Original Article

The relationship between attentional bias, anxiety sensitivity and metacognitive beliefs in substance abuser: with an emphasis on mediating effects of emotion regulation strategies

Parviz Dabaghi[1], Samad Fahimi*[2], Masoumeh Rahimkhanli[3], Arsia Taghva[4], Zeynab Azimi[5]

[1].*Assistant Professor, Department of clinical psychology, AJA University of Medical Sciences, Tehran, Iran, dabaghi_44@yahoo.com*

[2].*Ph.D candidate in psychology, Faculty of psychology and educational sciences, university of Tabriz, Tabriz, Iran (*Corresponding author). Tel: 09380169916 E-mail: samad.fahimi@yahoo.com*

[3].*M.A. in clinical psychology, university of kharazmi, Tehran, Iran. rahimkhanli_bj@yahoo.com*

[4].*Associate Professor, Department of Psychiatry, AJA University of Medical Sciences, Tehran, Iran. ataghva@yahoo.com*

[5].*PhD candidate in Educational Psychology Department of Educational Psychology and Counselling University of Tehran, zeinab.azimi1@yahoo.com*

Abstract

Background: the present study was aimed at examining the relationship between attentional bias, anxiety sensitivity and metacognitive beliefs in substance abusers with an emphasis on mediating effects of emotion regulation strategies.

Methods: The present study is fundamental in terms of the objective and descriptive regarding data collection, which was conducted within the framework of a correlation study. The statistical universe comprised a group of soldiers in Tehran who were considered as substance abusers and had been referred to addiction treatment centers of Baharestan County. Among the statistical universe, 120 participants were selected by non-random purposive sampling. Finally, Anxiety Sensitivity, Metacognitive Beliefs, emotional regulation strategies and the Stroop test questionnaires were conducted on the sample. For sorting, processing and analysis of data and the evaluation of the research hypothesis, we used the SPSS-17 and LISREL. To examine the relationship between variables, the Pearson correlation and path analysis were used.

Results: Pearson correlation results indicated that anxiety sensitivity, metacognitive beliefs, suppression, and reappraisal have a significant relationship with the attentional bias. The results of the path analysis revealed that the direct effect of anxiety sensitivity and metacognitive beliefs on the attentional bias is not significant, but these structures may have an effect on the attentional bias only through the mediator variables (suppression and reappraisal).

Conclusion: An individual resorts to metacognitive beliefs to dispose the negative emotions caused by high anxiety sensitivity but these emotions get intensified in this process and the individual in the long term experiences substance abuse through avoidance strategies such as suppression. Therefore, when the person experiences negative emotions, he will have attentional bias toward liberating signs of substance abuse inside and outside.

Declaration of Interest: None.

Key words: Substance-Related Disorders, Attention, Meta-Cognition, Anxiety, Emotions.

Introduction

Motivation-associated symptoms retain and attract attention: The person, who is dieting, will attend to the cake in the store, anxious person will recognize the threatening shadow and the depressed person will focus on the negative points among the positive points. Also, Attentional Bias (AB) toward symptoms associated with substance, have been observed in people who use substance frequently (1); including individuals with substance abuse disorders. Several studies have

shown attentional bias in substance abusers (2-3). This evidence is consistent with theoretical models, suggesting that attentional bias plays a role in the beginning, persistency and relapse of substance abuse disorder after a period of abstinence (2- 4). Recently published articles suggest that the attentional bias can predict the imminent use (5) and adjustment of the attentional bias may reduce the strength of the attentional bias, desire to use, temptation and substance abuse (6-7). Therefore, identifying the factors that predict attentional bias in substance abusers is important. Anxiety sensitivity (AS) (8), emotion regulation (9) and metacognitive beliefs (10) are cognitive factors which have yielded a lot of research on substance abuse disorder in recent years.

