of thoughts and cravings related to substance use. It uses a 6-point Likert scale (completely true = 5, not true at all = 0), and the Cronbach's alpha obtained was over 70%. The reliability of this questionnaire was calculated using Cronbach's alpha (Enayat et al., 2012; Khammarnia & Peyvand, 2018; Zoghipaydar et al., 2022).

2.2.2. Attention Bias

The questions are adapted from the Personal Bias List. This scale scores across several dimensions. Three questions (2, 6, 8) relate to the individual's relationship with time. Another three questions (4, 7, 10) reflect the internal tendency to choose one's values versus being influenced by others. The remaining questions are selected from several subscales. Question one measures self-spontaneity (choice a), question three measures unconditional self-attention (choice b), and questions five and nine reflect mature self-acceptance, which is not impaired by criticism or the possibility of failure (choices a and b, respectively). These questions indicate characteristics of self-actualization – spontaneity (question one) and self-acceptance (questions four, five, and nine). The questionnaire is scored on a three-point Likert scale. Validity was assessed by expert opinions, and reliability was calculated using Cronbach's alpha, resulting in a coefficient of 0.78, indicating acceptable reliability (Enayat et al., 2012; Mehrinejad et al., 2016; Taherifard et al., 2021).

2.2.3. Social Support

Developed by Wax and colleagues in 1986 based on Cobb's definition of social support, this questionnaire contains 23 items. Ebrahimi-Ghavam (1992) changed the scoring system to a binary format (0 and 1) to use Cronbach's alpha. The questionnaire includes three subscales: family support, friend support, and others' support. Reverse scoring applies to questions 3, 10, 13, 21, and 22. In Ebrahimi-Ghavam's study (1992) with 111 students and 211 pupils, the reliability coefficients were 0.91 for students, 0.71 for pupils, and 0.81 for the test-retest reliability after six weeks. Shahbakhsh (2009) reported an internal consistency coefficient of 0.66 for a sample of 311 students. In Khabbaz et al.'s (2011) study, the Cronbach's alpha was 0.74 (Atadokht et al., 2015; Khammarnia & Peyvand, 2018; Razaghi et al., 2020).

2.2.4. Emotional Processing Styles

The Emotional Information Processing Scale was developed by Baker et al. (2007) and later shortened to a 25-item version by Baker et al. (2010). Scores range from 1 (strongly disagree) to 5 (strongly agree). This scale has five dimensions: suppression, experiencing unpleasant emotions, emotional control, avoidance, and signs of unprocessed emotions. Baker et al. examined the factor structure of this

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questionnaire using exploratory factor analysis and extracted five factors. The Cronbach's alpha and test-retest coefficients were reported as 0.92 and 0.79, respectively. In Iran, Lotfi reported a correlation coefficient of 0.54 with the Emotion Regulation Scale, indicating convergent validity (Lotfi et al., 2013; Mehrinejad et al., 2016).

2.3. Data analysis

After completion, the questionnaires were collected, and the data were analyzed using structural equation modeling and LISREL software.

3. Findings and Results

The demographic findings indicated that individuals aged between 30 and 40 years comprised the largest portion of the sample with 51.24%. Individuals aged between 50 and 60 years formed the smallest portion of the sample with 7.46%. Additionally, individuals with education below high school diploma comprised the largest portion of the sample with 53.73%. Individuals with a bachelor's degree comprised the smallest portion of the sample with 3.98%.

Table 1

Descriptive Data of the Participants' Scores

Variable	Mean	Standard Deviation	Variance	Skewness	Kurtosis
Family	24.15	6.95	48.33	-0.663	0.023
Friends	23.47	6.91	47.76	-0.395	0.341
Others	25.57	6.65	44.32	-0.427	-0.072
Social Support	77.19	5.45	29.70	-0.625	0.318
Substance Use Temptation Post-Treatment	47.85	2.55	6.502	0.109	-0.984
Relationship with Time	1.41	0.99	0.993	1.590	0.341
Inner Inclination Reflection	1.31	41.05	1.114	1.519	0.341
Self-Actualization – Spontaneity	1.43	1.22	1.497	0.172	0.341
Personal Bias	4.84	2.71	7.381	2.425	0.341
Suppression	14.78	4.71	22.152	0.298	0.265
Unpleasant Experiences	15.54	4.89	21.939	0.111	-0.272
Unprocessed Emotion Signs	15.54	4.88	21.939	0.111	-0.272
Avoidance	15.93	4.52	20.421	-0.647	0.483
Emotional Control	14.20	4.99	24.903	-0.010	0.283
Emotional Information Processing	76.005	2.19	4.79	-0.359	0.433

One of the main assumptions of structural equation modeling is to examine the normal distribution of the variables under investigation. Researchers believe that if skewness and kurtosis are between -2 and 2, the distribution of variables is normal, and according to the table above, this condition is met.

