

# Metacognitions of Substance-Addicted Patients Compared to Individuals Without a Diagnosis of a Psychiatric Disorder

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## Abstract

In order to better understand the cognitive and adaptive functioning of the human mind, it is aimed to examine the relationship between the metacognitive problems and dependence associated problems of individuals with substance dependence by comparing the metacognition of the substance-dependent individuals to that of the individuals without a diagnosis of a psychiatric disorder. The study included 34 patients under treatment with the diagnosis of substance dependence and 34 non-patient individuals without any substance dependence diagnosis. A sociodemographic information form, The Metacognitions Questionnaire-30 published in 2008, and The Addiction Profile Index published in 2012 were used for the assessments in the study. The data produced by the administration of the scales were evaluated statistically using descriptive methods. The Kolmogorov-Smirnov distribution test was used for evaluating whether the data conform to a normal distribution. The t-test was used for comparing the parameters between the groups. The Pearson Correlation Analysis was used for comparing the differences between the scales. The study results demonstrated that the metacognition questionnaire scores of the patients being treated at the hospital for the diagnosis of substance dependence disorder were higher compared to those of the individuals without a psychiatric disorder. In regard to the assessment of the sub-dimensions of metacognition; the scores of the following subscales including the uncontrollability and danger, cognitive self-consciousness, and the need to control thoughts were higher in the substance dependent group compared to the control group. These results indicate that substance use has a negative impact on metacognition. It has also been determined that the metacognition of the negative beliefs about the uncontrollability of thoughts and danger, the positive beliefs about worry and the beliefs about the need to control thoughts were associated with the substance use characteristics and the frequencies of use. The study results suggest that the metacognitive processes and their sub-dimensions are important factors in the diagnosis and treatment of substance dependence; therefore, they should be considered to gain an insight into these processes.

**Keywords:** Substance-related disorders, metacognition, addiction, dependency (psychology)

## Öz

### Ruh sağlığı bozukluğu olmayan bireylere göre madde bağımlılığı olan hastaların üstbilgi özellikleri

Zihnin bilişsel ve uyuma yönelik çalışmasını daha iyi anlamak için, madde bağımlısı kişilerle, sağlıklı kişilerin üstbilgi işlevlerinin karşılaştırılması; ayrıca madde bağımlısı bireylerin bağımlılığa yönelik sorunlarıyla üstbilgi arasındaki ilişkinin incelenmesi amaçlanmıştır. Araştırmaya madde bağımlılığı tanısı alarak tedavi görmekte olan 34 hasta ve madde bağımlılığı tanısı almamış 34 sağlıklı birey dahil edilmiştir. Araştırmada, Sosyodemografik bilgi formu, 2008 yılında yayınlanan Üstbilgi Ölçeği-30 ve 2012 yılında yayımlanan Bağımlılık Profil İndeksi uygulanmıştır. Uygulanan ölçekler sonucunda elde edilen veriler değerlendirilirken tanımlayıcı istatistiksel metotların yanı sıra normal dağılımın incelenmesi için Kolmogorov-Smirnov dağılım test, parametrelerin gruplar arası karşılaştırmalarında t-testi, ölçekler arası karşılaştırmalarda ise Pearson Korelasyon Analizi kullanılmıştır. Çalışmadan elde edilen bulgular ışığında; madde bağımlılığı tanısı alarak hastanede tedavi görmekte olan hasta grubunun üstbilgi puanlarının madde bağımlılığı olmayan sağlıklı bireylere göre daha yüksek olduğu bulunmuştur. Üstbilginin alt boyutlarında; bağımlı grubun kontrol edilemezlik ve tehlike, bilişsel farkındalık ve düşünceleri kontrol ihtiyacı alt boyutlarından aldıkları puanları sağlıklı gruptan daha yüksektir. Bu sonuçlar madde tüketiminin üstbilgi üzerinde olumsuz etkisi olduğunu göstermektedir. Ayrıca kontrol edilemezlik ve tehlike, endişe ile ilişkili olumlu inançlar ve düşünceleri kontrol ihtiyacı üstbilgilerinin madde bağımlılık özellikleriyle ve kullanım sıklığıyla ilişkili olduğu belirlenmiştir. Çalışma sonucunda elde edilen bulgular üst bilişsel süreçler ve alt boyutlarının madde bağımlılığı tanı ve tedavi süreçlerinde önemli olduğu ve bu süreçlerin anlaşılmasında dikkate alınması gerektiğini düşündürmektedir.

