ORIGINAL RESEARCH

The moderator role of decision-making styles on relationship between personality and drug dependence vulnerability

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Abstract

Background: According to recent researches, decision-making style and personality traits play an important role in the drug dependence vulnerability. The aim of current research was to investigate the moderator role of decision-making styles on relationship between personality and drug dependence vulnerability.

Materials and Methods: Two hundred and twenty students of Tehran Payame Noor University were selected randomly and completed NEO big five personality scale, general decision-making style questionnaire and risk of addiction questionnaire. The data were analyzed using hierarchical regression analysis.

Results: The results of present study indicated that only neuroticism is able to predict risk of addiction. In addition, intuitive, dependent, spontaneous and avoidant decision-making style moderated the relationship between neuroticism and drug dependence vulnerability.

Conclusions: The results showed that by changing the decision-making style, it is possible to prevent substance dependence disorders in vulnerable populations.

Keywords: Decision-making style, Personality, Addiction vulnerability, Cognitive processing

Introduction

One of the most challenging issues in the phenomenon of addiction is to know why some people are affected by substance abuse and some are not. The role of individual differences in substance use and abuse is so important that some people, despite the availability of substances, never use them and others regularly are searching for substances for use and abuse. Recent researches have been investigating the factors that increase the risk of addiction and have shown the difference in tendency to substance use, has been caused by environmental (high levels of stress, the influence of peers, availability of substances), biological (genetic imperfection and neurological deficits) and psychological (negative emotions, avoidance reducing and low motivation to succeed) factors [1, 2]. Among the major environmental factors that have a role in substance abuse, we can point to socio-economic status, family situation and other circumstances [3]. From a neurobiological perspective, genetic factors are significant for tendency towards addiction; and 40 to 60 percent of addiction disorders occur because of these factors [4]. One specific gene is for dopamine D2 receptor that regulates brain dopamine, responds to chemical dopamine and creates feeling of reward and pleasure in the brain [5]. Individuals with a genetic defect in dopamine D2 receptors do not get good feelings naturally; so it is more likely that they will be absorbed by substances to compensate the deficiency of the brain receptors to produce feeling of pleasure and reward [6]. In addition, genetics plays an important role in personality characteristics, which some of these characteristics increase the risk of tendency to addiction and abuse [5]. Numerous studies have shown that specific personality traits exist in substance abusers or whom vulnerable to develop the disorder [7, 8, 9, and 10]. For instance, Rahmanian (2008) showed that there is a relation between psychopathy and craving in opioid addicts, and the duration of addiction has an impact on the extent of this relation [11]. In addition, Vaknin research showed that individuals who have an increased risk for substance abuse have specific personality characteristics. If we want to call some of these

characteristics, it could be point to antisocial, passive/aggressive, and anxious personalities [12]. In this regard, the findings suggest that personality traits of extraversion and neuroticism in opioid-dependent patients are higher than normal [13] and there is specific interaction between family history and personality pattern in substance abuse [14].

In addition to above, it appears that environmental factors have a greater effect on the substance use initiation, while genetic factors play an important role in the development of consumption and the onset of dependency and abuse [15]. During the past two decades another approach has been noted that focuses on drug developmental process of substance abuse [16]. In this regard, research findings have shown that poor decision makers are more likely to do maladaptive behaviors or be affected by substance dependence disorders [17]. Decision-making style represents a habitual pattern that they used when deciding. In other words, each person's decision-making style is his or her characteristic approach to understanding and responding to the task of deciding one's own [18]. Hence, the personality characteristics of each one involved in his or her decision-making style. Scotte and Bruce presented five general decision-making styles are presented [19]. 1) Rational decision-making style reflects the willingness of decision makers to identify all possible solutions, evaluating the results of all aspects of each approach, and finally select the optimum solution when faced with a decision situation [20]. 2) Intuitive style of decision-making is unconscious process that evolved in the light of experience gained. In this way, the individual doesn't have logic in relation to its decision, but has been doing what he or she thinks is true, relying on inner insight [21]. 3) Dependent style reflects the lack of independence of thought and action and decision makers rely on the support and guidance of others when deciding [22]. 4) Spontaneous decision-making style represents the sense of urgency and willingness to take immediate final decision in the shortest and the fastest probable time [18]. 5) Avoidant decision-making style in which individuals when faced with a problem or opportunity postpone the decision as late as