Table 2

Results of Correlation Between Variables

Variable	Substance Use Temptation Post-Treatment
Family	-0.657
Friends	-0.641
Others	-0.714
Social Support	-0.762
Relationship with Time	-0.325
Inner Inclination Reflection	-0.378
Self-Actualization – Spontaneity	-0.387
Personal Bias	-0.392
Suppression	-0.402
Unpleasant Experiences	-0.398
Unprocessed Emotion Signs	-0.377
Avoidance	-0.369
Emotional Control	-0.411
Emotional Information Processing	-0.428

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All correlation coefficients are significant at the 99% confidence level ($p < .01$). The model fit indices are presented in Table 3.

Table 3

Fit Indices of Proposed, Modified, and Final Models

Fit Index	RMSEA	GFI	AGFI	NFI	NNFI	IFI
Acceptable Range	0-1	0-1	0-1	0-1	0-1	0-1
Calculated Values	0.032	0.99	0.96	0.95	0.91	0.92

According to Table 3, the goodness-of-fit indices reflect an optimal fit.

Table 4

Structural Model: Paths and Their Standardized Coefficients in the Final Model

Path	Standard Coefficients	Standard Error	Critical Ratio	Significance Level
Attention Bias ← Temptation and Likelihood of Substance Use in Addicts with Relapse History	-0.39	0.241	-4.37	0.0005
Attention Bias ← Social Support	0.65	0.238	7.60	0.0005
Social Support ← Temptation and Likelihood of Substance Use in Addicts with Relapse History	-0.76	0.236	-8.74	0.0005
Emotional Processing Styles ← Social Support	0.67	0.490	7.65	0.0005
Emotional Processing Styles ← Temptation and Likelihood of Substance Use in Addicts with Relapse History	-0.42	0.331	-5.40	0.0005

Based on the standardized coefficients and critical values presented in the table above, all direct paths are significant ($p < .05$). The proposed research model includes two indirect paths with mediation. The significance of mediating relationships and the indirect effect of the independent variable on the dependent variable through the mediator was determined using the bootstrap method. Bootstrap results for the mediating paths of the proposed research model can be seen in Table 5.

Table 5

Bootstrap Test Results for Indirect Paths of the Research Model

Path	Data	Boot	Bias	Error	Lower Limit	Upper Limit	Significance Level
Attention Bias ← Temptation and Likelihood of Substance Use in Addicts with Relapse History with Mediating Role of Social Support	0.521	0.477	0.007	0.349	0.183	0.389	0.005
Emotional Processing Styles ← Temptation and Likelihood of Substance Use in Addicts with Relapse History with Mediating Role of Social Support	0.510	0.481	0.005	0.327	0.185	0.445	0.005

Considering the significance of the bootstrap test results ($p < .01$), it can be inferred that the mediating variables play a significant role.

The results of Levene's test showed that the significance level is less than 0.05, indicating heterogeneity in the distribution of the body image variable.

4. Discussion and Conclusion

The aim of this study was to model the temptation to abuse substances in addicts with a relapse history based on attention bias and emotional processing styles with the mediation of social support. As observed, the data collected supported the optimal fit of the model with the gathered data. The findings of this study are in line with prior studies

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(Atadokht et al., 2015; Baker et al., 2010; Christiansen et al., 2015; Enayat et al., 2012; Evans & Cahill, 2016; Farnam, 2019; Khammarnia & Peyvand, 2018; Kopera et al., 2017; Lotfi et al., 2013; Mayer et al., 2016; Mehrinejad et al., 2016; Mohammadkhani et al., 2011; Razaghi et al., 2020; Rinck et al., 2018; Taherifard et al., 2021; Weiss et al., 2013; Yang et al., 2018; Zoghipaydar et al., 2022).

