



ARAŞTIRMA / RESEARCH

Mediating role of metacognitions in the relationship between cognitive avoidance and smoking addiction: a structural equation modeling

Bilişsel kaçınma ve sigara bağımlılığı arasındaki ilişkide üstbilişlerin aracı rolü: bir yapısal eşitlik modellemesi

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Abstract

Purpose: Cognitive processes have an important place in starting or quitting smoking, which is an important public health problem all over the world. The present study was conducted to determine the mediator role of metacognition about smoking in the relation between cognitive avoidance and nicotine addiction in individuals who want to quit smoking.

Materials and Methods: The study was completed with a total of 294 people who volunteered to participate in the study and who filled the data collection forms. In the evaluation of the data, descriptive statistics and the Spearman Correlation Test was used for correlation analysis. The effects of cognitive avoidance, nicotine addiction, and metacognition about smoking on each other was examined with structural equality modelling.

Results: A total of 61.9% of the volunteers who participated in our study were male, and the mean age was 33.17 ± 10.62 . The data were found to support the model, and the goodness of fit indices were acceptable (CMIN/DF=2.02, GFI=0.93, AGFI=0.90, CFI=0.96, RMSEA=0.059). Cognitive avoidance and metacognitive beliefs affect nicotine addiction in individuals who want to quit smoking, and metacognitive processes about smoking played mediator roles in the interaction between cognitive avoidance and nicotine addiction.

Conclusion: It will be useful to include cognitive processes as well as metacognitive processes about smoking in smoking cessation programs.

Keywords: Cognitive avoidance, smoking addiction, metacognitions about smoking, structural equation modeling

Öz

Amaç: Tüm dünyada önemli bir toplum sağlığı sorunu olan sigara kullanımı ya da bırakmada bilişsel süreçlerin önemli bir yeri vardır. Bu araştırma, sigarayı bırakmak isteyen bireylerde bilişsel kaçınma ile sigara bağımlılığı arasındaki ilişkide sigaraya ilişkin üstbilişin aracı rolünü belirlemek amacıyla yapılmıştır.

Gereç ve Yöntem: Çalışma, çalışmaya katılmaya gönüllü olan ve veri toplama formlarını eksiksiz dolduran 294 kişi ile tamamlanmıştır. Verilerin değerlendirilmesinde tanımlayıcı istatistikler ve korelasyon analizi için Spearman korelasyon testi kullanılmıştır. Bilişsel kaçınma, nikotin bağımlılığı ve sigaraya ilişkin üstbilişin birbirleri üzerindeki etkileri yapısal eşitlik modellemesi ile incelenmiştir.

Bulgular: Çalışmamıza katılan gönüllülerin %61.9'u erkek ve yaş ortalamaları 33.17 ± 10.62 'dir. Verilerin modeli desteklediği ve uyum indekslerinin kabul edilebilir olduğu saptanmıştır (CMIN/DF=2.02, GFI=0.93, AGFI=0.90, CFI=0.96, RMSEA=0.059). Sigarayı bırakmak isteyen bireylerde bilişsel kaçınma ve üstbilişsel inançların nikotin bağımlılığını etkilediği, bilişsel kaçınma ile nikotin bağımlılığı arasındaki etkileşimde sigaraya ilişkin üstbilişsel süreçlerin aracı rol oynadığı belirlendi.

Sonuç: Sigara bırakma programlarında bilişsel süreçlerin yanı sıra sigara ile ilgili üstbilişsel süreçlerin de yer almasının faydalı olacağı düşünülmektedir.

Anahtar kelimeler: Bilişsel kaçınma, sigara bağımlılığı, sigara ile ilgili üst bilişler, yapısal eşitlik modellemesi

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INTRODUCTION

The fact that tobacco, which is one of the addiction-making substances, causes the death of one person every six seconds and more than 7 million people a year¹, and the emergence of psychological and physical diseases in many people² suggests that smoking addiction is an important public health problem³. Although smoking addiction, which is a preventable condition, decreases in developed countries, it is increasing in underdeveloped or developing countries⁴. According to the World Health Organization (WHO) 2019 Health Statistics Report, smoking rates in adult men over the age of 15 were reported to be 46.3% in Tunisia, 43.4% in Egypt, 35.2% in France, 29.3% in Japan, 26.4% in Germany, and 43.6% in Turkey⁵. According to the Turkish Statistical Institute (TUIK), the rate of smokers every day in individuals over 15 years of age increased from 25.4% in 2010 to 28.0% in 2019⁶. In the light of these data, the importance of works that will affect smoking addiction and quitting is better understood.