**Anahtar Kelimeler:** Madde ile ilgili bozukluklar, üst biliş, bağımlılık, bağımlılık (psikoloji)

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## INTRODUCTION

Originally, the term metacognition was introduced in the educational literature as the capacity to reflect the individual's own thoughts during the process of education (Flavell, 1979). The increasing number of studies has led to the conclusion that metacognition is recognized in terms of knowledge and cognitive processes involved in thinking, controlling, and directing the thought processes (Wells, 2000). Metacognition is divided into two broad sets of beliefs in psychological disorders (Wells, 2000): (1) Negative beliefs about the importance, controllability, and danger of certain types of thought, and (2) positive beliefs about some coping strategies determining some attitudes, including the ones towards addictive substances, for example, thinking that "worries are helpful in recognizing the problems" or "smoking increases the capacity to focus on the problems". Later, the use of this concept has been expanded over many research areas such as attachment, psychopathology, and developmental or cognitive psychology (Bacon & Izaute, 2009; Dinsmore et al., 2008; Tarricone, 2011)

From a general perspective, this context defines an extensively complex network of processes allowing for the integration of intersubjective knowledge in order to form one's own desires or feelings and to build unique comprehensive representations of others and of the World (Semerari et al., 2003). Several associations between these skills have been observed in the literature, all of them demonstrating the cognitive processes underlying the interpersonal experiences. In order to build a combined field, Lysaker et al. (2005) proposed the definition of metacognition including the four major skills:

- (1) The capacity to think of reflection of the self or of the mental states of the self;
- (2) The capacity to think of the status of other people's minds, or thinking about other people's mental states;
- (3) The capacity to understand that mankind is not the center of the world and that there are different ways of understanding reality; and
- (4) The capacity to integrate the experiences and the inner knowledge in a format that can be adaptable into the problems with broad definitions.

High-level functioning metacognition indicates that the person has a high capacity to create representations of one's

self, others, and the world, using these representations in order to respond appropriately to the psychological and social challenges (Lysaker et al., 2005). Recent studies have demonstrated that metacognition is significantly associated with the clinical parameters such as the symptom severity and level of functioning in several mental disorders including schizophrenia (McLeod, Gumley, MacBeth, Schwannauer and Lysaker, 2014), personality disorders (Semerari et al., 2014), hypochondriasis (Bouman & Meijer, 1999), depression (Ladegaard, Lysaker, Larsen and Videbech, 2014; Papageorgiou & Wells, 2003; Bouman & Meijer, 1999), test anxiety (Spada, Hiou, & Nikčević, 2006), state anxiety (Spada, Nikčević, Moneta, & Wells, 2008), obsessive-compulsive symptoms (Wells and Papageorgiou, 1998), nicotine addiction (Morrison, Wells, & Nothard, 2000), pathological procrastination (Spada et al., 2006; Wells and Papageorgiou, 1998), post-traumatic stress disorder (Roussis and Wells, 2006), and perceived stress (Spada et al., 2008). According to the metacognitive model of psychopathology, rather than focusing on the content of such experiences, one should focus on the processes that create, monitor, and sustain these cognitive experiences (Wells, 2009).

By means of metacognition, anxiety disorders and depression have been conceptualized and treated with remarkable results over the last twenty-five years (Normann, Van Emmerik, & Morina, 2014; Wells, 2009). As metacognition performs an executive function associated with cognition, it is also involved in emotional regulation (Wells, 2000). Thus, it is also involved in the development of emotional dysfunction and in its persistence. Emotional control problems are especially in the forefront of alcohol and substance use disorders. Such beliefs are considered to direct the individuals to the use of alcohol and to its maintenance as a means of cognitive-emotional regulation. Spada et al. conceptualized the role of metacognition in problematic alcohol use and in other behavioural patterns associated with dependence in several studies (Spada, Caselli, Nikčević and Wells, 2015; Spada et al., 2013; Spada & Wells, 2005, 2009). The authors defined the specific dimensions of metacognition associated with the use of alcohol, examining their relationship with the patterns of drinking behaviour (e.g. Spada, Zandvoort and Wells, 2007). Spada, Zandvoort et al. (2007) showed that cognitive beliefs associated with lack of confidence (negative evaluation of one's own cognitive function) predicted that one could be a problematic alcohol user, regardless of the negative emotions. In other words, the

