Impact of Metacognition Training On Males' Metacognition and Their Disposition towards Substance Abuse

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ABSTRACT

Objective: The aim of the present research was to study the effect of the metacognition training on the metacognition approaches and the magnitude of disposition towards substance abuse as the result of learning various metacognition strategies.

Methods: The research method was experimental with the pre-test, post-test design. The Statistical population included all of abusers male in TC, By applying the simple random sampling and using Krejcie and Morgan table, 36 male participants were recruited. They were the members of the Society of the Therapy-Oriented Community (TC) of the Mental Well-Being Office in the city of Kerman. To measure the variables, the Metacognition Questionnaire (MCQ-30) and the substance Abuse Disposition Questionnaire (ADQ) were used. The data were analyzed, through descriptive statistics, using the mean and the standard deviation of the; and through inferential statistics by MANCOVA analysis. All analyses were done using the SPSS version 19.

Results: The results of the analyses showed that the metacognition strategies and trainings significantly and positively changed the metacognition and accordingly reduce the disposition towards the substance abuse. The results limitations and are some suggestions discussed in the following sections.

Conclusion: Using metacognition trainings in the process of treatment is an effective technique in changing the metacognition approaches and reducing the disposition towards substance abuse.

1. Introduction

With regard to different methods for substance abuse treatments, metacognitive treatments can be eminent. In fact, metacognitive approaches are considered to be the same as the thought management methods through which therapists are intended to train and empower substance abusers to confront with the crave of substance abuse, thereby decrease their sense of need. Metacognition is defined as thinking about thinking and learning about learning (Fisher & Wells, 2009). For instance, when a student is asked to prepare a plan or a map of his or her learning and monitor it, he or she is involved in a metacognitive task (Abolghasemi, Ahmadi & Kiamarsi, 2007). As a result, in all mental activities, the person tries to predict and evaluate his or her mental dispositions, states, details, and the cognitive adequacy (Proust, 2007). Discriminating between cognition and metacognition provides a possibility for the person's ability to experience thinking in all of its possible dimensions (Fisher & Wells, 2009). The results of a research on 75 addicts regarding the association of the metacognition with their perfectionism and psychological consequences showed that the metacognitive thinking in substance

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abusers works in a dysfunction mode (Abolghasemi, Ahmadi & Kiamarsi, 2007). Some researchers conducted a research of a descriptive type and of the correlation kind on 4493 males with the purpose of determining the relationship between general self-efficacy or metacognition beliefs and coping strategies. The results showed that metacognition beliefs about substance abuse work in a dysfunction mode, too (Rabbani Bavojdan, Nikazin, Kaviyani & Khezri Moghadam, 2012). Other researchers made a comparison between metacognitive beliefs and ambiguity tolerance among 120 addicted, smokers, and normal individuals. They showed that metacognition training was effective (Ahmadi-Tahoor, Soltani & Najafy, 2012).

However, since various studies about metacognition and its benefits, inside and outside of Iran, but more research has been done in this area on students and learning strategies. Recently, Newly Wells and colleagues did extensive studies in the treatment of anxiety disorders and depression. The focus of this study was to reduce substance abuse on abusers. In this regard, we tried to investigate the impact of metacognition training on males' attitudes towards substance abuse. In other words, we wanted to see the strength of the metacognition training on males' enhanced power in confronting with the impulses of substance abuse.

Recently, some researchers have claimed that substance abuse is due to some organic-genetic disorders (Williams & Hill, 2012), but in general, most researchers believe that dependency on a substance is essentially rooted in conditioning principles and due to substance abuse, i.e. substance abuse changes many variables within a person. In the metacognition perspective, substance abuse leads to rapid and significant change in person's cognitive incidents. Recent research has increased our understandings of many paradoxical characteristics of the substance abuse behaviors. Based on the results of these investigations, the main problem is not just the lack of knowledge among substance abusers about the disadvantages and advantages of a substance, but their weakness against the compulsory and strong contemplation of using substances (Dimaggio, Carcione, Salvatore, Nicolò, Sisto & Semerari, 2011; Wells, 2008). This is the outcome of their lack of metacognition skills. Other scholars also confirmed the relationship between the metacognition and alcohol abuse (Herbert & Forman, 2011). Some others showed that the metacognition procures dysfunction, too.