It is already known that cognitive processes are effective in smoking cessation⁷. The multifaceted concept, which includes information, processes and strategies that evaluate, monitor, or control these cognitive processes, is called metacognition. The metacognitive model consists of three main hypotheses; 1) The Self-Regulatory Executive Functions (S-REF), 2) Cognitive Attention Syndrome (CAS), and 3) metacognitive beliefs⁸. S-REF takes into account the cognitive and metacognitive structures effective in controlling psychological disorders. In this model, anxiety and sadness are the most basic internal signals threatening the wellness of the self. As a result of preserving such emotions, psychological diseases develop, and tend to continue because of the way of thinking and strategies of the individual⁹. The activation of a certain thought is called CAS. The emotional period and negative assessments, which are limited and temporary for a normal individual, become long-term and repetitive because CAS increases the self-focused attention of the developing individual. These long-term and repetitive thoughts and evaluations result in cognitive distortion in the metacognitive belief system, and become rituals guiding the coping behaviors. As a result, the individual becomes addicted to endogenous and maladaptive “stop signals” for secret and implicit rituals⁸.

It is already known that metacognitions are closely related to many psychological and behavioral problems^{8,10-12}. Smoking addiction, which is used as a coping skill by individuals¹³ is also reported to be related closely with the metacognitive mechanisms¹⁴⁻¹⁸. According to the metacognitive model, the selection and implementation of coping skills to relieve and control the cognition is determined partly by positive metacognitions that consider dangerous status knowledge¹¹. The triggers like the images about smoking, memories or thoughts activate S-REF and related metacognitive beliefs to direct the evaluation and coping attitude. Positive and negative metacognitive beliefs (i.e. positive; “Thinking about smoking makes me feel better”, or negative; “I cannot control my thoughts on smoking”) persistently activate the processing of intrusive thoughts. The use of CAS to suppress these intrusive thoughts increases the negative effect and craving in the individual. Depending on this, the individual is more likely to smoke to regulate the emotions emerging in this way, and to minimize the inconsistency between the current and desired situation¹⁹. Cognitive conditions like suppression of thoughts, repetitive thoughts, and avoidance decrease the probability of the individual conducting a successful cognitive analysis. These cognitive conditions are the maladaptive coping skills in S-REF, which increases the probability of the individual smoking, triggering CAS. The maladaptive coping skills like cognitive avoidance, develop the internal incompatibility that is characterized with negative metacognitions in time, causing further increased psychological distress¹¹.

Cognitive avoidance that is associated with smoking addiction²⁰ prevents the restructuring of negative thoughts, and ensure that the false trust is protected²¹. Cognitive avoidance, which is the whole of the efforts of the individual to protect himself/herself from dangerous and compelling situations, is not an appropriate ability to cope. Because there is not showing any effort to solve the unwanted situations or stress factors as the basis of cognitive avoidance²². Avoiding disturbing internal stimuli about smoking (i.e. thoughts, emotions and physical sensations) can increase the tendency of smoking, or reduce the chance of success in quitting smoking^{23,24}.

No studies were detected in the literature on these two concepts, which are effective on smoking and quitting. This study was conducted on individuals

with cigarette addiction and the idea of quitting. It is assumed that there is an interaction between cognitive avoidance and meta-cognitive thinking system, which occurs due to nicotine addiction and affects quitting negatively. In addition, it was assumed in the study that the level of cognitive avoidance increases smoking rate and nicotine addiction level. The study was conducted in descriptive-relational fashion on individuals intending to quit smoking for the purpose of in-depth investigation of the intermediary role of metacognitions in the relation between cognitive avoidance and smoking addiction by establishing a structural equality model.