Anxiety can be imagined as a coherent and unified cognitive-emotional structure, which acts as a defensive motivational system. This model is made up of various components of anxiety and their interactions. At the heart of this structure is a sense of uncontrollability, which is widely focused on the threat, risk in the future or other potential negative events. Thus, this can be generally considered as a helplessness state, because a person sees himself/herself unable to predict, control, and obtain the desired results (11). It seems that the anxiety sensitivity is an important mediator variable between anxiety and disease. Anxiety sensitivity is a transdiagnostic factor, which plays a role in the spread and persistency of panic disorder and other emotional disorders (12). As a cognitive variable, AS refers to individual differences in fear of bodily sensations, which involves an increase in breathing, dizziness, and palpitations (13). Individuals with high anxiety sensitivity are afraid of these feelings because they believe that these feelings are the signs of catastrophic impending physical, psychological or social events and indications of life-threatening diseases, loss of control or embarrassment (14). Expectancy theory of anxiety suggests that AS is an anxiety trigger factor increasing the risk of developing anxiety-related psychopathology. In addition, AS has been reviewed as a powerful stimulant avoidance behavior (13). The results of the research related to the sensitivity of anxiety and avoidance behavior, have demonstrated the potential importance of anxiety sensitivity in beginning

and persistence of substance abuse and addictions, because the function of anxiety sensitivity, as reinforcing anxiety (15), can lead to the use of various types of psychotropic drugs, including alcohol, since it has the capacity to reduce, control or eliminate arousal, fear, or tends to catastrophize anxiety feelings (16- 19).

The term metacognition, which is often connected to John Flavell's (20) work, can be defined as a knowledge and cognitive process, which involves the evaluation, monitoring or control of thought. Wells & Matthews (21-22) suggest a multiple processing model- the Self-Regulatory Executive Function model (S-REF)-to show cognitive dysfunction in the psychological distress. The cognitive structure of the S-REF model is configured as an interactive three-level model. The first level contains stimulus-driven processing network that operates out of consciousness and its product enters the consciousness unannounced. The conscious and intentional processing system, in the second level of the S-REF- IE; inline-level (immediately) or within a network level, plays a role in maintaining cognitive self-regulation in response to intrusive and disturbing thoughts. The purpose of the processing of the S-REF is to reduce the discrepancy of current and desired states of self. Under the terms of adaptation, S-REF is short term, because people choose their coping styles that have been effective when dealing with discrepancies. The start and stop of S-REF are influenced by the first level of automatic processing and are done through the third level of model, i.e. metacognitive knowledge. Metacognitive knowledge is conceptualized as metacognitive information and beliefs that have positive and negative content (for example, "concerns will help me to cope" or "Some thoughts are dangerous.") and the general map to guide cognition. Wells and Matthews (21) argued that Cognitive Attentional Syndrome (CAS) is a particular thinking style as well as the core of psychological disorder. CAS is a variety of coping styles including extended thinking (for example, rumination and worry), monitoring for threat, thought suppression and avoidance, which have a conflicting effect on self-regulation and reduce distracting thoughts. According to the S-REF model, CAS is problematic because, by virtue of it, emotions and negative thoughts will continue and thereby it fails to reform dysfunctional

metacognitive beliefs and permanently solve self-discrepancies. Selection and implementation of the coping styles in psychological distress are based on metacognitive beliefs, which have focus on attention to the threat information. This leads to the establishment of the vicious and distressing cycle. Spada and Wells (23) and Spada, Caselli and Wells (24) applied the S-REF model to addictive behaviors. In their formulation for addictive behaviors, metacognitive beliefs and cognitive attentional syndrome, have been conceptualized at three different steps that are pre-engagement, engagement and post-engagement. In pre-engagement step, triggers activate coping styles, evaluation, S-REF model and related metacognitive beliefs, in the form of urges, mental images, memories and thoughts. Positive metacognitive beliefs such as "thinking about having the drug, will make me feel better" and negative metacognitive beliefs such as "I can't control my thoughts about the substance" activate the process of perseveration of intrusive thoughts and trying to suppress them leads to an escalation increase in the intensity of negative thoughts and craving. Therefore, in a logical conclusion, substance abusers use drugs, more likely in order to regulate these feelings and escape from the discrepancy of current and desired states.