In addition, they studied the consequences of the conceptual understanding of the alcohol abuse in the view of the metacognition (Spada, Moneta & Wells, 2007). Another researcher also showed that substance abuse causes dysfunction and delusions (Morrison, Gumley, Ashcroft, Manousos, White, Gillan, Wells & Kingdon, 2011).

In another research on alcohol abuse, it was concluded that positive and negative metacognition beliefs are effective in alcohol abuse and use alcohol as a control device to regulate mental stress, i.e. a positive metacognition on alcohol consumption lowers surveillance and accordingly increases alcohol intake. Drinking alcohol even for the first time disturbs the monitoring system of the cognition, and as a result, brings forth the second time drinking. Following this phase, using alcohol brings out both uncontrolled and risky situations that reinforce the negative metacognition belief in alcohol consumption. Therefore, in a vicious cycle, this belief triggers more drinking (Caltabiano & Ricciardelli, 2013). Many participants have confirmed the role of the metacognition beliefs in their dispositions towards substance abuse in many different tests. This matter has been stated by those people who considered using substance as a cognitive performance enhancer and a regulator of their negative feelings.

In general, for substance abusers, the metacognitive thinking and especially its approaches have dysfunctions. The results of some investigations have shown that metacognition may act as a potential factor in having an attitude towards substance abuse. This confirms other findings that metacognitive items have the main role in development, persistence, and responsive styles of the non-adaptation (Nikčević & Spada, 2010; Shirinzadeh Dastgiri, Gudarzi, Ghanizadeh, & Taghavi, 2008). Also, the findings of other investigations have shown that inability in controlling self could be the reflection or consequence of the deranged metacognitive beliefs of the substance abusers. Furthermore, these deranged beliefs may be responsible for disposition towards the usage of substances (Abolghasemi, Ahmadi & Kiamarsi, 2007; Rabbani Bavojdan, NikAzin, Kaviyani & Khezri Moghadam, 2012; Ahmadi-Tahoor, Soltani & Najafy, 2012). For instance, disordered beliefs, such as "my night sleep is disturbed" or "bad incidents keep happening", lead to regression to addiction, especially when substance abusers confront with some negative and unpleasant moods.

Deranged metacognitive beliefs weaken the coping styles, constructing cognitive interactions, and specific behaviors, and as a result, the context for substance abuse is rendered. A researcher (Wells, 2008) has proved that the metacognition therapy was effective in treating

depression and anxiety. The present research aimed to test whether the metacognition therapy is an effective method in treating substance abusers' disposition towards substance abuse. Furthermore, research indicates that the metacognition training can decrease or prevent substance abusers' regression to substance abuse (Rabbani Bavojdan, NikAzin, Kaviyani & Khezri Moghadam, 2012; Ahmadi-Tahoor, Soltani & Najafy, 2012). With the purpose of studying the role of the metacognitive variables, their dimensions, and sensations, some researchers compared the dysfunctional attitudes of 100 individuals. Their results showed that the metacognition training was effective in decreasing or preventing substance abusers' regression to substance abuse, too (Hajializadeh, Bahrinian, Naziri, & Modares-Gharavi, 2008). Therefore, a disposition towards substance abuse is a function of individuals' metacognition. The issue of need for decreasing the disposition towards substance abuse seems inevitable as the increased needs of therapists in using new methods and novel approaches are confirmed by the science of psychology.

Craving to use a substance is a common intervention among substance abusers (Toneatto, 1999). In addition, some researchers have shown the importance of the 'crave' in a research entitled "A triphasic metacognitive formulation of problem drinking" (Figure 1). In this regard, they have explained three phases. The first phase consists of the cravings, having mental images, memories, and thoughts, in addition to a positive belief on the usage that all lead to having a desire to think, ruminate, and worry, or any possible combinations of the mentioned items. The second phase is the escalation of craves, negative effect, reinforcement of the negative metacognitive beliefs about the need for controlling thoughts that leads to the increase in alcohol consumption. The third phase states that after activation of the positive metacognition on the rumination for alcohol usage, decrease in the metacognition surveillance and deregulation in the discipline are procured. In this phase, after the activation of the positive rumination of the post-event, the consequences of the affective, cognitive, and physiological aspects of dysfunction and deregulate; therefore, over the course of time they cause severe rumination that by itself is the cause of contradiction in the negative affection and thoughts about alcohol consumption (Spada, Caselli & Wells, 2012).