In line with these assumptions, answers were sought to four hypotheses regarding the relationships between independent variables. The first, cognitive avoidance affects nicotine addiction in individuals who want to quit smoking. The second, cognitive avoidance affects the metacognitive beliefs associated with smoking in individuals who want to quit smoking. As the third, smoking-related metacognitive beliefs affect nicotine addiction in individuals who want to quit smoking. As the last and fourth hypothesis, metacognitive beliefs play mediator roles in cognitive avoidance and nicotine addiction interaction in individuals who want to quit smoking.

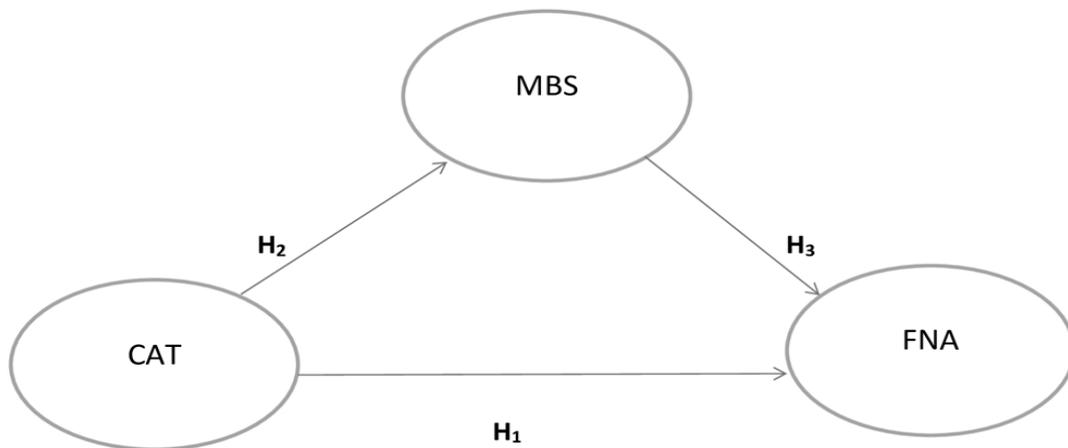


Figure 1. Hypothesis model

*FNA: Fagerström Nicotine Addiction, MBS: Metacognitive Beliefs About Smoking, CAT: Cognitive Avoidance Total

MATERIALS AND METHODS

Participants

The universe of the study consisted of the individuals who apply to the smoking cessation clinic of the department of chest diseases of a medical faculty hospital of a university in Turkey. Data were collected between 01.11.2019-09.05.2020. All individuals who applied to the smoking cessation clinic and met the study criteria were included. The purpose of the study was explained to all individuals and the volunteers were included in the study. The sampling calculation was based on the study of Spada et al. (2007), which had similar pattern¹⁴. There is no clear consensus on the number of sampling in structural equality modelling²⁵. It was cared that the sampling of the

study was between 10-20 times the number of the variables in the model and was not less than 200²⁶; therefore, 300 individuals who smoked were included in the study taking into account possible lost data. Six individuals were not included in the study because of missing information in their forms, and the study was completed with 294 individuals. Post power analysis was performed in the G-power 3.1 program regarding the adequacy of the sampling of the study, and the power of the study was found to be 0.98 ($\alpha=0.05$, $n=294$, $d=0.236$).

Individuals who were 18 years and older, who spoke and understood Turkish, who could read and write, approving the informed consent form, were included in the study. Individuals who refused to participate in the study, had psychological illness other than

smoking addiction, and who did not fill the forms completely, were excluded from the study.

Procedure

The data forms were given to the individuals, and they were asked to fill the forms on their own, and the researcher was near the individuals to answer any possible questions. Approval was received for the study from the Ethics Committee of Social and Humanitarian Sciences (Approval No. 104; Approval Date: 22.10.2019), and permission was received from the relevant institution. Also, "Informed Voluntary Consent Form" was taken from the patients. The data were collected in the smoking cessation clinic, and the filling of the data collection forms took an average of 10-15 minutes.

Measures

Information form

The Introductory Information Form consists of 12 questions on gender, age, educational status, marital status, income status, and smoking status, etc.

