Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.elsevier.com/locate/poamed

Original research article

Early maladaptive schemas, behavioral inhibition system, behavioral approach system, and defense styles in natural drug abusers

Vahid Khosravani [a,*], *Mohammad Seidisarouei* [b], *Amin Alvani* [c]

[a] *Masters in General Psychology, University of Azarbaijan Shahid Madani, Tabriz, Iran*
[b] *Masters in General Psychology, Islamic Azad University, Marvdasht, Fars, Iran*
[c] *Masters in General Psychology, Islamic Azad University, Arsenjan, Fars, Iran*

ARTICLE INFO

Article history:
Received 30 August 2015
Received in revised form
22 September 2015
Accepted 15 December 2015
Available online 25 January 2016

Keywords:
Early maladaptive schemas
Behavioral inhibition system
Behavioral approach system
Defense styles
Natural drug

ABSTRACT

Introduction: The early maladaptive schemas (EMSs), behavioral inhibition system (BIS), and behavioral approach system (BAS) can play a role in using defense styles, especially in drug abuse which may be a maladaptive defense style.
Aim: The aim of this study was to examine the relationship between EMS and BIS/BAS with defense styles in the Iranian abusers of natural drug.
Material and methods: In a cross-sectional design, we examined 316 abusers of natural drug (including abusers of opium and opium sap, henbane and marijuana) admitted at Niyayesh addiction treatment clinic in the city of Shiraz, Iran (male – 61.4%, female – 38.6%).
Results and discussion: Correlational analyses revealed that EMSs were correlated positively with both neurotic and immature defense styles, and negatively with mature defense style. Also, BIS and all BAS subscales were related to both neurotic and immature defense styles, and each of BAS subscales was negatively associated with mature defense style. Finally, there were significant sex differences in EMSs, BIS, BAS subscales, and defense styles.
Conclusions: We concluded that the EMSs, excess BIS and BAS subscales are important variables in using maladaptive defense styles and subsequently in tending toward natural drug abuse in the abusers of natural drug.

1. Introduction

Addiction is a state defined by compulsive engagement in rewarding stimuli. Despite adverse consequences, it can be thought of as a disease or biological process leading to such behaviors.[1] A natural drug is a chemical compound or drug produced by a living organism that is found in nature. Early maladaptive schemas (EMSs) are a sort of belief that people have about themselves, others, and the environments normally derived from dissatisfaction regarding the basic needs, especially emotional needs in the childhood.[2] When the

* *Correspondence to*: Alley #2, hafezshomali St., Marvdasht, Fars, Iran. Tel.: +98 9176316056.
E-mail address: vahid.psy@gmail.com (V. Khosravani).

http://dx.doi.org/10.1016/j.poamed.2015.12.003
1230-8013/

EMSs become active, the levels of released and direct or indirect excitement lead to depression, anxiety, and drug abuse.[3] It is believed that drug abuse is one of the coping strategies that the person uses to avoid negative effects of the activated EMSs.[4]

One explanation for why some individuals engage in risky health behaviors while others forgo them, lies with individual differences in sensitivity to cues of reward and punishment.[5] Researchers have proposed the existence of two separate systems that provide the basis for human action.[6,7] One incarnation of the dual motivation perspective is reinforcement sensitivity theory (RST).[8] This theory posits the existence of the behavioral approach system (BAS) and behavioral inhabitation system (BIS).[9] According to Gray's reinforcement sensitivity theory,[8] BIS represents sensitivity to punishment and BAS denotes sensitivity to reward.[10] BAS includes BAS-fun seeking (BAS-FS), BAS-reward responsiveness (BAS-RR), and BAS-drive (BAS-D).[11]

Defense styles are unconscious cognitive operations that occur in an unconscious level to minimize sudden changes in both internal and external environments by modifying the conscious experience of thought, feeling, and emotion.[12] These styles are used by individuals to overcome excessive anxiety.[13] Defense mechanisms are divided into three styles of immature, mature and neurotic.[14]

Drug use can be an inefficient way of defense against the negative effects of the EMSs. People with positive schemas are at lower risk of illness because they experience more positive excitements, and when encountering problems, they show more strength at coping.[15] Samkhaniyani et al.[16] in their research on individuals with gender identity disorder found that there is a positive significant relationship between the EMSs and immature defense style, and also there is a negative significant association between them and mature style. Young et al.[17] proposed that ''eliminating maladaptive coping responses permanently is almost impossible without changing the schemas.'' Mairet et al.[18] reported that the impact of EMSs on coping strategies is very strong. Young[19] suggests that individuals use cognitive (avoiding thinking about something), emotional (blocking or numbing feelings), behavioral (utilizing escape behaviors, such as drinking alcohol) and/or somatic (experiencing physical symptoms) means to avoid or defend the thoughts, feelings and emotions associated with EMSs. Several studies have shown that there are positive and significant relationships among EMSs and addiction potential.[20,21]