possible, and evade from any reaction to the problem [22]. Studies have shown that substance abusers often act impulsively, show defects in the task of deciding and poor response time [23, 24, 25]. They have trouble at the beginning of tasks and detection rules of receiving reward and punishment [24], and showed high scores in anxiety, disinhibition and depressive symptoms [25, 26, 27].

Overall, review of research suggests that genetic and environmental factors, interacting with each other create the risk factors that increase the likelihood of substance use. Also, the combination of these two factors can cause the protective factors that tend to reduce tendency to substances. The amount of tendency depends to both risk factors and protective factors. Individuals who have more risk factors and less protective factors are more likely to be diagnosed with substance dependency disorders [28]. Therefore, trying to identify protective and risk factors of developing substance use can reduce the risk of substance dependency. Risk factors might interact between the effects of environmental and genetic factors and increase the power of substance use prediction. A large number of risk factors including genetic, familial, sociocultural, personality and behavioral factors are known, but few studies have been done on protective factors. Because of the personality traits that increase the likelihood of substance use are determined by genetics and less capable to change. Therefore, identification the factors that mediate and reduce the effects of personality traits, may be effective in the treatment and prevention of this disorders. Subsequently, this study aimed to investigate the moderator role of decision-making styles on relationship between personality and drug dependence vulnerability.

Materials and Methods

This study is a basic study from the goal perspective and has a correlation design in terms of data gathering. The study population consisted of all students studying in the Payame Noor University of Tehran-South during 2005-2006 academic year. The 220 subjects were selected randomly. From which 51.7 percent were female and 48.3 percent were male. In terms of marital status, 57.5 percent were married and 41.7 were unmarried, marital status of 0.8 was not clear. From which 40 percent were undergraduate, 57.15 percent were graduate and 2.85 percent were enrolled in the Ph.D. In addition, the mean and standard deviation of subjects' ages were 27.77 and 8.99 respectively.

Instruments

NEO-Five Factor Inventory-short form (NEO-FFI): Costa and McCrae (1989) designed short form of the Five-Factor Inventory to measure the five personality traits. This is in the form of self-report and measures the personality in five main traits of neuroticism, extraversion, openness to experience, agreeableness and conscientiousness scales. The questionnaire included 60 items based on the Likert 5 point scale (strongly disagree, disagree, neutral, agree and strongly agree). Scoring is not the same in all items. This means that in some items, scores are 4 for strongly disagree, 3 for disagree, 2 for neutral, 1 for agree and strongly agree shall be zero; while some others has scored in reverse mode [29]. This inventory has been standardized by Garosi Farshi in Iran (2001). Reliability of the questionnaire has been achieved using test-retest reliability, .83 (neuroticism), 0.75 (extraversion), 0.80 (openness to experience), 0.79 (agreeableness), 0.79 (conscience) respectively [29].

The General Decision-making Style Questionnaire (GDMS): This questioner is designed by Scott and Bruce (1995) to evaluate the decision-making practices. GDMS is a self-report questionnaire, which contains 25 items for 5 styles. Styles measured the questionnaire public decision-making by: rational, intuitive, dependent, avoidant and spontaneous. Each item should be answered based on the Likert 5 point scale (strongly disagree, disagree, neutral, agree and strongly agree). By comparing the scores on each subscale of various styles, the style that has the most points is the participant decision-making one. The validity of GDMS has been reported very high by Scott and Bruce (1995); and reliability based on Cronbach's alpha for the subscales styles have been reported: 0.85 for rational, 0.84 for intuitive, 0.86 for dependent, 0.94 for spontaneous and 0.87 for avoidant styles. In Heidari and Marzoughi (2012) research GDMS validity was calculated using

item analysis, which was high. The reliability of the instrument subscales using Cronbach's alpha were 0.77 for rational, 0.78 for intuitive style, 0.76 for dependent, 0.86 for spontaneous and 0.83 [30].