Fagerström Nicotine Addiction Test (FNAT)

FNAT, which was developed by Heathorn et al. (1991), consists of 6 questions. Each question has specific scores based on the response. Scores obtained from the test are classified as follows: 1) Low (0 - 4 points); 2) Moderate (5 -6 points); 3) High (7 - 8 points) and 4) Very high (9 - 10 points). The validity and reliability study of FNAT for Turkish was made by Uysal et al.²⁷. The Turkish version of FNAT has moderate reliability, and its Cronbach Alpha Coefficient is 0.56. In our study, the Cronbach alpha coefficient of the scale was determined as 0.77.

Smoking-Related Metacognitive Beliefs Scale (SRMBS)

The scale, which was developed to evaluate the metacognitive beliefs about smoking is a 20-point self-notification scale¹⁷. The Turkish validity and reliability of the scale, which was developed by Nikčević et al. in 2015, was conducted by Alma et al. (2018)¹⁸. The Turkish form consists of 17 questions, and 4 sub-dimensions; Positive Metacognitive Beliefs about Cognitive Regulation (PMBCR), Positive Metacognitive Beliefs about Emotional Regulation (PMBER), Negative Metacognitive Beliefs about Non-Controlling Status of Smoking (NUCB), Negative Metacognitive Beliefs about Cognitive

Inhibition (NMBCI) consists of four sub-dimensions. The Cronbach Alpha Coefficients of the scale were calculated for each four factors of the Smoking-Related Metacognitive Beliefs Scale. The Cronbach Alpha Coefficients were found to be 0.93 for PMBCR, 0.91 for PMBER, 0.84 for NUCB, and 0.84 for NMBCI¹⁸. In our study, the Cronbach Alpha Coefficients were found to be 0.91 for PMBCR, 0.89 for PMBER, 0.78 for NUCB, and 0.75 for NMBCI.

Cognitive Avoidance Scale

The scale, which was developed by Gosselin, P., Langlois, F., Freeston, M. H., et al. (2002) aims to determine individual evaluation and cognitive avoidance strategies. The scale, which is in 5-Point Likert style, consists of 25 items^{28,29}.

The total of the responses to all items are calculated to use the Cognitive Avoidance Scale, whose Turkish validity and reliability study was conducted by Akyay and Kesebir (2016) as a single-factor scale²⁹. The Cognitive Avoidance Scale includes 5 sub-dimensions; thought insertion, conversion of images into thoughts, distraction, avoidance of threatening stimuli, and suppression of thoughts. The Cronbach Alpha Coefficient was found to be 0.94 for the total of the Cognitive Avoidance Scale. When the total correlations of the items were evaluated, they were found to be between 0.40 and 0.74²⁹. In our study, the Cronbach Alpha Value for the entire the scale was found to be 0.95, 0.74 for changing thought sub-dimension, 0.83 for converting images to thoughts sub-dimension, 0.89 for distraction sub-dimension, 0.87 for avoiding threatening stimuli sub-dimension, and 0.86 for suppression of thoughts sub-dimension.

Statistical analysis

The SPSS ver. 25 (IBM SPSS Statistics Standard Concurrent User V 25) was used for the analyses of the collected data in this study. Before evaluating the data, validation analysis and descriptive factor analysis were made on the scales. The Cronbach's Alpha internal consistency of scales was given in the introduction section of the scales. The Basic Components Technique was applied for Explanatory Factor analysis. It was determined that Kaiser-Meyer-Olkin (KMO) test value was > 0.80 and $p < 0.01$ Bartlett's test of sphericity for all scales. It was seen in line with these findings that the scales could be used safely without removing any items from them²⁶. Mardia's Multivariate Kurtosis Coefficient Critical Ratio was used to see whether the data were

distributed normally ($p < 0.05$; critical ratio < 1.96)³⁰. Because the data is not normally distributed, descriptive statistics, and the Spearman Correlation Test was used for the correlation analysis. In the comparisons, the $p < 0.05$ was considered to be statistically significant.