Thus, considering aforementioned researches, metacognition is an important cognitive mediator for the substance abusers seeking therapy. The main goal of the present research was to evaluate the training of the metacognition approaches with regard to the effective methods in treating the substance abusers who are the members of the Society of the Therapy-Oriented Community (STC). To this effect, the primary focus of the present research was to evaluate the three-phase model of Spada, Caselli, and Wells (Spada, Caselli & Wells, 2012), who applied the metacognition approaches on the alcohol abusers. Some researchers conducted an investigation on 200 abusers and 200 non-abusers and came to the conclusion that a change in metacognition beliefs was necessary to decrease in drug usage.

Thus, the raised question was whether teaching the metacognitive approaches to substance abusers and reinforcing the metacognition would be effective in treating or decreasing substance abusers' disposition towards substance abuse. So, the first hypothesis is that training the metacognitive approaches would have a positive impact on substance abusers' metacognition training. The second hypothesis is that training the metacognitive approaches would have a positive impact on decreasing substance abusers' disposition towards substance abuse (Baghiani Moghadam, Fazel Poor & Rahai, 2008).

2. Methods

The present research is a pre-test, post-test experiment. The statistical population was all the substance abusers of the Society of the Therapy-Oriented Community (TC) of the Mental Well-Being Office in Kerman. Using the Krejcie and Morgan table (Krejcie & Morgan, 1970), the sample was calculated as 36 participants who were recruited by simple random method. Then, they were divided into two groups (18 each): experiment (intervention) and control (comparison) groups. Next, the independent variable (the metacognition approaches) was implemented.

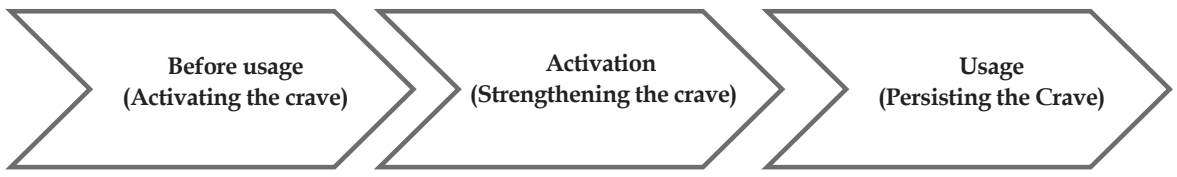

Figure 1. The triphasic model of the metacognition of drinking problem.

Psychotic and uneducated people were excluded from the group. To measure the variables, the questionnaires of the metacognition (MCQ-30) and the substance abuse disposition (ADQ) were used as the pretest and the posttest with the consent of the participants in both experimental and control groups. MCQ-30 is a 30-question test measuring the indexes of metacognitive beliefs consisting of positive beliefs about worries; negative beliefs about riskiness and uncontrollability; lack of cognitive confidence; the need to control thoughts; and cognitive self-conscious. The scoring is based on four scales (completely agree to disagree) from one to four. The lowest score is 30 and the highest is 120. The internal consistency of the global questionnaire is 0.93 (α =0.93) and its sub-scales ranges from 0.71 to 0.87 that seems to be satisfactory (Shirinzadeh Dastgiri, Gudarzi, Ghanizadeh, & Taghavi, 2008). Its reliability was reported to be 0.79 in positive beliefs about worries, and 0.59 with respect to negative beliefs about riskiness and uncontrollability, 0.69 with respect to the lack of cognitive confidence, 0.74 in the need to control thoughts, and 0.87 in cognitive self-conscious (Abasi, Fata, Sadeghi, Banihashemi & Mohammadi, 2013). In the present research, the items of the questionnaire have a high internal consistency and reliability for positive beliefs about worries (0.69); negative beliefs about riskiness and uncontrollability (0.78); lack of cognitive confidence (0.69); the need to control thoughts (0.78); and for cognitive self-conscious (0.86).

ADQ is a written test constructed with 54 questions that are scored based on yes and no answers. This questionnaire reported to have a reasonable consistency and validity of 0.76 and 0.89 (Cronbach α reliability) (Khayatipur, Ghorban Shirudi, & Khalatbari, 2010). In the present research, the validity of the questionnaire, by the panel of experts, was 0.89 and its reliability, using Cronbach α, was calculated to be 0.76.

