IPA
International Journal of Psychology
Vol. 13, No. 1, Winter & Spring 2019
PP. 40-62

Iranian **P**sychological
Association

The Role of Sensitivity to Reward and Punishment and Moral Disengagement in the Prediction of Craving among People with Substance Dependency

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Received: 14/ 3/ 2018 Revised: 7/ 6/ 2018 Accepted: 8/ 7/ 2018
Doi: 10.24200/ijpb.2018.125014.1012

Craving is considered as one of the most important factors in treatment failure and relapse in patients undergoing abstinence programs. This study was aimed to determine the role of sensitivity to reward and punishment and the moral disengagement in the prediction of craving in people with substance dependency. The method of this study was descriptive-correlational. The statistical population of this research comprised the whole people with substance dependence referring to Ardabil Centers of Addiction Treatment in the second half of 2015. One hundred and Twenty people were selected from this population through multistage random sampling and were asked to respond to Questionnaires of sensitivity to reward and punishment (Torrubia & Tobena,1984), moral disengagement (Bandura, Barbaranelli, Caprara & Pastorelli, 1996), and also to craving questionnaire (Somoza, Dyrenforth, Goldsmith, Mezinskis & Cohen, 1995). Pearson's correlation and multivariate regression tests were used in analyzing data. The results showed that craving was related to sensitivity, reward and

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[DOR: 20.1001.1.20081251.2019.13.1.3.8]
[DOI: 10.24200/ijpb.2018.125014.1012]

punishment; total score disengagement moral and components; moral justification; language euphemistic; displacement responsibility; responsibility diffusion; distorting consequences; and attribution of blame. Fourteen percent (14%) variance of craving was explained by sensitivity to reward and punishment and moral disengagement in the multiple regression analysis results.The results of this study demonstrated that moral disengagement and sensitivity to reward and punishment might have a significant role in predicting craving among substance abusers.

Keywords: reward sensitivity and punishment, moral disengagement, craving, substance dependency

The main feature of different types of drug related addictions and disorders is a set of cognitive, behavioral, and physiological symptoms indicating that an abuser still keeps on drugs despite the considerable problems that abounds (American Psychiatric Association, 2013; Translated by Seyyed Mohammadi, 2014). One of the most salient characteristics of persons suffering from drug dependence is their continuous consumption despite the negative consequences such as: serious medical conditions; legal problems; job, friends, and social status losing (Petry, Bickel & Arnett, 1998). According to extant estimations, there are 24.6 million drug abusers in the U.S with 8.9 million of them suffering from mental disorders (Substance Abuse and Mental Health Services Administration, 2013). Moreover, there are almost 190 million substance abusers in the World and 25 million abusers in Iran based on reports from formal sources. Research showed an increase of abusers population in the past forty years (Vassileva, Georgiev, Martin, Gonzalez & Segala, 2011). This wide range, in itself, implies lack of awareness of the real danger of the problem (Momtazi & Rawson, 2010). Furthermore, in Iran, the growth rate of abusers was more than three times that of the entire population in the past 20 years (Tavakoli, SHojaeizadeh & Mazloumi, 2010). Accordingly, many treatment and

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[DOR: 20.1001.1.20081251.2019.13.1.3.8]

[DOI: 10.24200/ijpb.2018.125014.1012]

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[DOR: 20.1001.1.20081251.2019.13.1.3.8]

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rehabilitation programs were planned; however, the statistics of addicts, especially those who already kicked the habit, is still remarkable (Nielsen, 2012). One of the important factors that make such programs fail and increase substance abuse among people in abstinence programs is craving (Ekhtiari, 2008). The concept of craving can be regarded as a multi-dimensional personal experience that is tightly related to the strong feeling of obtaining pleasant feelings to overcome unpleasant feelings (Rosenberg, 2009). Craving is, in essence, one of the most important factors of addiction and is typically defined as severe emotion along with strong engagement to substance (Singleton & Gorelick, 1998). Craving is important to the extent that almost every addiction related theory considers it, and changes caused from it as central features of substance dependence (Jason, MacQueen & Drobes, 2013). Adrian & Wayne (2013) reported that craving, defined as severe interest in experiencing drugs, is a considerable preventive factor to overcome addiction. Additionally, in clinical and experimental studies, craving was reported as a significant predictor of abuse and after-treatment relapse (Witkiewitz, Bowen, Douglas & Sharon, 2013). It is also known as the main incentive in substance abuse disorders and control, and it leads to less abuse of substance and pleasant consequences (Kober, 2014). The existing findings of Masoomi-Nomandan, Hasani & Hatami (2014) revealed that craving is positively correlated with maladaptive emotional schemas (rumination, guilt, uncontrollability and blame).