One of the psychological characteristics that can assist the individual in dealing with anxiety and negative experience is emotion regulation. Emotion regulation strategies refer to the use of strategies (e.g.; suppression or cognitive reappraisal) in order to influence, experience and modulate emotions. Adaptive emotion regulation is defined as the ability to use effective coping strategies during the course of stressful situations. Effective coping can be a buffer of addictive behaviors and emotional distress (25). A number of relationships have been found between the defect in the ability to organize, integrate, and regulate emotions, thoughts, and behaviors during the exposure to intense psychological pressure with the onset and escalation of substance abuse among adolescents and young people (25- 26). In recent years, researchers have noted that emotion regulation strategies play an intermediary role in attentional bias (27). Emotion regulation strategies may reflect people's strategies to cope with negative emotions. Studies have shown that some of the emotion regulation strategies (for example,

reappraisal) are more effective than others (28-29). Based on the foregoing, it is assumed that anxiety sensitivity as a predisposing and stable variable indicates a person's desire to interpret the physical, psychological, and social consequences of anxiety experiences as annoying and dangerous matters. Possibly, individuals with high anxiety sensitivity, unsuccessfully tried to reduce the anxiety through metacognitive beliefs (negative and positive), but metacognitive beliefs will cause more anxiety experience and excitement. Now, if a person does not have good emotion regulation strategies to deal with this negative emotion, he or she will be involved in addictive behaviors and over time, the person experiencing negative emotions, gets involved in attentional bias toward resources that brought him or her to the desired state, despite being temporary or inappropriate. Therefore, the present study was carried out to examine the relationship between attentional bias, anxiety sensitivity and metacognitive beliefs in substance abuser individuals with an emphasis on mediation role of emotion regulation strategies.

Methods

Population, Sample and Sampling Methods
The present study is fundamental in terms of the objective and descriptive in terms of data collection. It was conducted within the framework of a correlation study. The statistical universe comprised a group of soldiers in Tehran who were considered as substance abusers and had been referred to addiction treatment centers of Baharestan County between August 2013 to October, 2014. Among statistical universe, 120 participants were selected by non-random purposive sampling. Criteria for entering patients into the study included: the presence of DSM- IV diagnostic criteria for substance abuse disorder, the absence of comorbidity with diagnostic criteria for psychotic disorders in DSM-IV based on the diagnosis of a psychiatrist and a clinical psychologist, a minimum age of 18 years and a maximum of 30 years, minimal reading and writing literacy, having at least one year of experience in the substance abuse and the patient's consent to participate in research. Criteria for exclusion of patients from the study were: the existence of comorbidity with diagnostic criteria for psychotic disorders. After ensuring the

inclusion and exclusion criteria for the study sample, patients were referred to the test chamber. In the test room, the participants were informed of the procedure for completing the questionnaires and the Stroop test and a consent form was completed and finally anxiety sensitivity, metacognitive beliefs, emotional regulation strategies and the Stroop test questionnaires were conducted. Similar to the previous studies, the computer-based Stroop test was performed. Initially, this sentence was said to all participants: "You will see the words that are written with four main colors: blue, red, green, and yellow. You must read the word color loud and very fast regardless of their meaning." In the beginning, to learn the test procedures, the test was carried out in the form of training and after making sure that the participants learned the procedures, the original experiment was carried out. It is worth noting that the words used in the training test were different from words used in the main test. A soon as saying the color or reading words by participants and pressing the button on the keyboard of the laptop by psychologist, the time was automatically recorded by the program and the next slide was displayed immediately after pressing the button. After the end of the Stroop test, total time came automatically for both threatening and neutral words separately.

The Questionnaire of Demographic Characteristics: The questionnaire was used to collect demographic characteristics of the participants in the study and contained items such as age, education, several times substance withdrawal, years of abuse, and a history of hospitalization.