specific dimensions of metacognition associated with alcohol use (positive metacognitive beliefs about alcohol use) lead to the alcohol drinking behaviour as a specific coping strategy against the emotions and cognition, playing an active role in aggravating the alcohol use problems gradually as an eventual result (negative metacognitive beliefs about alcohol use) of this strategy. Spada et al. (2009) also demonstrated that the high levels of belief about the need to control the thoughts predicted the future relapses and heavy drinking levels at the three, six, and twelve-month follow-up visits of the outpatients attending an abstinence program. Regular alcohol use is also associated with the activation of negative beliefs during and after a drinking event. Although the effectiveness of treatment approaches for alcohol problems has been extensively documented, relapsing to alcohol drinking behaviour is still common (Miller, Wilbourne and Hettema, 2003). Active beliefs trigger the negative emotional states that force a person to drink more (Spada, Moneta and Wells, 2007). Exacerbations in this behaviour tend to be associated with the symptoms of anxiety, depressive mood states (Driessen et al., 2001; Paulus et al., 2016; Tómasson and Vaglum, 1996), and stressful experiences (Wang & Chen, 2015).

There is empirical evidence that functional insufficiencies in metacognition are associated with poor outcomes in drug dependence treatments (Saladin et al., 2012; Thorberg et al., 2011). The type of the substance used, withdrawal, the risk for recurrences (Toneatto, 1999), self-inflicted harm (Blankenship, Nesbit, & Murray, 2013), emotional distress (De Rick, Vanheule, & Verhaeghe, 2009; Quattropiani, Lenzo, Mucciardi, & Toffle, 2016) and non-clinical cases of alcohol use (Lyvers, Onuoha, Thorberg and Samios, 2012) have all been associated with problems in the regulation of metacognition.

The outcomes of a literature review, covering the published articles until today, highlight the importance and association of working with this set of skills in individuals with dependence. There is a need for further research as the effects of current interventions on metacognition have not been documented yet or it has not been clarified yet whether there are specific metacognitive profiles for individual types of disorders. Regarding the types of interventions, although there is evidence that drug dependencies trigger significant neuropsychological changes, the potential to plan a treatment based on this information is still very limited (Bart, 2012). Therefore, an analysis in terms of metacognitive capabilities may contribute to new

psychotherapeutic treatment options and/or may help optimize the existing ones. For example, it has been observed that people with low scores on self-reflection respond better to individual interventions (Lysaker et al., 2013). On the contrary, it has been recommended that people with low scores on mastery would benefit more from the group interventions allowing them to develop an understanding in mental states of the other individuals (Wasmuth et al., 2015).

The scope of this research includes examining the metacognitive skills and the dependency scores of the patients under substance dependence treatment, investigating the associations of them to specific metacognitive features, and identifying the specifically differentiated metacognitive features in this patient population compared to the normal population.

## METHOD

### Participants

A total of 68 participants between the ages of 18-65 years were included in the study. Of these, 34 participants were the patients diagnosed with the substance use disorder and treated as inpatients at Neuropsychiatry Istanbul Hospital. The remaining 34 participants were the individuals without any diagnosis of the substance use disorder and without any history of previous psychiatric treatments. The patients were assigned to the patient group and to the control group by exercising care to allow an equivalent distribution in both groups in terms of age and sex. Individuals in both groups reported that they resided in a city. The questionnaires were administered in an appropriate environment on the basis of volunteering.