To conduct the experiment, and in order to first keep the consistency, Wells' seven common steps of therapy sessions were provided as follows (Wells, 2008):

1. Determining the nature of the problem in the last passed month.
2. Determining the time schedule.
3. Diagnosing (if necessary) and measuring the risk.
4. Investigating about A-M-C1.
5. Selecting and applying the suitable measurement tool.
6. Investigating the amount of motivation and the desire for corporation and working out a way to solve the possible difficulties.
7. Determining the goal of treating the patients.

The summary of the sessions, and the number for each session are listed as follows:

1. Getting to know the clients.
2. Introducing the metacognition model.
3. Challenging the positive and negative metacognition beliefs.
4. Introducing the inefficient coping techniques and their quantification.
5. Continuation of the challenge of positive and negative metacognition beliefs.
6. Challenging the CAS2.
7. Introducing the dual mental approaches.
8. Formulating a program for coping and anticipating the possible impulses (craves).
9. Completing a general plan for treatment and programming all sessions of reinforcement for the future sessions.

The data were analyzed with the help of the SPSS version 19, conducting the descriptive statistics, such as the mean and the standard deviation, and the inferential analysis like the MANCOVA.

3. Results

The descriptive analyses related to the indexes of the metacognitive beliefs are presented in Table 1, comprising the mean and the standard deviation. It is necessary to mention that before conducting the analyses, the presumptions were tested.

Based on the data in Table 1, the indexes of the metacognitive beliefs have these scores:

In the experimental group with regard to 'the positive beliefs about worries' in the pretest, the mean score was 16.44±3.40 (Mean±SD), and in the control group, the same beliefs got the mean score of 15.64±2.03 in the pretest. In the experimental group with regard to 'the positive beliefs about worries' in the posttest, the mean score was 23.33±4.88, and these beliefs in the control group in the posttest, had 16.06±2.38.

1. The standard model of Metacognitive Therapy (A→ M→ C) in return the standard model in Cognitive Therapy (A→ B→ C).

2. Cognitive Attentional Syndrome (CAS)

Table 1. Descriptive indexes of dependent variables.

Metacognition belief	Pre/post tests	Experimental Group		Control Group	
		M	SD	M	SD
Positive beliefs about worries	Pretest	16.44	3.40	15.64	2.03
	Post test	23.33	4.88	16.06	2.38
Negative beliefs about riskiness and uncontrollability	Pretest	21.16	2.18	21.27	2.20
	Post test	16.35	2.74	22.73	3.24
Lack of cognitive confidence	Pretest	14.26	2.12	15.10	1.29
	Post test	18.34	3.24	15.78	2.28
The need to control thoughts	Pretest	10.14	2.70	11.12	2.63
	Post test	16.06	1.51	10.89	2.28
Cognitive self-conscious	Pretest	12.26	2.62	11.26	2.69
	Post test	19.73	2.24	12.20	2.47
Global meta-cognition	Pretest	73.51	5.03	74.29	4.24
	Post test	88.08	4.86	75.57	4.64
Substance abuse disposition	Pretest	46.21	6.20	74.19	54.20
	Post test	14.73	2.10	19.22	2.18

n=18; df=1, 34

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In the experimental group with respect to 'the negative beliefs about riskiness and uncontrollability' in the pretest, the mean score was 21.16±2.18, and in the control group, with respect to these beliefs in the pretest, the mean score was 21.27±2.20. In the experimental group with respect to 'the negative beliefs about riskiness and uncontrollability' in the posttest, the mean score was 16.35±2.74, and these beliefs in the control group had the mean score of 22.73±3.24.

In the experimental group, 'the lack of cognitive confidence' in the pretest scored the mean of 14.26±2.12, and in the control group, these beliefs scored the mean of 15.10±1.29. In the experimental group, in the posttest 'the lack of cognitive confidence' had the mean score of 18.34±3.24, and these beliefs in the control group had the mean of 15.78±2.28 in the posttest.