Based on conditioning models, in etiology of drugs disorders, people often rely on drugs to escape from annoying states (sensitivity to punishment) and reaching pleasant states (sensitivity to reward); thus, it might be stated that sensitivity to punishment and reward are among the important factors of

craving. Multiple perspectives have dealt with addiction; the Reinforcement Sensitivity Theory of Gray is an important and advanced neuro-psychological theory (Gray & McNaughton, 2003). Gray (1982) based the theory on the two dimensions of anxiety and impulsivity. Furthermore, Gray (1990) offered a pattern of personality consisting of three cerebral-behavioral systems. The first is the behavioral activation system that responds to conditional incentives as reward and lack of punishment. This system increases activation and sensitivity which leads to elicitation of positive emotions and active avoidance. The second, known as the behavioral inhibition system responds to conditional stimuli as punishment and lack of reward, it also responds to innate frightful and new stimuli. The activity of this system leads to elicitation of the emotional state of anxiety and behavioral inhibition, passive avoidance, silence, increase of attention, and constitution. Studies conducted during the past decades on both human and animal's brain have proved that drug usage damages the natural performance of the brain reward part; continuous abuse of substance might disrupt the reward system performance of the brain (Gray & McNaughton, 2003). Ivory & Kombouropoulos (2012) revealed that sensitivity to reward is directly and positively related to alcohol use. Additionally, Urosevic, Collins, Muetzel, Schissel & Lim (2015) showed that high level of sensitivity to reward is positively correlated with the beginning of substance abuse and increase of alcohol use. A research conducted by Abdi, Bakhshipour, & Mahmood Alilou (2011) approved the relationship between high degree of sensitivity to reward and tendency behaviors and also drugs abuse. Nicola, Tedeschi, Risio, Pettorruso & Martinotti (2015) also reported that high level of impulsivity is closely related to craving of alcohol drinking and other addictive

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behaviors. Similarly, Mathew, Burris, Froeliger, Saladin & Carpenter (2015) concluded that craving might act as the impulsivity-communicative mechanism, which in turn, implies the positive correlation of impulsivity and craving. Morris, Trylvar, Tsai & McCarthy (2016) also maintained that high sensitivity to reward might increase the risk of substance abuse. Genovese & Wallace (2007) reported that in 13 of the 15 types of substance abuse, students with low punishment sensitivity showed the highest levels of use. Sensitivity to punishment plays an important role in alcohol consumption disorder (Jonker, Ostafin, Glashouwer, Van Hemel-Ruiter & De Jong, 2014).

One important factor for unsuccessful treatment of addiction and variable related to substance craving is moral disengagement. Moral disengagement is defined as the low interest of a person to consider ethical principles and unusual justification of inappropriate behaviors (Bandura, Barbaranelli & Caprara 1996). Bandura et al. (1996) showed that persons with moral disengagement are more inclined to take part in criminal actions, more quarrelsome, and have less feeling of tendency to society. According to theoretical precepts, moral disengagement is not a fixed feature but a cognitive orientation to the world that grows by time and is affected by the social contexts in which people act (Moore, 2008). Kleinjan, Van Den Eijnden & Engels (2009) investigated the role of disengagement beliefs and dependence to nicotine in leaving smoking. They concluded that high addiction to smoking is correlated with disengagement beliefs. After controlling dependence on nicotine, disengagement beliefs showed a negative relationship with leaving motivation. The study also revealed that moral disengagement might be regarded as an infrastructure mechanism for many anti-social behaviors of adolescents and is related to quarrelsome behaviors (Kokkinos,