### Measures

#### *The Metacognitions Questionnaire-30*

The scale was originally named as Metacognition Questionnaire and was developed by Well and Cartwright-Hatton in 1997. In 2004, a shorter form of the scale was developed by the same authors and was named as The Metacognition Questionnaire-30 (MCQ-30). This questionnaire is used for ranking the interpersonal differences in cognitive confidence, positive and negative beliefs, and metacognitive monitoring (Well and Cartwright-Hatton, 2004). Tosun and Irak (2008) first made a preliminary

two-stage study consisting of translation and back-translation stages in order to translate the questionnaire into Turkish. After the required revisions were made on the relevant items of the questionnaire based on the study results, the elicited questionnaire in Turkish was administered to an appropriately sized study population. The Cronbach Alpha reliability coefficient of the Turkish version of the questionnaire was found to be 0.86. For the first (odd-numbered items) and second halves (even-numbered items) of the questionnaire, this coefficient was 0.72 and 0.79, respectively. The results showed that the internal consistency of MCQ-30 was high. In detail, the test re-test correlation coefficients for the items of the questionnaire were 0.40 (for MCQ-19), 0.94 (for MCQ-9), and between 0.70 and 0.85 for the subscales. The results demonstrated that the MCQ-30 is a reliable scaling tool in a Turkish sample. Factor analysis was used for determining the construct validity of MCQ-30 and the results showed a 'perfect level of adaptation' (Tosun and Iraq, 2008).

MCQ-30 consists of five factors, each having six items. The items number 1, 7, 10, 20, 23, and 28 compose the positive beliefs about worry subdimension, the items 6, 13, 15, 21, 25, and 27 compose the negative beliefs about uncontrollability of thoughts and danger subdimension, the items 8, 14, 18, 24, 26, and 29 compose the cognitive confidence subdimension, the items 2, 4, 9, 11, 16, and 22 compose the beliefs about need to control thoughts subdimension, and finally the items 3, 5, 12, 17, 19, and 30 compose the cognitive self-consciousness subdimension of the questionnaire (Well and Cartwright-Hatton, 2004). Each item on the scale is responded on a Likert type rating scale in a range from one to four. "I absolutely do not agree" is scored as 1, "I partly disagree" is scored as 2, "I partly agree" is scored as 3, and "I definitely agree" is scored as 4 (Tosun and Iraq, 2008).

### **Addiction Profile Index (BAPI)**

Ogel, Evren, Karadag, and Gurol (2012) developed a practical scale to evaluate the characteristics of the problems associated with the substance use on a multidimensional perspective and to help the treatment planning in individuals using alcohol or substances. Addictive Profile Index (BAPI) is a self-report questionnaire consisting of 37 questions and 5 sub-scales. The subscales rank the substance use characteristics, the diagnostic criteria of dependency, the effect of substance use on one's life, the craving for substance use, and the motivation to stop the use of substances. The scale was found to be sensitive to the use

of both alcohol and non-alcohol substances, allowing the inclusion of both substance-using individuals and alcohol users. Each item on the scale is responded on a Likert type rating scale in a range from one to five. "Never" is scored as 0, "rarely" is scored as 1, "sometimes" is scored as 2, "often" is scored as 3, and "almost always" is scored as 4. The Cronbach alpha coefficient of the whole scale was 0.89 and it was in the range from 0.63 to 0.86 for the subscales. The "item-total item" correlation coefficient for the total score was in the range from 0.42-0.89 (Ögel et al., 2012).

### **Study Design**

The SPSS 21.0 statistical analysis package program was used for performing the statistical analyses in order to evaluate the data elicited during the study. Due to the inconsistent answers to the control items and due to the missing or incorrect notations on the forms, four case report forms of the study were excluded from the analysis. The statistical analyses included 68 case report forms. The scales to collect data in the study were preferred as they were approved scales with reliability and validity analyses. The descriptive statistical methods such as frequency, percentage, mean, and standard deviation were used for evaluating the data. The Kolmogorov - Smirnov distribution test was used for testing whether the data conform for a normal distribution.

The Pearson Chi-square test and Fisher's exact test were used for comparing the categorical parameters. The t-test was used for comparing the parameters between the groups. The Pearson Correlation Analysis was used for comparing the differences between the scales.

The Mann-Whitney U test and Kruskal Wallis test were used for comparing the scores of the scales and the socio-demographic features as the quantitative data in the groups.

The results were evaluated in a 95% confidence interval and a value of  $p < 0.05$  was accepted to be statistically significant.