In the experimental group with respect to 'the need to control thoughts' in the pretest, the mean score was 10.14±2.70, and in the control group the same beliefs got the mean score of 11.12±2.63. In the experimental group in the posttest, the need to control thoughts got the mean score of 16.06±1.5, and these beliefs in the control group had the mean score of 10.89±2.28.

In the experimental group with regard to 'the cognitive self-conscious' in the pretest, the mean score was 12.26±2.62, and in the control group, the same beliefs got the mean score of 11.26±2.69. In the experimental group with respect to 'cognitive self-conscious' in the posttest, the mean score was 19.73±2.24, and these beliefs in the control group got the mean score of 12.20±2.47.

In the experimental group with respect to 'the global metacognition' in the pretest, the mean score was 73.51±5.03, and in the control group the same beliefs had the mean score of 74.29±4.24. In the experimental group with regard to 'the global metacognition' in the posttest, the mean score was 88.08±4.86, and these beliefs in the control group had the mean score of 75.57±4.64.

In the experimental group with regard to 'the substance abuse disposition' in the pretest, the mean score was 46.21±6.20, and in the control group the same beliefs got the mean score of 74.19±5.42. In the experimental group with regard to 'the substance abuse disposition' in the posttest, the mean score was 14.73±2.10, and these beliefs in the control group got the mean score of 19.22±2.18.

The covariance assumptions

The first assumption: the continuous dependent variable should be measured.

Second: independent variable must include at least two dependent groups.

Third: The results of the various subjects to be independent from each other.

Fourth: the affiliated groups should be of significant outliers.

Fifth: the dependent variable distribution group should be almost normal.

Sixth: the variance of the difference between all combinations of groups should be the same.

Seventh: covariance between the groups should be homogeneous.

Eight: variance between groups should be homogeneous.

Before the analysis, the Kolmogorov–Smirnov test of normality (sig.) was conducted and the results of 'the positive beliefs about worries' in Table 2, showed that in both groups (both in pretest and posttest), the scores confirmed the distributions. The impact of the interaction tests between the pretest and the groups was not significant (F=1.54, P=0.27). Therefore, the regression slopes seem to be equal. Cox's test for homogeneity of variance was conducted and the results showed that the variances of the pretest and posttest were equal (F=2.17, P=0.12), and the results of the linearity test showed that the relationship was a linear one (F=0.61, P=0.01). The correlation between the pretest and posttest of 'the positive beliefs about worries' with the history of abuse (years of usage) showed that the relationship was linear (F=-0.32, P=0.05).

The results of the Kolmogorov–Smirnov test of normality of 'the negative beliefs about riskiness and uncontrollability' in Table 2, showed that in both groups (both in pretest and posttest) the scores distributions were normal. The impact of the interaction tests between the pretest and the groups was not significant (F=0.78, P=0.46). Therefore, the regression slopes seemed to be equal. Cox's test for homogeneity of variance showed that the variances of the pretest and the posttest were equal (F=1.74, P=0.19), and the results of the linearity test showed that the relationship was a linear one (F=0.66, P=0.01). The correlation of 'the negative beliefs about riskiness and uncontrollability' (pretest-posttest) with the history of abuse showed that the relationship was linear (F=0.35, P=0.05).

The Kolmogorov–Smirnov test of normality of 'lack of cognitive confidence' showed that in both groups (in both pretest and posttest) the scores distributions were normal. The impact of the interaction tests between the pretest and the groups was not significant (F=0.40, P=0.54). Therefore, the regression slopes seemed to be equal. Cox's test for homogeneity of variance showed that the variances of the pretest and the posttest were equal (F=0.39, P=0.54), and the results of the linearity test showed that the relationship was linear (F=0.59, P=0.01), and also showed that the relationship was a linear one (F=0.66, P=0.01). The correlation of 'lack of cognitive confidence' (pretest-posttest) with the history of abuse shows that the relationship was linear (F=-0.33, P=0.05).

The Kolmogorov–Smirnov test of normality of 'the need to control thoughts' showed that in both groups (in both pretest and posttest), the scores distributions were normal. The impact of the interaction tests between the pretest and the groups was not significant (F=0.64, P=0.12). Therefore, the regression slopes seemed to be equal. Cox's test for homogeneity of variance showed that the variances of the pretest and the posttest were equal (F=0.49, P=0.32). The results of the linearity test showed that the relationship was a linear one (F=0.60, P=0.01), and showed that the relationship was linear (F =0.66, P=0.01). The correlation of 'the need to control thoughts' (pretest-posttest) with the history of abuse showed that the relationship was linear (F=0.32, P=0.05).