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Voulgaridou, Mandrali & Parousidou, 2016). Dijkstra (2009) also reported that smokers who are highly bound to moral disengagement have less participation in leaving activities. In addition, the study uncovered that bounding to moral disengagement is dependent on individual differences and is influential in comprehending the effects of smoking leaving interferences. Newton, Andrews, Champion & Teesson (2014) by conducting a research on adolescents revealed that moral disengagement is one of the perilous individual factors promoting alcohol abuse and hashish among adolescents.

Based on Sensitivity to Reward Theory of Gray (1982), those who are sensitive to reward become dependent on received rewards and this, in turn, might be related to craving. Furthermore it seems that such a variable might have impacts on craving of dependent persons. Therefore, given the above-mentioned points, the present study tries to answer the question that whether sensitivity to reward and punishment and also moral disengagement might predict the craving among dependent people.

Method

This descriptive study makes use of correlation research design. The study population consists of all substance dependent patients who were under treatment at Ardabil Addiction Treatment Centers in the first half of 2015. The least size of samples in correlation studies should be 30 persons for each variable (Delavar, 2006), although 90 participants were sufficient for the present study, 120 patients were selected through random cluster sampling procedure to increase the validity of obtained findings. 120 male participants with age average of 35/09 and standard deviation of 8.81 took part in this study. From the sample size, 19 persons had elementary education (15.85%), 29 had secondary

education (24.2%), 45 high school education (37.5%), 26 had M.A education (21.7%), and one person had higher than M.A education (0.8%). Furthermore, 11 (9.2%) of them had governmental careers, 64 (53.3%) were self-employed, and 45 persons (37.5%) were unemployed. In addition, in terms of monthly income, 43 persons (35.8%) reported their income to be less than 300 thousand tomans, 28 persons (23.3%) between 300 to 500 thousand tomans, 36 persons (30%) between 500000 to 1000000 tomans, and 13 (10.8%) reported their income higher than one million tomans. Finally, 87 of them (72.5%) had previous experience of addiction leaving and the remaining 33 persons (27.5%) had no experience.

To gather data, the list of all Addiction Treatment Centers of Ardabil (15 centers) were prepared and two of them were randomly selected (Hastibakhsh and Hadi addiction treatment centers). After that, all cases of the two centers were assessed and 60 patients that were dependent to at least one substance were selected from each. The purposes of the study were explained to them; after gaining their active consent, they were assured that their responses would remain confidential and were subsequently asked to respond to the prepared questionnaires for the study at their centers. Finally, Pearson correlation and multiple regression analysis tests were used to analyze the gathered data.

Instruments

Sensitivity to Reward Scale

The scale of sensitivity to reward and punishment was the main version of a 48-item self-assessed scale including items about person's interests and feelings. The odd items evaluate sensitivity to punishment and the even ones assess sensitivity to reward. The scale of sensitivity to punishment and reward was

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first developed by Torrubia & Tobena (1984) with the aim of developing an instrument to measure individual differences in the activity of behavioral inhibition system (Torrubia, Avila, Molto & Caseras, 2001). Subjects respond "yes" or "no" to each item, and an individual's score is based on the total number of positive responses for each of the two 24-item subscales. A typical item for the Sensitivity to Reward scale (SR) is, "Does the prospect of obtaining money motivate you strongly to do some things?"; while an item example from the Sensitivity to Punishment scale (SP) is, "Do you often refrain from doing something because you are afraid of it being illegal?" (Torrubia et al, 2001). The purpose of the questionnaire was the simultaneous evaluation of the activity of both behavioral inhibition and activation system and assessment of individual differences in two dimensions described by Gray. These dimensions include; anxiety or sensitivity to punishment and impulsiveness or sensitivity to reward. To examine the psychometric features of the questionnaire, its main designers administered it among 2140 M.A students and its Cronbach alpha value for sensitivity to reward items turned out to be .76 and for sensitivity to punishment items turned out to be .82 (Sajjadi, 2008). Furthermore, its reliability in Iran was examined by investigating 200 high school female students in two districts of Shiraz city via Cronbach alpha test. The results showed that the odd items reliability was .74 and .70 for the even items. The formal validity of this scale was also double checked in agreement percentage of three psychology experts and the result percentage was .81 (Goodarzi & Shamelo, 2010). Finally, the questionnaire reliability in this study was .71 for sensitivity to reward items and .69 for sensitivity to punishment items.