Anxiety Sensitivity Index (ASI): Anxiety sensitivity index is a self-report questionnaire which has a 16-item Likert scale. Each item reflects the idea that anxious feelings are unpleasant experiences and can lead to harmful consequences. Higher scores characterize the level of the fear of anxiety symptoms. The range of scores is between 16 and 80 (30). The examination of the psychometric properties of this scale has shown high internal consistency (alpha between 0.80 and 0.90). Retest reliability after 2 weeks was 0.75 and 0.71 for three years, which indicates that ASI is a stable personality construct (31). In the present study, Cronbach's alpha was 0.912.

Metacognitions Questionnaire (MCQ): In fact, a wide range of empirical evidence in support of metacognition theory is based on the research that has been completed through this questionnaire. The questionnaire is based on S-REF model with 30 items and 5 subscales and its options are determined through 4 Likert scale. In fact, this scale is the short form of 65-option metacognition questionnaire of Wells and Cartwright-Hatton. Psychometric properties of this scale in Iranian samples were also examined. Shirinzadeh investigated the factor structure of the questionnaire based on exploratory factor analysis and principal components analysis with varimax rotation. In this study a sample of 250 people were employed in factor analysis and 5 factors were identified. To study the concurrent validity, the questionnaire was administered simultaneously with Spiel Berger's state-trait anxiety inventory and the correlation between them was 0.45. To determine the validity of the metacognitions questionnaire, the internal consistency method, the cronbach's alpha formula and the data from the sample of 250 people were used. Internal consistency coefficients for the entire scale were 0.91 and for subscale were between 0.71 and 0.87, which implies the desired validity of the scales and subscales. Besides, to determine the retest validity, 50 people were chosen from the sample voluntarily and examined twice during 4 weeks. Total coefficient obtained was 0.73 and for uncontrollability and danger subscales was 0.59, positive beliefs 0.83, cognitive self-consciousness 0.81, cognitive confidence 0.64 and need to control thoughts 0.868. These coefficients indicate an optimal validity of the questionnaire and its subscales. In the present study, Cronbach's alpha for the total scale was 0.868.

The Emotion Regulation Questionnaire (ERQ); The emotion regulation questionnaire was made by Gross & John (34) and consists of 10 items capturing two specific emotion regulation strategies, cognitive reappraisal and expressive suppression on a 7-point Likert scale. The cognitive reappraisal scale has 6 items and the expressive suppression has 4 items. Cronbach's alpha for both cognitive reappraisal and expressive suppression subscales was 0.79 and 0.73 respectively and test-retest validity coefficient for total scale was 0.69. The ERQ internal consistency reported in Milan University was in range of 0.48 to 0.68 for cognitive reappraisal and 0.42 to 0.63 for suppression. The reported correlation coefficients of reappraisal

and suppression with positive affect scale were 0.24 and -0.15 and -0.14 and 0.04 with negative affect scale, respectively. In the study of Wong and colleagues (9) Cronbach's alpha for the total scale was 0.96. In the present study, the obtained Cronbach's alpha for the suppression and reappraisal was 0.874 and 0.902, respectively.

Modified Test: One of the measurement instruments used in this study was Stroop test. The words that had emotional charge for substance abuse disorders were selected from the previous researches (for example; 36). In the first step a list of those words were presented to professors of psychology, psychiatrists and clinical psychology doctoral and masters students to comment on it and rate the words they consider as emotional based on the importance for substance abusers. Subsequently, 20 words that were selected on the basis of the foregoing strategies and 20 words that had no specific emotional charge and were considered neutral and also in terms of the number of syllables were equal with other words were added to the list. All colors chosen randomly with four colors; blue, yellow, green and red, were written in the same size as the slide. Afterward, to ensure internal consistency, the test was carried out on a sample of 30 clients of addiction treatment centers of Baharestan County and the results showed high internal consistency (Cronbach's alpha 0.88). Stroop computer tool was designed in such a way that the arrangement and paint type of the words were completely random and the arrangement and paint type of the words from one participant to another one randomly varied. The score of interference or attentional bias was obtained by subtracting the average time of reaction to the emotionally-charged slides from reaction time to the neutral words. For sorting, processing, data analysis and evaluating of the research hypothesis, we used the SPSS version 17 and LISREL-version 8.72. To examine the relationship between variables, we used the Pearson correlation and path analysis.