### **Procedure**

After the review of literature relevant for the objective of the thesis, The Addictive Profile Index (BAPI) and The Metacognition Scale (MCQ-30) were selected to be used in the study as both scales were analyzed for validity and reliability. The required permissions were obtained from

Uskudar University Neuropsychiatry Hospital in order to communicate with the eligible individuals in the proposed study sample, which was decided to consist of inpatients treated for dependency. The study was approved by the ethics committee of Uskudar University. The scales were administered to the inpatients with dependency, who were in the age range from 18 to 65 on the basis of volunteering. The data were collected from 38 patients; however, the forms from 34 patients were included in the analyses due to missing or incorrect answers in the forms and due to missing answers to the discriminating variables. Another group in the study sample was planned to consist of individuals without any diagnoses of dependence and without any history of previous psychological treatments. The individuals to be included in this group were selected to form the equivalent gender distribution to that of the patient group. Meeting these criteria, 34 non-patient individuals between 18-65 years old were contacted. Scales were administered to the non-patient individuals participating in the study under appropriate conditions on the basis of volunteering.

In order to evaluate the data to test the proposed hypotheses, Kolmogorov-Smirnov distribution test was used for examining whether the data conform to a normal distribution, and the Pearson Chi-square test and Fisher Exact test were used for comparing the data from the categorical parameters. The t-test was used for comparing the parameters between the groups. A Pearson Correlation Analysis was performed to compare the scales. The Mann-Whitney U test and Kruskal Wallis test were used for comparing the

quantitative data between the groups in terms of the scale scores and socio-demographic characteristics.

## RESULTS

Analysing the study data, the Kolmogorov-Smirnov distribution test was used to determine whether two data sets conform to the same patterns of distribution. The Pearson Chi-square test and Fisher Exact test were used for comparing the data from the categorical parameters. The t-test was used to compare the inter-group parameters.

The t-test was performed to determine whether the mean subscale scores and the mean of the total score of MCQ-30 were different between the groups. The results revealed a statistically significant difference between the groups in the mean scores of the following subscales including the negative beliefs about uncontrollability of thoughts and danger ( $t=3.624$ ;  $p=0.001<0.05$ ), the cognitive self-consciousness ( $t=2.561$ ;  $p=0.013<0.05$ ), and the beliefs about the need to control thoughts ( $t=2.436$ ;  $p=0.018<0.05$ ). The mean of the total score of MCQ-30 ( $t=2.436$ ;  $p=0.018<0.05$ ) was significantly different between the two groups, too. However, the differences in the mean scores of the following subscales including the positive beliefs about worry ( $t=1.253$ ;  $p=0.215>0.05$ ) and cognitive confidence ( $t=-0.057$ ;  $p=0.955>0.05$ ) were not statistically significant (Table 2).

**Table 1:** Sociodemographic characteristics

		Patient		Control		p
		n	%	n	%	
Age Group	Under 24	11	%32,4	9	%26,5	$X^2=0,325$ $p=0,850$
	25-30	8	%23,5	8	%23,5	
	Over 31	15	%44,1	17	%50,0	
Gender	Male	31	%91,2	31	%91,2	-
	Female	3	%8,8	3	%8,8	
Marriage Status	Married	12	%35,3	20	%58,8	$X^2=3,778$ $p=0,044$
	Single	22	%64,7	14	%41,2	
Psychiatric Treatment	Yes	24	%70,6	0	%0,0	$X^2=37,091$ $p=0,000$
	No	10	%29,4	34	%100,0	
Education	Primary School	6	%17,6	7	%20,6	$X^2=4,324$ $p=0,115$
	High School	16	%47,1	8	%23,5	
	Undergraduate	12	%35,3	19	%55,9	

**Table 2:** Distribution of the total and subscale scores of the Metacognitions Questionnaire by groups

	Patient (n=34)		Control (n=34)		t	p
	Mean	SD	Mean	SD		
Positive beliefs about worry	13.559	4.679	12.206	4.212	1.253	0.215
Cognitive confidence	12.294	4.570	12.353	3.876	0.057	0.955
Negative beliefs about uncontrollability of thoughts and danger	16.471	5.229	12.529	3.586	3.624	<b>0.001</b>
Cognitive self-consciousness	14.235	3.340	12.235	3.095	2.561	<b>0.013</b>
Beliefs about the need to control thoughts	15.765	4.023	13.441	3.839	2.436	<b>0.018</b>
Total scale score	72.324	16.709	62.765	13.398	2.602	<b>0.011</b>