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Moral Disengagement Scale

This scale was a 32-item questionnaire for assessing the person's talent for moral disengagement (Bandura et al, 1996). It evaluated eight mechanism of moral disengagement including moral justification, euphemistic labeling, advantageous comparison, displacement responsibility, responsibility diffusion, distorting consequences, dehumanization, and documents blame. Each of these mechanisms was evaluated by four items scale. The participants would respond to the items in a five-part Likert format from “absolutely disagree (1)” to “absolutely agree (5)”. Higher numbers in each sub-scale indicated the higher extent of that mechanism and higher scores in all of the mechanisms also showed higher disengagement. The questionnaire showed a high correlation in the moral judgment test and its reliability was reported to be 82 (Bandura et al, 1996). Moreover, its reliability in this study was .76 for moral justification, .76 for euphemistic labeling, .80 for advantageous comparison, .77 for displacement responsibility, .76 for responsibility diffusion, .79 for distorting consequences, .75 for documents blame, .79 for dehumanization, and .90 for the total moral disengagement.

Substance Craving Short Scale

This test was an eight-item self-reported tool developed by Somoza, Dyrenforth, Goldsmith, Mezinskis & Cohen (1995). It measured the time, frequency, and severity of substance craving in a five-part Likert format from “not at all (0)” to “very much (4)”. The test showed a high correlation with addiction severity comparison and its Cronbach alpha value was reported to be .88 (Somoza et al, 1995). Furthermore, its Cronbach reliability was reported to be .78 by Basharpoor (2014).

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Table1

Mean, SD, and Correlation Indices of Participants' Scores in each of Moral Disengagement, Sensitivity to Punishment and Reward

Variables	M (SD±)	Sensitivity to Punishment	Sensitivity to Reward	Moral Disengagement	Moral Justification	Euphemistic Labeling	Advantageous Comparison	Displacement Responsibility	Responsibility Diffusion	Distorting Consequences	Documents Blame	Dehumanization	Craving
Sensitivity to Punishment	16.32)3.99(±	1											
Sensitivity to Reward	31.55)55.4(±	.57" .001	1										
Moral Disengagement	70.92)19.49(±	.610 .25	-.77 .20	1									
Moral Justification	12.28)4.55(±	-.17 .43	-.24" .004	.80" .001	1								

Euphemistic Labeling	11.65)3.11(±	-.47 .30	-.17' .029	.80" .001	.64" .001	1							
Advantageous Comparison	11.85)3.17(±	.21' .011	.26 .39	.75" .001	.55" .001	.60" .001	1						
Displacement Responsibility	11.45)2.98(±	.18' .0232	.45 .32	".73 .001	.50" .001	.47" .001	.43" .001	1					
Responsibility Diffusion	10.65)3.00(±	.15 .44	-.20 .41	.75" .001	.44" .001	.52" .001	.54" .001	.60" .001	1				
Distorting Consequences	11.30)3.39(±	-.065 .24	.18 .42	.74" .001	.54" .001	.54" .001	.47" .001	.48" .001	.51" .001	1			
Documents Blame	11.52)3.21(±	.30 .37	-.084.18	.72" .001	.55" .001	.55" .001	.43" .001	.41" .001	.45" .001	.39" .001	1		
Dehumanization	11.98)3.31(±	.082 .19	-.033 .36	.84" .001	.67" .001	.56" .001	.57" .001	.60" .001	.57" .001	.58" .001	.59" .001	1	
Craving	18.71)4.35(±	.21′ .01	".29 .001	".30 .001	.23′′ .006	.27′′ .003	.17 .065	.28′′ .002	".30 .001	.28" .002	.24" .009	.33 .36	1

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The results of Table 1 revealed that craving was positively and significantly correlated with sensitivity to punishment (p≤ .05; r= .21), sensitivity to reward (p≤ .01; r= .29), total moral disengagement (p≤ .01; r= .30), moral justification (p≤ .01; r= .23), euphemistic labeling (p≤ .01; r= .27), displacement responsibility (p≤ .01; r= .28), responsibility diffusion (p≤ .01; r= .30), distorting consequences (p≤ .01; r= .28), and documents blame (p≤ .01; r= .24).