The Structural Equality Modelling was implemented with LISREL 8.71 program. The following indices were evaluated to test the suitability of the model: CMIN/DF (< 5); RMSEA (< 0.08); GFI, Goodness of Fit Index (> 0.90); AGFI, Corrected Goodness of Fit (> 0.90); and CFI, Comparative Fit Index (> 0.90)^{26,30}. Since the data were not distributed normally, the Asymptotically Distribution Free (ADF) Method was applied, and a Bias-Corrected Preloading Approach based on 2000 samples was applied to test the standardized total and the direct

and indirect effects of each variable³⁰. The value of $p < 0.05$ was considered statistically significant in comparisons.

RESULTS

A total of 61.9% of the volunteers who participated in our study were male, 41.8% were high school graduates, 50% were married, 49.7% did not have children, 58.5% were working, 35.5% were students, 73.8% had moderate income level, 78.2% had elementary families, and 86.4% had no physical or psychological diseases. In addition, the participants smoked an average of 17.41 ± 9.39 cigarettes per day at the average age of 33.17 ± 10.62 , and smoked for an average of 14.61 ± 9.99 year

Table 1. Age, mean, standard deviation, and correlation values of the participants received from scales

Variables	Mean±SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
FNA	4.72±2.93	-													
CRP	11.57±4.64	.344**	-												
ERP	12.08±3.24	.237**	.670**	-											
SUN	9.30±3.48	.601**	.473**	.429**	-										
CIN	8.35±3.30	.527**	.448**	.333**	.789**	-									
CAT	65.90±23.43	.236*	.232**	.303**	.322**	.382**	-								
TR	11.99±4.81	.075	.260**	.275**	.338**	.403**	.802**	-							
TTT	12.51±5.23	.041	.226**	.269**	.308**	.377**	.865**	.678**	-						
D	13.69±5.71	.071	.175**	.206**	.238**	.296**	.902**	.662**	.718**	-					
ATS	13.27±5.61	.030	.174**	.231**	.306**	.343**	.906**	.651**	.738**	.796**	-				
ST	14.42±5.54	.009	.235**	.357**	.256**	.291**	.849**	.590**	.660**	.699**	.723**	-			
Age	33.17±10.62	.169**	-.026	-.085	.254**	.158**	-.102	-.118*	-.120*	-.019	-.012	-.217**	-		
TYS	14.61±9.99	.270**	.047	-.054	.298**	.208**	-.073	-.087	-.080	.005	-.007	-.173**	.880**	-	
NCSPD	17.41±9.39	.769**	.265**	.182**	.542**	.413**	-.001	.027	-.037	.031	0.016	-.028	.246**	.331**	-

*Spearman's rho (** $p < .01$, * $p < .05$); FNA: Fagerström Nicotine Addiction, CRP: Positive Metacognitive Beliefs on Cognitive Regulation, ERP: Positive Metacognitive Beliefs About Emotional Regulation, SUN: Negative Metacognitive Beliefs about the Uncontrollability of Smoking, CIN: Negative Metacognitive Beliefs About Cognitive Inhibition, CAT: Cognitive Avoidance Total, TR: Thinking Replacement, TTT: Transforming Images into Thoughts, D: Distraction, ATS: Avoiding Threatening Stimuli, ST: Suppression of Thoughts, TYS: Total Years of Smoking, NCSPD: Number of Cigarettes Smoked Per Day.

It is seen in Table 1, that nicotine addiction has a positive relation with the sub-dimensions of the metacognitive beliefs smoking-related, the sum of cognitive avoidance, age, total year of smoking and the number of cigarettes per day ($p < 0.01$). It was determined that the sub-dimensions of smoking-related metacognitive beliefs had a statistically significant and positive relation with the sum and

sub-dimension of cognitive avoidance ($p < 0.01$). Also, a statistically significant relation was detected between age, total number of cigarettes smoked, and the number of cigarettes per day ($p < 0.01$).

The test results of the first-established structural equality model did not meet the recommended statistical indices in line with the model (RMSEA =

0.094, AGFI = 0.82). for this reason, necessary changes were made in the model considering the statistical significance of the theoretical backgrounds and modification index values. The standardized

parameters of the final model are given in Figure 2. The effects of each variable on nicotine addiction is summarized in Tables 2 and 3.