Results

Descriptive findings related to demographic data show that the average age of participants is 13.22 (SD=2.5). In the case of education, 55 people of participants were under high school diploma, 42 people with high school diploma, 10 people associate degree and 13 people bachelor's degree and higher. 30 participants were married and 90 were single. The average time of substance abuse was 2.99 year (SD=1.33). The type of the abused substance in 76 participants was opium, 23 participants cannabis, 15 participants heroin and 6 participants crystal.

Table 1 shows the descriptive results of the variables of anxiety sensitivity, metacognitive beliefs, emotion regulation strategies and attentional bias in the substance abuser.

Table 1. Descriptive results of anxiety sensitivity, metacognitive beliefs, emotion regulation strategies and attentional bias in the substance abuser. (n=120)

Variables		M	SD
Anxiety Sensitivity		33.88	10.73
Metacognitive Beliefs		80	8.52
Emotion Regulation	Suppression	20.43	3.91
	Reappraisal	25.85	6.97
Attentional Bias		3.39	1.79

To evaluate the data normality, Kolmogorov-Smirnov test was used whose results showed that the significance level was larger than 0.05.

Therefore, the null hypothesis (H0), i.e. the distribution of scores of anxiety sensitivity, metacognitive beliefs, emotion regulation strategies, and the bias is normal, was confirmed. Therefore, we are allowed to use parametric statistical tests.

To examine the relationship between anxiety sensitivity, metacognitive beliefs, emotional regulation strategies, and the attentional bias, Pearson's correlation coefficient was used and the results are shown in Table 2.

Table 2.The correlation matrix of anxiety sensitivity, metacognitive beliefs, emotion regulation strategies and attentional bias in the substance abuser.

Variables	Attentional Bias	Anxiety Sensitivity	Metacognitive Beliefs	Suppression	Reappraisal
Attentional bias	1				
Anxiety Sensitivity	0.43[**]	1			
Metacognitive Beliefs	0.38[**]	0.44[**]	1		
Suppression	0.58[**]	0.63[**]	0.41[**]	1	

| Reappraisal | -0.65[**] | -0.48[**] | -0.37[**] | -0.63[**] | 1 |

$P<0.05^*$ & $P<0.01^{**}$

To examine the relationship between anxiety sensitivity, metacognitive beliefs, emotional regulation strategies, and the attentional bias, Pearson's correlation coefficient was used. The first result obtained from the correlation analysis, as can be seen table 2, shows a direct relationship between anxiety sensitivity and attentional bias (r=0.43, p>0.01). Moreover, attentional bias with metacognitive beliefs and suppression with metacognitive beliefs have a direct relationship (r=0.38, r=0.58, p>0.01, respectively). Moreover, according to the correlation table, reappraisal had a significant negative correlation with attentional bias in the substance abuser (r=-0.65, p>0.01).

Since there is a significant relationship between the criterion variable; i.e. attentional bias and predictor variables; i.e. anxiety sensitivity, metacognitive beliefs, suppression and reappraisal, to answer the question of whether emotion regulation (suppression and reappraisal) mediates the relationship between attentional bias with anxiety sensitivity and metacognitive beliefs, the path analysis was used. The results of this analysis are presented in table 3 and figure 1.

To investigate the hypotheses and to determine the coefficients of the impact of exogenous variables on the endogenous variables and to determine the mediation of mediator variables, path analysis technique through LISREL software 72.8 was used. To investigate the hypothesis and to determine the effect coefficient of exogenous variables on the endogenous variables and determine the mediation role of mediator variables, path analysis technique was used by LISREL 8.72.