Table 2

Regression Analysis of Craving Based on Sensitivity to Punishment and Reward and Moral Disengagement

Variable	Predictors	R	R^2	F	Sig of F	B	SE B	β	t	Sig
Craving		.37	.14	6.150	.001					
	Fixed Amount					13.215	5.228		3.575	.001
	Sensitivity to Punishment					.120	.146	.084	.818	.415
	Sensitivity to Reward					.294	.163	.186	1.807	.05
	moral disengagement					.092	.026	.314	2.528	.001

Table 2 indicates that 14 percent of total variance of craving was predicted by sensitivity to punishment and reward and moral disengagement. ANOVA results also showed that the regression model was significant (F=6.150; p≤.05). Furthermore, regression results uncovered that only sensitivity to reward (t=1.807; p≤.05) and moral

disengagement (t=2.52; p≤.01) predicted the craving.

Table 3

Regression Results of Craving Based on Components of Moral Disengagement

Variable	Predictors	B	SE B	β	t	Sig
Craving	Fixed Amount	16.59	1.34		12.33	.001
	Moral Justification	-.400	.129	-.428	3.11	.002
	Euphemistic Labeling	-.010	.131	-.010	-.073	.94
	Advantageous Comparison	.158	.118	.165	1.34	.183
	Displacement Responsibility	.007	.125	.007	.054	.957
	Responsibility Diffusion	.035	.129	.035	.271	.787
	Distorting Consequences	.133	.107	.149	1.25	.214
	Documents Blame	-.116	.112	-.122	-1.031	.305
	Dehumanization	.119	.134	.129	.884	.379

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According to Table 3, Regression results also revealed that out of moral disengagement indices, only moral justification predicted the craving ($p \leq .05$; $T=3.11$).

Discussion

One of the important factors that lead to failure of treatment programs and relapse in patience with abstinence programs is craving. The Pearson correlation results showed that craving is correlated with sensitivity to reward and punishment. This finding is in line with previous researches, showed the relation of sensitivity to reward and punishment with substance abuse (Abdi et al. (2011); Ivory et al. (2012); Urošević et al. (2015); Nicola et al (2015) and Mathew et al (2015)). To justify this finding, it might be contended that the current reward and punishment in the context (as external factor) along with sensitivity to them (as internal factor) might play a role in craving of dependent persons. One of the theories related to craving is the sensitivity to incentive theory. According to this model, which is also referred to as Neuro-adaptive theory, craving is dependent on neuro circuit, neuro layers, and reward system (Terry, Robinson & Berridge, 1993). According to this theory, the extreme sensitivity is the Dopamine Neuro transmitter system that increases the incentive salience of drugs which, in turn, leads to craving. The model states that wanting is not always a conscious action, therefore, relapse might happen without consciousness (Robinson, Ladd & Anderson, 2014). Additionally, the positive correlation of craving with sensitivity to punishment might be justified by the treatment model. Wikler (1948) who was the first person that formulated a model for craving and relapse based on conditioning theory believed that while drug abuse continues, some environmental signals in the form of conditional stimulus, treatment signals, and

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especially craving, as non-conditional stimulus, are bolded. After completion of the conditioning process, conditional stimuli might elicit some conditional responses and treatment, and craving signals are part of them; thus, the drug user shows relapse to avoid unpleasant feelings of craving. According to this model, persons usually look for drugs to escape from annoying feelings; in fact, instead of becoming motivated by reward system, they look for finding ways to relieve their unpleasant feelings (Basharpoor, 2014) and as a result of this, considerable changes happen in their brain. These changes lead to creation of behavioral signals and changes in them. Among these changes, lack of control on using the drug and craving to it might be mentioned.