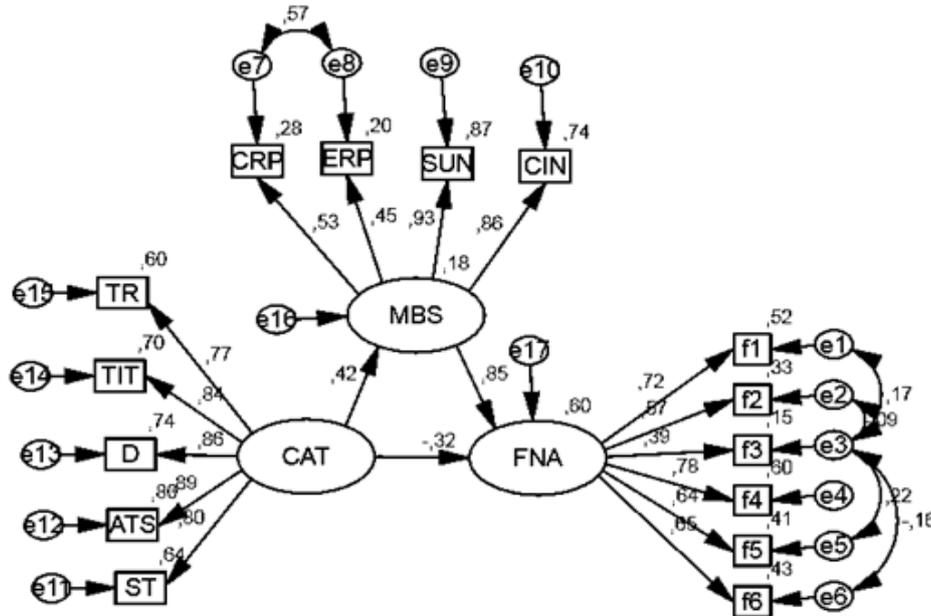


Figure 2. Structural equation modeling regarding metacognition, ruminative thought style and burnout

FNA: Fagerström Nicotine Addiction, MBS: Metacognitive Beliefs About Smoking, CRP: Positive Metacognitive Beliefs on Cognitive Regulation, ERF: Positive Metacognitive Beliefs About Emotional Regulation, SUN: Negative Metacognitive Beliefs about the Uncontrollability of Smoking, CIN: Negative Metacognitive Beliefs About Cognitive Inhibition, CAT: Cognitive Avoidance Total, TR: Thinking Replacement, TIT: Transforming Images into Thoughts, D: Distraction, ATS: Avoiding Threatening Stimuli, ST: Suppression of Thoughts; All routes were significant at min $p < 0.05$ level.

When the fitness statistics of the structural equality model given in Figure 2 obtained as a result of the changes were examined, it was found that the Chi-Square = 166.388, $df=82$, $p<0.05$. Since $df>0$, the model was seen to be a fully-satisfied model; however, because $p<0.05$, model compliance index

values should be examined. The model compliance index values were determined to be $CMIN/DF=2.02$, $GFI=0.93$, $AGFI=0.90$, $CFI=0.96$, $RMSEA=0.059$. These values showed that the data support the model, and the compliance indices are acceptable (Gürbüz and Şahin, 2018; Kline, 2011).

Table 2. Regression weights, standardized regression weights and squared multiple correlations for model

Variables			Estimate			t	P
			Unstandardized β	Standardized β	S.E.		
MBS	<---	CAT	0.233	0.422	0.041	5.701	0.001
FNA	<---	MBS	0.273	0.850	0.036	7.625	0.001
FNA	<---	CAT	-0.057	-0.324	0.011	-5.215	0.001
SMC							
MBS			0.178				
FNA			0.595				

FNA: Fagerström Nicotine Addiction, MBS: Metacognitive Beliefs About Smoking, CAT: Cognitive Avoidance Total, S.E: Standard Error; SMC: Squared Multiple Correlations