**Table 3:** Correlation analysis of API and MCQ-30 scores

		Addiction Profile Index (API)					
		Substance use characteristics	Diagnostic Criteria	Effect on everyday life	Craving	Motivation	API total score
Positive beliefs about worry	r	0.350	0.293	0.414	0.188	0.419	0.423
	p	<b>0.043</b>	0.092	<b>0.015</b>	0.287	<b>0.014</b>	<b>0.013</b>
Cognitive confidence	r	0.307	0.329	0.355	0.015	0.231	0.305
	p	0.078	0.058	<b>0.040</b>	0.934	0.188	0.079
Negative beliefs about uncontrollability of thoughts and danger	r	0.551	0.560	0.720	0.225	0.534	0.652
	p	<b>0.001</b>	<b>0.001</b>	<b>0.000</b>	0.200	<b>0.001</b>	<b>0.000</b>
Cognitive self-consciousness	r	0.306	0.233	0.321	0.225	0.446	0.393
	p	0.078	0.185	0.064	0.201	<b>0.008</b>	<b>0.022</b>
Beliefs about the need to control thoughts	r	0.509	0.395	0.537	0.229	0.436	0.528
	p	<b>0.002</b>	<b>0.021</b>	<b>0.001</b>	0.193	<b>0.010</b>	<b>0.001</b>
Total MCQ score	r	0.538	0.489	0.632	0.227	0.542	0.611
	p	<b>0.001</b>	<b>0.003</b>	<b>0.000</b>	0.196	<b>0.001</b>	<b>0.000</b>

The results of the correlation analysis conducted to examine the relationship between the metacognition scale and the API scale in the patient group demonstrated that the positive beliefs about worry was positively and significantly correlated with the substance use characteristics ( $r = 0.350$ ;  $p = 0.043 < 0.05$ ) and the effect of substance use on everyday life ( $r = 0.414$ ,  $p = 0.015 < 0.05$ ) subscales. There was a positive and significant correlation between the metacognition subscale cognitive confidence and the API subscale the effect of substance use on everyday life ( $r = 0.355$ ,  $p = 0.040 < 0.05$ ). The negative beliefs about uncontrollability of thoughts and the danger subdimension was positively and significantly correlated to the following subscales of API including the substance use characteristics ( $r = 0.551$ ;  $p = 0.001 < 0.05$ ), diagnostic criteria ( $r = 0.560$ ;  $p = 0.001 < 0.05$ ), the effect of substance use on

everyday life ( $r = 0.720$ ;  $p = 0.000 < 0.05$ ), and motivation ( $r = 0.534$ ;  $p = 0.001 < 0.05$ ) (Table 3).

A significantly positive correlation was observed between the cognitive self-consciousness subscale of MCQ-30 and the motivation subscale of API ( $r = 0.446$ ,  $p = 0.008 < 0.05$ ). The beliefs about need to control the thoughts subscale was significantly and positively correlated with the following subscales of API including the substance use characteristics ( $r = 0.509$ ,  $p = 0.002 < 0.05$ ), diagnostic criteria ( $r = 0.395$ ,  $p = 0.021 < 0.05$ ), the effect of substance use on everyday life ( $r = 0.537$ ,  $p = 0.001 < 0.05$ ), and motivation ( $r = 0.436$ ;  $p = 0.010 < 0.05$ ). The mean total score of MCQ-30 was positively and significantly correlated with the following API subscales including the substance use characteristics ( $r = 0.538$ ;  $p = 0.001 < 0.05$ ), the

diagnostic criteria ( $r = 0.489$ ,  $p = 0.003 < 0.05$ ), the effect of substance use on everyday life ( $r = 0.489$ ;  $p = 0.003 < 0.05$ ), and the motivation ( $r = 0.542$ ;  $p = 0.001 < 0.05$ ) (Table 3).