The Kolmogorov–Smirnov test of normality of 'the cognitive self-conscious showed that in both groups (in both pretest and posttest) the scores distributions were normal. The impact of the interaction tests between the pretest and the groups was not significant (F=0.27, P=0.60). Therefore, the regression slopes seemed to be equal. Cox's test for homogeneity of variance showed that the variances of the pretest and the posttest were equal (F=0.68, P=0.74), and the results of the linearity test showed that the relationship was a linear one (F=0.69, P=0.01). The correlation of 'the cognitive self-conscious' (pretest-posttest) with the history of abuse showed that the relationship was linear (F=-0.36, P=0.05).

The Kolmogorov–Smirnov test of normality of 'the global metacognition' showed that in both groups (in both pretest and posttest) the scores distributions were normal. The impact of the interaction tests between the pretest and the groups was not significant (F=3.33, P=0.08). Therefore, the regression slopes seemed to be equal. Cox's test for homogeneity of variance showed

Table 2. Presumptions of the scores distributions.

Dependent variable		Impact of interaction tests between participants and the dependent variable				Equality of variances		Pretest Post test correlations		Pretest Post test (years of abuse)	
Metacognition belief	**Test**	**Test/Group**	**Mean square**	**F**	**Sig.**	**F**	**Sig**	**r**	**Sig.**	**r**	**Sig.**
Positive beliefs about worries	Pretest	Pretest	56.14	4.50	4.04	2.17	0.12	0.61	0.01	-0.34	0.05
		Groups	0.89	0.08	0.80						
	Post test	Pretest * Groups	12.34	1.54	0.27						
		Error	14.04								
Negative beliefs about riskiness and uncontrollability	Pretest	Pretest	136.71	15.03	0.01	1.74	0.19	0.66	0.01	0.35	0.05
		Groups	157.41	12.61	0.01						
	Post test	Pretest * Groups	2.32	0.78	0.46						
		Error	7.55								
Lack of cognitive confidence	Pretest	Pretest	37.22	17.19	0.01	0.39	0.54	0.59	0.01	-0.33	0.05
		Groups	32.15	5.27	0.01						
	Post test	Pretest * Groups	0.67	0.40	0.54						
		Error	4.97								
The need to control thoughts	Pretest	Pretest	98.50	4.40	0.01	0.49	0.32	0.60	0.01	0.32	0.05
		Groups	105.03	4.60	0.01						
	Post test	Pretest * Groups	14.54	0.64	0.12						
		Error	22.61								
Cognitive self-conscious	Pretest	Pretest	139.20	14.39	0.01	0.68	0.74	0.69	0.01	-0.36	0.05
		Groups	18.06	18.30	0.01						
	Post test	Pretest * Groups	0.26	0.27	0.60						
		Error	0.98								
Global meta-cognition	Pretest	Pretest	8.74	11.59	0.01	0.88	0.20	0.70	0.01	-0.46	0.01
		Groups	16.03	121.67	0.01						
	Post test	Pretest * Groups	2.54	3.33	0.08						
		Error	0.76								
Substance abuse disposition	Pretest	Pretest	23.60	75.11	0.01	0.62	0.42	0.57	0.01	-0.47	0.01
		Groups	8.09	18.26	0.01						
	Post test	Pretest * Groups	0.49	0.92	0.40						
		Error	0.53								

n=18; df=1, 34

that the variances of the pretest and the posttest were equal (F=0.88, P=0.20), and the results of the linearity test showed that the relationship was a linear one (F=0.70, P=0.01). The correlation of 'the global metacognition' (pretest-posttest) with the history of abuse showed that the relationship was linear (F=-0.36, P=0.05).

The Kolmogorov–Smirnov test of normality of 'the substance abuse disposition' showed that in both groups (in both pretest and posttest) the scores distributions were normal. The impact of the interaction tests between the pretest and the groups was not significant (F=0.92, P=0.40). Therefore, the regression slopes were probably equal. Cox's test for homogeneity of variance showed that the variances of the pretest and the posttest were equal (F=0.62, P=0.42), and the results of the linearity test showed that the relationship was a linear one (F=0.57, P=0.01). The correlation of 'the substance abuse disposition' (pretest-posttest) of the history of abuse showed that the relationship was linear (F=-0.47, P=0.01).