The regression results also indicated that sensitivity to reward might predict the craving (β=19). These findings are consistent with those of Urošević et al. (2015), Mathew et al. (2015) and Morris et al. (2016). Craving acts as the impulsivity communicative and sensitivity to reward mechanism as stated by all. Some persons show more responses to creating signals of craving as craving means having positive expectations of the substance; thus making them more vulnerable to drug abuse as they often act impulsively. As a result of this, high impulsivity was along with more empowering of the drug and this could be an explanation for increase of craving in them.

Also the results of regression analysis showed that sensitivity punishment cannot predict craving. These findings are not in line with studies done by Jonker et al (2014) and Genovese et al (2007). According to this, the above hypothesis was not proved due to the empirical literature and theoretical framework. The disapproval of this hypothesis does not indicate the universality of lack of relation in other populations and samples; because the interactions of each society, features of samples, lack of control

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of interfering factors, and other factors can have an effect on disapproval of this hypothesis.

Additionally, the Pearson results showed that craving was correlated with total score of moral disengagement and its indices included moral justification, euphemistic blaming, displacement responsibility, responsibility diffusion, documents blame, dehumanization, and distorting consequences. These results are in line with those of Bandura et al (1996), Moore (2008), Kleinjan et al (2009), Dijkstra (2009) and Newton et al (2014). To explain these findings, it might be stated that as the reason of many unpleasant behaviors was self-compurgation processes, ignoring moral principles might create sense of humiliation; consequently, these mechanisms are unconsciously used to maintain self-esteem which in turn, causes persons to neglect and belittle moral precepts. Therefore, a higher purpose is achieved by justifying an unpleasant behavior through strategies such as: putting suitable titles on unpleasant behaviors; showing the behavior in an unreal way; comparison of unpleasant behavior with other worse behaviors; avoiding responsibility; group display of an unpleasant behavior; ignoring consequences; ignoring their actions consequences; and trying to prepare a motivational source to back their actions within the criteria framework by calling out other people as main reasons of fault (Bandura, 1977). These mechanisms build the ability to ignore moral principles without humiliation. Moreover, as internalized controls are typically affected by different operations, remarkable changes are made in their moral actions without any change in personality structure and these self-compurgation processes are, in essence, the justification of many inhumane behaviors not personality defects (Bandura, 1986). As a result, these mechanisms make people return to drug abuse even after treatment.

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The regression results also indicated that moral disengagement might predict the craving (β=31). This finding agreed with that of Jason et al. (2013), Adrian et al. (2013), Witkiewitz et al. (2013) and Masoomi-Nomandan et al. (2014) that concluded that craving was a significant predicting factor in drug abuse and relapse after treatment. Persons with high moral disengagement ignore the negative consequences of their addiction behavior, and deny any problem related to their addiction by unsuitable justification of their behaviors due to lack of interest in moral issues. In other words, they do not think of the consequences of their behaviors by justifying their unpleasant behaviors and try to enjoy their drug, though shortly.

Generally, the present study findings revealed that moral disengagement and sensitivity to reward are the predictors of abusers' craving and abusers experience more problems in these regards. These findings also indicated that these factors were among the important factors for re-abusing of drugs. The study was limited to some factors, which included the use of correlation research design, lack of control of variables such as type of drugs, and also restriction of the study participants to males. As a result, it is recommended that further studies be conducted in which the above-mentioned restrictions are taken into consideration as a possibility of treatment programs significantly helping abusers to overcome their addiction is perceived. Finally, for the concern of practical implications, it is recommended that educational courses and programs that teach problem solving skills be organized to increase patients' ability to effectively deal with their temptations and craving.

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Acknowledgment

The authors of this study express their wholehearted thanks to the management, personnel, and all patients of Ardabil Addiction Treatment Centers for their cooperation in conducting the research study. They also appreciate the Drug Control Headquarters for their financial support.

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