There was a significantly positive correlation between the mean total score of the API scale with the following subscales of MCQ-30 including the positive beliefs about worry ( $r = 0.423$ ;  $p = 0.013 < 0.05$ ), the negative beliefs about uncontrollability of thoughts and danger ( $r = 0.652$ ;  $p = 0.000 < 0.05$ ), cognitive self-consciousness ( $r = 0.393$ ;  $p = 0.022 < 0.05$ ), and the beliefs about need to control thoughts ( $r = 0.528$ ;  $p = 0.001 < 0.05$ ). The total scores of API and MCQ-30 were positively and significantly correlated ( $r = 0.611$ ,  $p = 0.000 < 0.05$ ) (Table 3).

## DISCUSSION

The aim of our study was to assess whether the metacognitive features of the substance dependent patients were different from those of non-patient individuals and to determine the correlation of the metacognitive features with dependency characteristics. Therefore, two groups were included in the study. One of the groups consisted of 34 people who were on treatment because of a substance use disorder. The other group consisted of 34 non-patient volunteering individuals with matching sociodemographic characteristics and without a psychiatric disorder. Comparing the features of metacognition, it was seen that there was not a difference in the subdimensions of the positive beliefs about worry and cognitive confidence. Several studies emphasize the specific association of metacognition with dependency. The positive beliefs about worry are suggested to be a part of this process (Spada and Wells, 2006, 2009). However, the positive beliefs about worry are also highly related to our other emotion regulation skills (Wells, 2000). In psychological disorders, metacognition is divided into two categories as positive and negative beliefs toward worry (Wells, 2000). The positive beliefs about worry are particularly evident in several conditions, such as generalized anxiety disorders (Wells and Papageorgiou, 1998) and perceived stress (Spada, Nikcevic, et al., 2008). The positive beliefs about worry are considered to be the first step in depression (Papageorgiou and Wells, 2003) or in alcohol dependency (Spada et al., 2013); however, they become symptomatic due to subsequent metacognitive organizations. In a study on individuals with OCD and healthy controls, Pazvantoglu et al. (2013) reported that they did not find a significant difference in the positive beliefs about worry.

This can be interpreted with the uncontrollability of the experienced stress in OCD rather than the impact of positive beliefs. Yilmaz (2015) determined that positive beliefs about worry were associated with ruminations but they were not directly associated with depression in a study on university students. For this reason, we may suggest that the positive beliefs about worry and the cognitive confidence are not the discriminating features of dependence as there were no differences between the patient and control groups in terms of these two subscales (Table 2). However, it was observed that there was a significant difference between the substance dependent group and the control group in terms of the following parameters including the negative beliefs about uncontrollability of thoughts and danger, the cognitive self-consciousness, the beliefs about the need to control thoughts, and the total scores. Several studies have demonstrated the association of these metacognitions with alcohol and substance dependence (Spada and Wells, 2005; 2006; Spada et al., 2009, 2013).

When the correlation between the burden of dependence and the metacognitive features were tested in the patient group, it was observed that there was a moderately significant correlation between the total scores. As it is known, addiction is a multifactorial disorder (Koob and Volkow, 2016). API measures the burden of addiction by several parameters including the characteristics of substance use, the dependency diagnosis, the effect of substance use on the person's everyday life, craving, and motivation for quitting using substances (Ögel et al., 2012). The examination of the characteristics of substance use assesses the frequency of use and the use of multiple substances. It is also a subscale evaluating the problems created by dependency. High scores indicate a higher dependency burden. In our study, it was observed that the characteristics of substance use were particularly related to the parameters including the negative beliefs about uncontrollability of thoughts and danger, the beliefs about the need to control thoughts, and the total score of the MCQ-30.

Several studies have highlighted that the metacognition of the negative beliefs of uncontrollability of thoughts and danger have been associated with dependency (Hoyer, Hacker, and Lindenmeyer, 2007; Moneta, 2011). Our study shows that the frequency of substance use and the use of multiple substances are correlated with the negative beliefs of uncontrollability of thoughts and danger. The beliefs about the need to control thoughts subdimension is usually associated with the failure to control thoughts

and danger (Spada and Wells, 2009). Several studies have reported similar results in alignment with our study.