To explain the results, social support can be understood as an individual's perception or experience of being loved, cared for, respected, and valued, and having a supportive source when facing stress (Atadokht et al., 2015). Individuals who perform poorly in establishing social connections often feel lonely in their lives. Loneliness is an unpleasant state involving negative emotional responses and social dissatisfaction in one's social relationships, leading to cognitive, emotional, and behavioral maladjustments (Kopera et al., 2017). One experience of substance dependence is temptation (Khammarnia & Peyvand, 2018), which plays a key role in the continuation of dependence, substance abuse, and relapse (Khammarnia & Peyvand, 2018). Drummond (2000) defined temptation as a conscious desire, impulse, craving, need, or compulsion to use substances. Temptation is the conscious experience of wanting to use substances (Khammarnia & Peyvand, 2018; Zoghipaydar et al., 2022). The World Health Organization considers temptation as the basis for initiating substance dependence, loss of control, and relapse. However, some studies in the 1970s and 1980s showed that temptation is not a precursor to relapse and does not necessarily lead to relapse (Enayat et al., 2012; Khammarnia & Peyvand, 2018; Zoghipaydar et al., 2022). Nonetheless, these studies do not deny the association between temptation and substance dependence behavior.

Research has shown that temptation disrupts attention in dependent individuals (Christiansen et al., 2015; Enayat et al., 2012; Rinck et al., 2018). Attention bias is considered a cognitive component of temptation or may be responsible for it (Rinck et al., 2018). Given the relationship between emotions (temptation) and cognition (attention bias), emotional states can modulate focus and attention, and attention processes can modulate emotional processes. Furthermore, attention bias towards substance-related cues moderates relapse and temptation (Christiansen et al., 2015; Rinck et al., 2018).

Attention bias may interfere with substance use and relapse in three ways. First, the stability of addictive behaviors may result from increased awareness of the presence of substance-related cues in the environment. This automatic process makes these cues processed sooner. Second, when substance-related cues are present in the environment, they are automatically processed, and it is difficult to divert attention from these cues. Third, the limitation of attention capacity and automatic focus on substance-related cues result in impaired processing of other cues in the environment (Christiansen et al., 2015).

Various studies indicate that physical withdrawal from substances is not very difficult; the main challenge in treating addicts, even with long-term periods of abstinence, is the high rate of relapse. Relapse is the resumption of drug use or problematic behavior after a period of abstinence (Kopera et al., 2017). Relapse and resumption of substance use are associated with more negative consequences, such as higher likelihood of heavy substance use, more severe dependence, use of multiple substances, increased criminal behavior, and additional costs to health and treatment networks (Weiss et al., 2013). Many researchers consider social support to be a multidimensional concept that encompasses both actual and perceived dimensions. Social support means the feeling that a person is cared for by others, valued, and belongs to a social network (Atadokht et al., 2015; Farnam, 2019; Khammarnia & Peyvand, 2018; Razaghi et al., 2020; Yang et al., 2018). Therefore, social support is the knowledge that makes an individual believe they are respected and loved by others, considered a valuable and dignified person, and belongs to a network of mutual relationships and commitments (Razaghi et al., 2020; Yang et al., 2018).

In this context, evidence indicates that individuals unable to regulate their emotional responses to daily events experience greater distress. This distress can lead to substance abuse as a way to reduce emotions. Low emotional regulation, resulting from an inability to effectively cope with and manage emotions, plays a role in the initiation of substance use. Individuals with low emotional regulation are often drawn to substance use to cope with negative emotions (Kopera et al., 2017; Razaghi et al., 2020). Emotional regulation refers to actions taken to change or modulate an emotional state and is a specific form of self-regulation. Cognitive emotional regulation involves organized efforts to regulate thoughts, feelings, and actions to achieve specific goals. Emotional regulation encompasses a wide range of conscious and unconscious, physical, cognitive, and behavioral processes (Mohammadkhani et al., 2011; Razaghi et al., 2020). Overall, emotion regulators are essential for well-being and successful functioning, playing a crucial role in adapting to stressful life events. Substance

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abusers, who lack proper recognition of their emotions and feelings, lose the ability to adopt appropriate, logical, and reality-based behaviors. Additionally, these individuals struggle with correctly using emotions (Kopera et al., 2017; Mohammadkhani et al., 2011; Razaghi et al., 2020). They face difficulties in paying attention to emotional information, accurately perceiving it, processing it correctly, and managing emotions optimally in interpersonal relationships. These difficulties lead to an inability to analyze, decide, and choose appropriate behavior in stressful situations, leading them towards maladaptive behaviors (Razaghi et al., 2020).

5. Limitations & Suggestions

The limitations of this research include the sample being limited to males (men) and only to the addiction treatment and residential centers in Rasht city.

It is suggested that future research evaluates the level of attention bias, temptation, and emotional processing styles before and after applying therapeutic interventions. In this study, it was not possible to precisely control the duration of substance use and the amount of substance used by dependent individuals. Additionally, the examination of a single gender limits the generalizability of the findings to men.

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Declaration

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

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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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Authors' Contributions

This article is derived from the first author's doctoral dissertation. All authors contributed equally.

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