Identifying People in Risk of Addiction Questionnaire (IPRA): This questionnaire is designed by Anisi et al. (2013) to identify people at risk of addiction. This self-report questionnaire has 74 items in four subscales. Subscales measured by the questionnaire include depression and helplessness, positive attitude to drug, anxiety and fear and high sensation seeking. Scoring method is Likert-type multiple-choice including strongly disagree / never (0) disagree / rarely (1) neither agree nor disagree (2) somewhat agree / often (3), agree / always (4). To obtain a total score, four subscales are summed together. Cronbach's alpha reliability coefficient for the subscales have been reported 0.96 for depression and helplessness, 0.93 for positive attitude to drugs, 0.90 for anxiety and fear and 0.80 for high sensation seeking. The validity was calculated using item analysis, and high reliability have been reported [31].

Results
To investigate the moderating effect of decision making styles on the relationship between personality styles as predictor variables and the risk of addiction as a criterion variable, regression analysis was used. According to Baron and Kenny (1986), hierarchical regression analysis is an appropriate statistical method to evaluate the effect of moderating variable on the strength of the relationship between the predictor and criterion variables. For this purpose, the main effect of moderator and predictive variables on the criterion variable as well as the interactive effect of predictor × moderator on predictor variable must be mentioned [32]. In the first stage; for evaluation of predictive power of personality dimensions effect on the addiction vulnerability, personality dimensions were separately entered in the regression analysis.
Before using regression coefficient, to evaluate the independency of the errors from each other, Durbin Watson test was used and it was in the range of 1.5 to 2.5, so regression analysis could be used. Results are shown in table 1.

The results of the first phase of analysis showed that neuroticism predicted addiction vulnerability (F $_{(5,113)}$ = 5.14, p <0.000); As R^2 changes showed that 18.5% of the variance in addiction vulnerability is explained by neuroticism. In the second stage - to assess the predictive power of decision-making styles on the addiction vulnerability - five decision-making styles, as moderators, were entered into regression analysis. The second stage results showed that the decision-making styles of intuitive, spontaneous and avoidant decision-making style can predict positively and rational style can predict negatively addiction vulnerability. Since only the relationship between addiction vulnerability and neuroticism trait were significant, to evaluate the moderating effect of decision-making style on the strength of the relationship between addiction vulnerability and personality dimensions, interactive effect of each decision-making style with neuroticism personality trait was entered into third stage of the regression equation. The result indicates the decision-making styles of intuitive (β = 0.351), avoidance (β = 0.344), spontaneous (β = 0.306) and dependent (β = 0.214) are significant moderators between addiction vulnerability and neuroticism trait.

Discussion
Results showed that personality dimension of neuroticism significantly were able to predict addiction vulnerability. In addition, the findings showed that decision-making styles of intuitive, spontaneous and avoidant are able to positively and rational style negatively predicts addiction vulnerability. Results also showed that the decision-making styles of, intuitive, avoidant, dependent and spontaneous have moderating role on the strength of relationship between addiction vulnerability and neuroticism trait. In this regard, the relationship between personality traits and addiction vulnerability has been proven in numerous preceding studies [8, 33]. The relationship between personality neuroticism with prediction of addiction vulnerability can be explained according Eysenck (1997) theory [34]. According to this theory, people with high neuroticism traits often feel despair and lack of emotional stability and high anxiety experience; so many people with