One of the API subscales, the effects of substance use on everyday life, examines the psychosocial functioning and the other effects on life. Besides questioning the economic and legal issues, it consists of several questions on the severity of substance use regardless of whether the substance is used on a daily basis. It has been observed that the effects of substance use on a person's life subscale is highly correlated with the subscale of the negative beliefs of uncontrollability of thoughts and danger, and moderately correlated with the beliefs about the need to control thoughts. Behaviours are managed by emotions (Dragan, 2015). It is known that; particularly, individuals with dependence experience excessive problems in social life, at work, and in family relationships (Vonasch, Clark, Lau, Vohs, & Baumeister, 2017). Studies show that avoiding negative emotions is the underlying factor for these problems becoming persistent (Hamonniere and Varescon, 2017). To avoid negative emotions, thoughts are tried to be controlled. While trying to control the occurrence of thoughts, the increasing levels of anxiety may make it more difficult to control the thoughts. Consequently, impulsive and unplanned behavioural patterns are more common in the individuals with dependence instead of the controlled and planned ones (Hamonniere & Varescon, 2017). These behaviours both affect the person's life negatively and increase the number of problems the individual has to deal with. Our study has elicited results consistent with the literature, demonstrating that the presuppositions about the uncontrollability of thoughts directly influence the person's life.

An interesting result of our research is that craving is not associated with any metacognition. Craving is an actively discussed issue about substance use in the literature. Despite the inconsistent evidence that relapses are associated with craving, craving has usually been reported to be a trigger for relapses and at the same time, it is a diagnostic criterion for substance abuse (APA, 2000). It is assumed that the negative beliefs about the uncontrollability of thoughts and danger may reflect the thoughts associated with craving (Spada et al., 2007). In a study on individuals with methamphetamine dependence, Bruehl et al. (2006) emphasized that craving involves different types of expectations, emotions, and control levels; requiring more detailed further research. Hoyer et al. (2007) stressed that the association between relapses and the motivation for

alcohol dependence was unambiguous. The assumption, suggesting that the variables associated with metacognition mediate the responses to alcohol-related cues, may help explain why craving does not lead to recurrences directly. In our study, it was observed that there was no single variable of metacognition directly correlated with it. The craving may sometimes be associated with positive beliefs about worry, and sometimes it may be associated with relieving stress. For this reason, it may not be associated with a single subscale.

The motivation subdimension is the measurement of motivation to stop the use of substances and it is considered to have a positive relationship with the treatment. Nevertheless, the motivation to stop the use of a substance is interpreted in a way that the person experiences increasing problems with dependence, aggravating the condition. Motivation appears to have a weak-to-moderate correlation with the following parameters including the positive beliefs about worry, negative beliefs about the uncontrollability of thoughts and danger, the cognitive self-consciousness, and the beliefs about the need to control thoughts. Semerci and Elaldı (2011) stated that the increased levels of metacognitive skills in the students at the 3rd and 5th grades of the medical school appeared to be a positive factor to achieve successful outcomes starting during the course of their education processes and extending to their professional lives. If the anxiety is perceived as uncontrollable and dangerous, it is unlikely to turn into a controlled behaviour again. For this reason, the motivation to give up is also a contributing factor to the disease burden. Naturally, the motivation sub-dimension leads to an increase in the need for cognitive confidence and the beliefs about the need to control thought.

Our study has allowed us to examine several distinct variables about dependence from the point of metacognition. Unfortunately, the limited number of the patients and the non-patient controls has caused difficulties in interpreting the data. Therefore, it is recommended that the study should be repeated using a larger sample. However, in order to promote different approaches to the treatment of dependence, further research should continue, investigating which aspects of addiction are related to specific metacognitions. Especially, it is not clear which metacognitions are associated with craving. Individual differences can lead to the active use of different metacognitions for craving. On the other hand, we can assume that the most important dimension of the dependencies is the negative

beliefs about the uncontrollability of thoughts and danger. Focusing on the mediating role of positive beliefs in the motivation for treatment and conducting larger studies on the negative beliefs about the uncontrollability of thoughts and danger, and on the beliefs about the need to control thoughts may be critical for the treatment of dependence.

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