First, the fitting indexes of the hypothesized model were tested, and standardized coefficients for direct, indirect and total effects and percentage of variance explained by the variables were presented. In the table below, the fitting indexes of the path model are presented. Based on these indexes and due to the proximity of GFI and CFI to 1 and the small size of the RMSEA index, it can be concluded that the assumed model has a good and almost perfect fit with the data.

Table 3. The fitting indexes of the path model

RMSEA	GFI	CFI	X^2/df	Df	X^2
0.001	0.92	0.91	0.00	0	0.00

CFI: the comparative fit index, x2/df: chi-square relative to its degree of freedom, GFI: goodness of fit indices, RMSEA: the Root Mean Square Error of Approximation, Df: Degrees of freedom, X^2 :chi-square

Table 4. The direct, indirect and total path model standard coefficient

Path	Direct effect	Indirect effect	Total effect	Coefficient of Determination (R^2)
From Anxiety Sensitivity to Reappraisal	-0.39	-	-0.39	%42
From Metacognitive Beliefs to Reappraisal	-0.20	-	-0.20	
From Anxiety Sensitivity to Suppression	0.56	-	0.56	%80
From Metacognitive Beliefs to Suppression	0.16	-	0.16	
From Anxiety Sensitivity to Attentional Bias	0.0	0.03	0.03	
From Metacognitive Beliefs to Attentional Bias	0.0	0.13	0.13	%84
From Reappraisal to Attentional Bias	-0.47	-	-0.47	
From Suppression to Attentional Bias	0.27	-	0.27	
P<0.01				

As it can be seen in the table above, anxiety sensitivity and metacognitive beliefs have a positive effect on suppression and a negative effect on reappraisal. Generally, anxiety sensitivity and metacognitive beliefs explain 42% of variance of the reappraisal and the remaining

variance is explained by variables outside the model. Also, anxiety sensitivity and metacognitive beliefs explain 80% of suppression variance and the remaining variance is explained by variables outside the model. In addition, the model explains 84% of variance of attentional bias and the remaining variance is explained by variables outside the model.

The direct effect of anxiety sensitivity and metacognitive beliefs on the attentional bias is not significant, but these structures may have an effect on the attentional bias only through the mediator variables (suppression and reappraisal). Moreover, reappraisal has a negative effect on attentional bias and suppression has a positive effect on it. Accordingly, it could be said that suppression and reappraisal strategies have an intermediary role in the relationship between anxiety sensitivity and metacognition with attentional bias.

For a more clear understanding of the relationships between variables in the model, the graph of fitted model pathways is shown in figure 1.
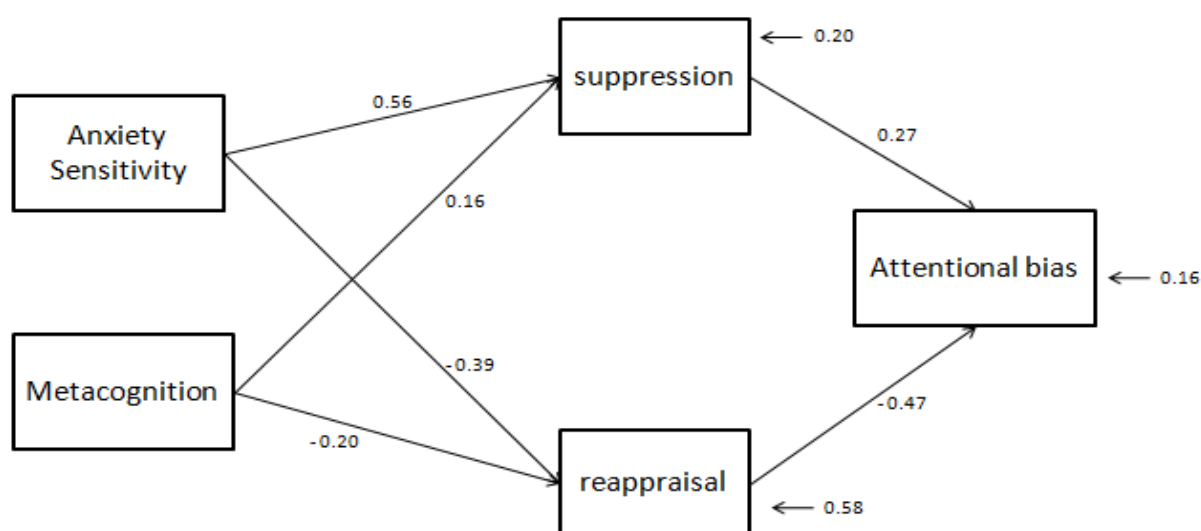