So far, the pretests of the variables and the history of substance abuse (years of usage) were slack variables. In order for the linearity to be justified, their correlation coefficients between the pretests of the variables should

Table 3. The matrix of correlations of metacognition items: substance abuse, disposition, and history of abuse (years of usage).

	Variable	1	2	3	4	5	6	7	8
1	Positive beliefs about worries	-							
2	Negative beliefs about riskiness and uncontrollability	-0.55*	-						
3	Lack of cognitive confidence	0.61*	-0.57**	-					
4	The need to control thoughts	0.68**	-0.64**	0.48**	-				
5	Cognitive self-conscious	0.71**	-0.57**	0.61**	0.68**	-			
6	Global metacognition	0.75**	0.72**	0.75**	0.70**	0.75**	-		
7	Substance abuse disposition	-0.44**	-0.58**	-0.55**	-0.51**	0.41**	-0.55**	-	
8	History of abuse (years of usage)	-0.34**	0.35**	-0.33**	0.32**	-0.36**	-0.46**	-0.47**	-

* P≤0.05, **P≤0.01

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be lower than the level of expectations (0.90); thus, with these correlations, the assumption of non-multiple linearity among variables was justified. In order to see the nonlinearity assumptions among the pretests, the matrix of the correlation results is presented in Table 3.

In order to investigate the effect of the intervention (experiment), a multivariate analysis of covariance (MANCOVA) was conducted on the pretest scores and the results were compared to the posttest scores. The results of the MANCOVA on the metacognition items with respect to the control of the pretests and the history of abuse are presented in Table 4.

According to Table 4, the results showed that, in respect to Pillai's effect (5.77), at least one of the dependent variables (the metacognition items) indicated a significant difference. To investigate the cutting difference, an analysis of the covariance was conducted in the context of MANCOVA on dependent variables. The results of the covariance in the context of MANCOVA are presented in Table 5.

According to Table 5, the results showed that the covariance analysis was significant in all items of the metacognition. Therefore, there was a significant difference in the experimental group in ameliorating or recovering the metacognition in comparison to the control group of the substance abusers, and the change was due to the intervention. Also, with respect to the history of the substance abuse (years of abuse), it can be stated that the experiment was useful without considering years of abuse.

The results of the covariance analysis regarding the impact of the metacognition training in recovering the global metacognition in both groups of the posttests with respect to the control of the pretests are presented in Table 6.

Based on Table 6, the effect of the pretest with the estimate of 15.73 at the 0.01 level of significance was meaningful. The power of the test was 0.98 and the eta square 0.38. Therefore, the hypothesis of the research was confirmed.

The disposition towards substance abuse

The results of the covariance analysis of the impact of the metacognition training on 'disposition towards substance abuse' in both groups - in posttest with respect to the controlling pretest and years of abuse- are presented in Table 7.

According to Table 7, the effect of the pretest with the estimate of 17.42 at the 0.01 level of significance was meaningful. The power of the test was 0.98 and the eta square 0.47. Therefore, the hypothesis of the research was confirmed.

Table 4. The summary of MANCOVA for the comparison of posttests results of the meta-cognition items in experimental and control groups.

Effect	Test	Value	F	df (hypothesis)	df (error)	Sig.	Effect size	Power of the test
Group	Pillai's effect	0.55	5.77	5	30	0.10	0.55	0.97

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Table 5. The results of the covariance in the context of MANCOVA for the comparison of posttests results of dependent variables in experimental and control groups.

Effect	Dependent variable	Sum of squares	Mean square	F	Sig.	Effect size	Power of the test
Group	Positive beliefs about worries	2654.21	2654.21	11.91	0.01	0.75	0.98
	Negative beliefs about riskiness and uncontrollability	1245.07	7245.07	7.65	0.01	0.65	0.96
	Lack of cognitive confidence	1524.22	1524.22	9.69	0.01	0.71	0.97
	The need to control thoughts	1575.79	1575.72	9.88	0.01	0.72	0.97
	Cognitive self-conscious	1287.35	1287.35	8.95	0.01	0.67	0.96

df=1

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4. Discussion

This research was conducted with the purpose of investigating the impact of the metacognition training on males metacognition and their disposition towards substance abuse. First, the participants had 10 sessions of metacognition training, and both the metacognition and the disposition towards substance abuse were tested at the beginning and at the end of the sessions. The results showed that the training was useful in changing the metacognition approaches, and as a result, it changed their disposition towards substance abuse.