The results of the structural equality model analysis made to determine how cognitive avoidance and smoking-related metacognitive beliefs predicted nicotine dependence in individuals with smoking addiction are given in Figure 2 and Table 2. It is seen that cognitive avoidance in individuals with smoking addiction affects smoking-related metacognitive beliefs and nicotine addiction, which is statistically significant ($p < 0.01$). It was also determined that the metacognitive beliefs associated with smoking had significant effects on nicotine addiction ($p < 0.01$). A one-unit increase in cognitive avoidance leads to a 0.233 increase in smoking-related metacognitive beliefs, and to a 0.057-unit decrease in nicotine

addiction. Also, a one-unit increase in smoking-related metacognitive beliefs leads to an 0.273-unit increase in nicotine addiction. However, a standard deviation change in cognitive avoidance leads to a standard deviation of -0.422 in smoking-related metacognitive beliefs, and to a standard deviation of -0.324 in nicotine addiction. In addition, a standard deviation change in smoking-related metacognitive beliefs causes a standard deviation of 0.850 in nicotine addiction; and 17.8% of the changes in smoking-related metacognitive beliefs and 59.5% of the nicotine addiction changes were explained by this model (Table 2).

Table 3. Standardized estimates of direct and indirect effects on nicotine addiction

		Impact Value		Bias-corrected 95% Lower/Upper		Hypothesis Acceptance Status
		CAT	MBS	CAT	MBS	
Direct Effects	MBS	0.422*	-	0.301/0.539	-	H₁, H₂ and H₃, accept
	FNA	-0.324*	0.850*	-0.447/-0.202	0.760/0.937	
Indirect Effects	MBS	-	-	-	-	H₄ accept
	FNA	0.359*	-	0.244/0.484	-	

FNA: Fagerström Nicotine Addiction, MBS: Metacognitive Beliefs About Smoking, CAT: Cognitive Avoidance Total, * $p < 0.01$

It is seen in the table that cognitive avoidance has a statistically significant effect on nicotine addiction (impact value=-0.32, $p < 0.01$) and on smoking-related metacognitive beliefs (impact value=0.42, $p < 0.01$). It was also determined that cognitive avoidance has a direct effect on nicotine addiction through smoking-related metacognitive beliefs (impact value= 0.35, $p < 0.01$). for this reason, smoking-related metacognitive beliefs are a significant mediator between cognitive avoidance and nicotine addiction (Table 3).

DISCUSSION

The purpose of the present study was to determine whether cognitive avoidance had effects on nicotine addiction, and find out if smoking-related metacognitive beliefs have a mediator role between smoking addiction and cognitive avoidance. According to the results of the relational analyses, nicotine addiction has a positive and significant relation between cognitive avoidance, smoking-related metacognitive beliefs, and four sub-dimensions (Table 1). Based on these findings, it was determined that the data support the established model, and cognitive avoidance and smoking-related metacognitive beliefs have direct effects on nicotine

addiction (Table 2, Table 3, Figure 2). The mediator effect of smoking-related metacognitive beliefs was determined in the relation between nicotine addiction and cognitive avoidance (Table 3).

The cognitive avoidance that is related to smoking addiction²⁰, or the avoidance coping skill leads to the restructuring of negative thoughts and schemes by enhancing false confidence²¹. As a matter of fact, it is already known that smoking causes cognitive impairment and inadequacy in a dose-dependent manner and based on duration^{31,32}. This cognitive inability, disruption and restructuring can cause that the individual uses cognitive avoidance to protect him/herself from dangerous and deterrent situations. However, this is not a proper coping ability. Because, avoiding the situation is preferred instead of eliminating or replacing the stress-causing situation³³. It was reported that smoking causes changes in the brain areas that are hypothesized to be related to inappropriate stress coping (i.e. avoidance-driven, emotion-oriented)³⁴, and the areas related with cognitive avoidance²⁰. In our study, in line with the literature, it was determined that there was a relation between cognitive avoidance and nicotine addiction (Table 1), and that cognitive avoidance affected

smoking addiction directly (Table 2, Table 3, Figure 2). Depending on these findings, H_1 was accepted.