Figure 1. The graph of fitted model pathways

Conclusion

The present study was carried out to examine the relationship between attentional bias, anxiety sensitivity and metacognitive beliefs in substance abuser individuals: with an emphasis on mediation role of emotion regulation strategies. The results showed that anxiety sensitivity, metacognitive beliefs and emotion regulation strategies have a significant relationship with the attentional bias. We initially in explaining the relationship between attentional bias and anxiety sensitivity in substance abusers, describe the interactions between anxiety sensitivity and metacognitive beliefs. The way through which an individual interprets the numerous emotional symptoms may make him vulnerable to the experience of severe anxiety reactions (37). Based on cognitive theories of anxiety, the concept of anxiety sensitivity shows that negative cognitive appraisals play a role as a risk factor in the development and persistence of the psychological problems (15). In fact, people with high anxiety sensitivity are more likely to appraise the anxiety-associated symptoms as a sign of impending harm and as a result, a vicious cycle is likely to be formed between the anxiety feelings and negative interpretations and appraisals which will put a person in a state of constant vigilance to the anxiety-associated symptoms. According to Reiss, et al. (1995), anxiety sensitivity increases the readiness to vigilance and avoidance of anxiety-eliciting stimulators and leads to an increase in worry and rumination in relation to getting anxious (38). In this regard, metacognitive model proposes that mental disorders are created and maintained through sustainable patterns of thinking, attentional strategies related to control and threat, avoidance, and thinking suppression all of which together lead to the formation of a cognitive attentional Syndrome and this syndrome causes a failure in the modification of incompatible beliefs with self and increases access to negative

information about self. Based on the basic principle of self-regulation executive function model, metacognitive beliefs considered as a part of the metacognitive knowledge causes the formation and activation of cognitive attentional syndrome and this syndrome is also continued through several special mechanisms and intensifies the negative emotional experience. Therefore, a high level of anxiety sensitivity may be associated with an increased rumination about an extreme catastrophizing of the related topics with anxiety and this may lead to an increase in the selective processing of threat-related information and increase the levels of the individual anxiety experiences and the person may engage in cognitive attentional syndrome such as worry and rumination through metacognitive beliefs and enter the vicious cycle of the adverse conditions. In this regard, Spada, Caselli & Wells (10) and Spada & Wells (23) have noted in the S-REF model on the role of metacognitive beliefs and cognitive attentional syndrome for addictive behaviors in three steps and suggested that in the pre-engagement step, triggers activate the S-REF model and the related metacognitive beliefs, in the form of urges, mental images, memories and thoughts and they relay the appraisal and coping styles. Positive and negative metacognitive beliefs activate the process of perseveration of intrusive thoughts and trying to suppress them (cognitive attentional syndrome) leads to an escalation increase in the intensity of negative thoughts and craving.