neuroticism choose the substance to self-regulate, solve problems and achieve relaxation. In addition, this correlation can be explained due to chronic stress of neurotic individuals. Chronic stress due to cortisol level elevation can put brain at risk of tendency to substance use [35]. A genetic defect that is common between individuals vulnerable to addiction and neurotic people is defect in dopamine D2 receptor, which responds to dopamine transmission and induces feelings of reward and pleasure in the brain. Individuals who have defect in this receptor, usually don't get good feelings normally, it is more probable to be absorbed to substances for compensation if brain receptors low functionality to produce a sense of pleasure and reward [5]. Another result represents a moderating role for ineffective decision-making styles on the addiction vulnerability occurrence. Decision-making means the judgment and cognitive processing which determines individual behavior. Decisions making, according to Clarke and Cornish is a conscious thought process to help people in goal setting and compatibility, and a base for defense mechanisms by which information is selected in the environment, attention to them will be focused and processed [9]. This result can be explained by cognitive biases in substance dependent individuals [16]. Because cognitive biases like attention and memory can lead to impaired decision-making process and individual vulnerable to addiction use ineffective decision-making styles. However, since neurotic people do without thinking and trust their own feelings or rely on the others, their decision-making styles also have been affected and have being decided intuitively or dependently. On the other hand, when these people are under stress or avoid exposure to decision-making situations and ignore these situations as much as possible (avoidant decision-making style) or if they have to make decisions impromptu and fast (spontaneous decision-making style). Schifrin and Schneider "Bottom-up and Top-down processing "theory can explain the impact of different decision-making styles on the relation between personality traits and addiction vulnerability. Bottom-up or stimulus-driven processing is directly affected by stimulus while

Top-down or conceptually-driven processing is under the influence of perception. Schneider and Schifrin also have distinguished between controlled and conscious cognitive processing and automatic and unconscious cognitive processing. Therefore, the automated processing such as implicit memory and attention, are bottom-up processing usually dry and stereotyped and have been influencing by personality traits [15]. On the other hand, since the conscious cognitive processing such as memory and decision-making, are flexible and conceptual processes, which people can consciously intervene and have more control over these activities; as a result, the effects of stereotyped variables such as personality characteristics on addiction vulnerability and the tendency to the substance, can be reduced by changing the style of decision-making.

Conclusion
Overall, the results showed that the personality and style of decision-making could be predictors of the risk of addiction vulnerability. Subsequently, the individuals who are more neurotic and use intuitive, spontaneous and avoidant decision-making styles more, and use rational decision-making style less, are at risk of addiction. Ultimately, the results showed that intuitive, avoidant, spontaneous and dependent decision-making styles could moderate the strength of the relation between addiction vulnerability and neuroticism personality trait. The results of this study can be used in the treatment and prevention of substance disorder relapse. Since personality traits can change less, we can change the style of decision-making in people who are at high addiction vulnerability. Finally, since the study was conducted only on a sample of students, to validate and generalize the results, it has recommended that future studies target more general population and modification decision-making styles to examine the relations between variables.

Conflict of interests
Authors declare no conflict of interest.

Table 1: Summary of regression analysis results to examine the moderating effect of decision-making styles on the relationship between personality traits and addiction vulnerability

Phase	Criterion variable: addiction vulnerability	F	DR^2	Durbin Watson	t	ß	Sig
1	**Predictor variable**	5.143	0.185	1.860			
	Neuroticism				3.71	0.335	0.000
	Extraversion				0.675	0.061	0.501
	Openness to experience				1.380	0.124	0.170
	Agreeableness				1.336	0.120	0.184
	Conscientiousness				1.202	0.114	0.232
2	**Moderator variable**	13.367	0.370	2.084			
	Rational decision-making style				2.121	0.174	0.036
	Intuitive decision-making style				3.761	0.315	0.000
	Dependent decision-making style				1.772	0.141	0.079
	Spontaneous decision-making style				2.154	0.204	0.033
	Avoidant decision-making style				3.365	0.298	0.001
3	**Predictor × Moderator**	12.143	0.348	2.008			
	Neuroticism × rational decision-making style				0.967	0.092	0.336
	Neuroticism × intuitive decision-making style				3.118	0.351	0.002
	Neuroticism × dependent decision-making style				1.976	0.214	0.050
	Neuroticism × spontaneous decision-making style				2.608	0.306	0.010
	Neuroticism × avoidant decision-making style				3.073	0.344	0.003

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