The first hypothesis was confirmed indicating that training the metacognitive approaches would have a positive impact on the substance abusers' metacognition training. This finding concords with the results of Rabbani-Bavojdan et al. (2012) on the relationship between general self-efficacy or the metacognition beliefs and coping strategies; the results of Ahmadi-Tahoor, Soltani, and Najafy (2012) on the metacognitive beliefs and ambiguity tolerance; the results of the research on the relationship between the metacognition and substance abusers' perfectionism 3; and the findings of Hajializadeh et al. (2008) on the comparison of dysfunctional attitudes, metacognition, their dimensions, and sensations. In addition, the results are in agreement with the results of Dimaggio et al. (2011) on the metacognition and obsessive-compulsive personality disorders that were treated with the metacognitive interpersonal therapy.

The finding of this hypothesis is explained by the fact that the more substance abuse, the worse destructed metacognition. As a person abuses more drugs, his metacognition abilities will decrease further; which in turn leads to strong disposition towards the substance abuse.

The second hypothesis was confirmed indicating that training the metacognitive approaches would have a positive impact on decreasing substance abusers' disposition towards substance abuse. This finding concords with the findings of Rabbani-Bavojdan et al. (2012) on the relationship between general self-efficacy and metacognition beliefs; the results of Ahmadi-Tahoor, Soltani and Najafy (2012) on the comparison of the metacognitive beliefs and ambiguity tolerance; the results of the Baghiani-Moghadam, Fazel Poor, and Rahai (2008) on the necessity of change to decrease the substance; and the result of Nikčević and Spada (2010) and Morrison et al. (2011) studies on the metacognition and persecutory delusions. They showed that the metacognition is effective in decreasing smoking.

Table 6. Covariance analysis.

Index variable	df	Means square	F	Sig.	Eta squared	Power of test
Group (control)	1	4616.31	15.74	0.01	0.38	0.98
Positive beliefs about worries	1	2654.21	11.91	0.01	0.75	0.98
Negative beliefs about riskiness and uncontrollability	1	7245.07	7.65	0.01	0.65	0.96
Lack of cognitive confidence	1	1524.22	9.69	0.01	0.71	0.97
The need to control thoughts	1	1575.72	9.88	0.01	0.72	0.97
Cognitive self-conscious	1	1287.35	8.95	0.01	0.67	0.96

df=1

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Table 7. Covariance analysis of the impact of the metacognition training on disposition towards substance abuse in both groups in the posttest.

Index variable	Means square	F	Sig.	Eta square	Power of test
Groups	2892.63	17.42	0.01	0.47	0.98

df=1

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This finding is explained by the fact that after training the metacognition approaches, the approaches show the addicted a new way of life and awaken and strengthen their hidden abilities, to confront with the temptations and the impulses to return to substance abuse. Obviously, substance abuse is related to people's beliefs. Primarily, when these beliefs function inadequately, they do not have the potency to prevent abuse or protect people. When beliefs become strong, they act as a protective mean and a shelter.

This study had some limitations too. First of all, it was an interventional study on just males' substance abusers, so it is difficult to generalize these findings to all abusers. Second, the main limitation relates to not enough references on substance abuse and metacognition. Moreover, data were collected by self-report instrument that should be considered. Finally the sample participants had special conditions that made them hard to work with.

It is suggested that future researchers consider these findings and investigate them on both genders. It is better to do these studies in TCs, as the abusers are together there. Larger samples of other societies in other cities are to be considered too. In addition, the impact of the metacognition training should be investigated on other disorders too. Besides, these findings have implication in the treatment of substance abusers bitterly.

The results of the analyses showed that the metacognition strategies and trainings significantly and positively changed the metacognition and accordingly reduce the disposition towards the substance abuse. Using metacognition trainings in the process of treatment is an effective technique in changing the metacognition approaches and reducing the disposition towards substance abuse.

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