Therefore, in the addicted person, anxiety sensitivity plays a role as a trigger to experience negative emotions and the person in an attempt to get rid of this case will take advantage of cognitive attentional syndrome which was activated through metacognitive beliefs (positive and negative), but during this situation nothing is achieved but negative emotions. Thus, in a logical conclusion, substance abusers are more likely to use drugs in order to regulate these feelings and escape from the discrepancy of current and desired states. At the same time, it must be noted to the emotion regulation role as a structure in revised DSM-IV that is spoken on its 50 percent role in axis I disorders and 100 percent in axis II disorders (39). When the person is facing with an emotional situation, good feel and optimism is not enough alone to control their emotions, but in

this case they also need to have the best cognitive functioning to control their emotions. Emotion regulation is a behavior and thought that provides the opportunity for individuals to gain knowledge of their emotions and how to deal with it (40). Emotion regulation strategies that become active before a stressful event cause a change and interpretation in the situation in a way that reduces emotional response associated with that situation. This process is Reappraisal. Hence, a person who uses reappraisal at the time of an emotional event evaluates the event as challenging rather than threatening and shows a more calm emotional reaction. In contrast, the person who uses the suppression, in order to cope with the negative emotions, displays negative reinforced behaviors, i.e., substance abuse behaviors, that eliminate the emotions effectively but for a short time and undesirably. Thus, people with a suppressive emotion regulation will benefit from the substance to avoid the negative emotions and thereby take away from the negative emotions. The results of this study also indicated that emotion regulation strategies have an intermediary role in the relationship between anxiety sensitivity and metacognition with attentional bias. Studies have also demonstrated that emotion regulation strategies have an intermediary role in attentional bias towards threat (27).

Research literature has extensively emphasized on the role of attentional bias in the beginning, maintenance and relapse of substance abuse (2-3, 41) and more interestingly, the robustness of attentional bias can predict the impending substance abuse (5) and modify it, and reduce the possibility of its use (6-7). It seems that the reasons for the importance of attentional bias in the beginning, continuing, and more important in predicting recurrent substance abuse can be found in the underlying factors of attentional bias. People with high anxiety sensitivity, often react negatively to symptoms of anxiety and consider signs of anxiety as annoying and also experience undesirable situation even in normal everyday situations. Also, it seems that in an attempt to get rid of this mode these people use positive metacognitive beliefs that imply the benefits of engaging in specific cognitive activities such as worry, rumination, thought monitoring, etc. (such as the concern helps me to order the things that are on my mind) and negative metacognitive

beliefs which imply on the uncontrollability, meaning, significance and danger of thoughts and cognitive experience (such as, if I cannot control my thoughts, I cannot have a good performance). All of these strategies have a negative effect on the individual's attention threshold to identify the negating information on the false beliefs. Moreover, given that self-regulatory executive function has a voluntary and conscious activity, the activation of this pattern involves individual's attention resources and prevents the absorption of appropriate and negating information on the false beliefs and then thinking may be biased and it becomes difficult to control this situation and this in turn leads to continuing and worsening of emotional distress (42). Thus, this vicious and interactive cycle of anxiety sensitivity and metacognitive beliefs puts the person in a growing emotional state that releasing from this suffering situation is possible with the use of efficient and inefficient ways of dealing with emotions. In fact, when the emotions increase, the individual may be taking substance abuse or drinking. Negative emotion regulation strategies can temporarily reduce the amount of negative emotions. In fact, individuals feel comfort with substance abuse and reduce distressing emotions through negative reinforcement. However, this solution is temporary savior and becomes a problem. In the substance dependence phase, the positive and negative metacognitive beliefs (for example, the substance abuse will help me to reduce my discomforts) act in parallel with changes in metacognitive monitoring (the ability to monitor the internal state as a guide to identify discrepancies and achieve the desired state) and finally the person at the time of the threat (inner and outer), reproduces the same vicious cycle and in the experience of negative emotions selects strategies that have been liberating and chooses the substance abuse.

The limitations of this study include the small sample study, which were selected non-randomly and examined. Other limitation of the present study was using only men as research participants that limited the ability to generalize the results to women. The results of this study are to be used in an interventional research plan to treat relapse of substance abuse in the substance abuser.

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