It was reported that cognitive avoidance causes the restructuring of negative schemes, and addictions are associated with maladaptive schemes^{21,35}. It is already known that maladaptive schemes and metacognitions play roles in psychological changes³⁶. Metacognitions, which express the belief and ways we can control about our cognitive system, are divided into two areas as positive metacognitions about control strategies that affect internal events, and negative metacognitions regarding the importance, controllability and danger of internal events³⁷. The selection and application of coping strategies targeting control of the cognition are determined by positive metacognitions, which focuses the attention on information suitable for distress like environmental threats, negative sensation, and bodily sensations. This can lead to the use of maladaptive coping strategies (i.e. avoidance, suppression of thoughts, and persistent thinking) that do not produce effective psychological outcomes. With each passing day, the use of maladaptive coping skills, and the internal experiences that lead to increased psychological stress, and the selection of coping skills are provided by negative metacognitions, which causes the development of intrinsic disagreements¹¹. To overcome these internal disagreements, and to stop the rise of psychological stress, the individual may move towards cognitive avoidance³³ or addictive behaviors or substances^{8,10,12}. In the present study of ours, it was determined that there was a relation between cognitive avoidance and smoking-related metacognitive beliefs in individuals with smoking addiction (Table 1), and that cognitive avoidance affected smoking-related upper cognitive beliefs directly (Table 2, Table 3, Figure 2). In the light of these findings, H_2 was accepted.

The maladaptive coping skills used cause psychological distress, and this condition is closely related with metacognitive structures¹¹. Individuals use positive smoking-related metacognitions as a means of regulating the cognitive-emotional changes, and this metacognitive structure plays a central role in the initiation of smoking. Negative metacognitions related to smoking, on the other hand, include the perceived negative effects of smoking on cognitive functions and individual evaluations, thoughts about smoking, and beliefs about non-controllable status of smoking^{15,19}. Both positive and negative metacognitions related with smoking are closely

related with “desire”, which plays an active role in nicotine addiction as well as in other addictions. In this role, it is known that the effect of negative exponentials is more significant¹⁹. The triggers in the form of smoking-related impulses, images, memories or thoughts in individuals who smoke are related with metacognitive beliefs as a guide to coping and individual evaluation, and activates S-REF. At this stage, positive and negative metacognitive beliefs cause the activation of the attempted and challenging repetitive process of CAS, which causes the rise of craving, in other words, the desire and negative emotion. Depending on the increase in the inconsistency between the current situation and the situation s/he desires, the individual continues to smoke to be released from the negative emotions caused by this inconsistency and to cognitively avoid it¹⁹. As a matter of fact, it is known that the smoking-related metacognitions affect smoking and nicotine addiction^{14,17,18}. It was determined in our study that there was a relation between smoking-related metacognitive beliefs and nicotine addiction in individuals with smoking addiction (Table 1), and that smoking-related metacognitive beliefs affected nicotine addiction directly with a mediator role between cognitive avoidance and nicotine addiction (Table 2, Table 3, Figure 2). In line with these findings, H_3 and H_4 were accepted.

The study was conducted with individuals who admitted to the smoking cessation clinic with the intention of quitting smoking. For this reason, the present only provided data on the cognitions of individuals in this group. Not providing evaluations on cognitive avoidance or metacognitions of individuals who do not consider quitting smoking can be seen as a limitation of the present study. Also, the sampling consisted of individuals who admitted to the smoking cessation clinic, and potential contradictions like socio-economic status and education were not evaluated. Again, the collection of the data in one center limits its generalizability. The answers of the individuals were limited to the expressions in the measurement tools.

As a result, cognitive avoidance and metacognitive beliefs affect nicotine addiction in individuals who want to quit smoking, and play intermediary roles in individual avoidance and nicotine addiction interaction. It is considered that it will be useful to include cognitive processes as well as metacognitive processes in smoking cessation programs. It is also considered that if individuals can define their feelings

and thoughts with their own expressions, it will contribute to the literature. It is recommended to conduct studies with large sampling, multi-centered and comparative groups in which potential contradictions like socio-economic status and education are controlled. Also, conducting randomized controlled studies on cognitive avoidance, smoking-related metacognitive beliefs, and nicotine addiction will increase the probability of success of individuals who want to quit smoking.

Yazar Katkıları: Çalışma konsepti/Tasarımı: ME; Veri toplama: ME; Veri analizi ve yorumlama: NŞ; Yazı taslağı: ME; İçerğin eleştirel incelenmesi: NŞ; Son onay ve sorumluluk: ME, NŞ; Teknik ve malzeme desteği: ME; Süpervizyon: NŞ; Fon sağlama (mevcut ise): yok.

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