While studying defense styles in the field of personality, we find that the human's thought is not always rational, based on reality, objective and purposeful. Defense styles which are responsible for protecting us against anxiety, affected by the BAS/BIS, may have normal or abnormal functions. Previous researches showed that there is a relationship between BIS (reversely) and high levels of BAS to the drug abuse.[5,8,22,23] Franken and Muris,[5] and Franken et al.[24] documented a relationship between BAS-FS and BAS-D to drug use and dependence among addicts. Dawe and Loxton[25] showed the role of BAS-D in relation to use rewarding drug. A direct association between the BIS and BAS subscales with drug abuse has been shown.[24] Atashkar et al.[26] in their study on students concluded that BAS components have a significant positive relation to mature style and they have a significant negative correlation with neurotic and immature styles. Also they showed that BIS has a significant negative association with mature style and a significant positive relation to immature style.

Evidence suggests that the physiology and epidemiology of drug abuse between women and men is somewhat different.[27] Previous studies in the field of addiction have shown that in relation to gender, males earned higher scores on the BAS and females on the BIS scales.[28] Regarding gender differences in EMSs, the research results showed that women scored significantly higher than men on EMSs.[20] In the application of defense styles in men and women, the study has shown that men and women differ in their use of defense styles.[29]

2. Aim

The purpose of this study was to assess the relationship between EMS and BIS/BAS with defense styles in the abusers of natural drug since August 2014 to May 2015. The aim was realized through searching answers to the following hypotheses:

(1) There are significant correlations between EMSs, BIS, and BAS subscales with defense styles in the abusers of natural drug.
(2) There are significant differences between the means of EMSs, BIS, BAS subscales, and defense styles in males and females as the abusers of natural drug.

3. Material and methods

3.1. *Study design*

This was a cross-sectional study of a sample of general population of Iranian drug abusers. The sample was selected among the abusers of a natural drug referred to Niyayesh addiction treatment clinic in Shiraz, Iran.

3.2. *Participants*

This was a study of natural drug abusers (N = 316, 194 males and 122 females; mean age 33, SD 6.03, age range 16–56), conducted from August 2014 to May 2015 on the Iranian drug abusers including abusers of opium and opium sap, henbane and marijuana, referred to the addiction treatment clinic of Niyayesh in Shiraz, Iran. Participants agreed to attend the study and filled out and signed the informed consent forms. The characteristics of the participants are presented in Table 1.

Participants were invited to take part in the research in the addiction treatment clinic of Niyayesh, and they willingly participated in the study. The investigators had permission from a specialist of addictive behaviors and asked the addictive patients for their consent. The inclusion criteria of participants in this study included using drug for at least one year, defining the drug used, and neither having neither mental disorders nor the background. All diagnostic criteria

Table 1 – Participants characteristics (N = 316).

Characteristics	N (%)
Gender	
Males	194 (61.4)
Females	122 (38.6)
Age	
16–24 years	48 (15.2)
25–34 years	112 (35.4)
35–44 years	118 (37.3)
45–54 years	24 (7.6)
55+ years	14 (4.4)
Level of education, no.	
Illiterate	10 (3.2)
Under diploma	122 (38.6)
High school graduate (diploma)	140 (44.3)
College graduate or more	44 (13.95)
Marital status	
Single	120 (38.0)
Married	168 (53.2)
Divorced	28 (8.9)
Duration of drug usage, years	
1–5	168 (53.2)
6–10	68 (21.5)
11–15	34 (10.8)
16–20	22 (7.05)
21+	24 (7.6)

were set by a specialist of addictive behaviors in the clinic of Niyayesh. The patients filled out the questionnaires in the clinic. All of them were studied in accordance with the 1989 revision of the Helsinki Declaration as well as APA ethical standards.

Participants' demographic characteristics (gender, age, level of education, the drug used, marital status, and duration of drug usage) were collected by demographic questionnaire.

Schema Questionnaire-Short Form (SQ-SF)[30] was used to assess EMSs. The SQ-SF measures five domains including: (1) disconnection and rejection, (2) impaired autonomy and performance, (3) impaired limits, (4) other-directedness, and (5) over vigilance and inhibition.[30] Respondents are asked to rate statements on a 6-point Likert scale from ''completely untrue of me'' to ''describes me perfectly.'' In the current study, we used the Persian version of SQ-SF. In Iran, Yousefi and Shirbagi,[31] and Sadooghi[32] in their studies confirmed psychometric properties of the Persian version of SQ-SF through the methods of the Cronbach's alpha, Split-half, and exploratory and confirmatory factor analysis. The SQ-SF has in different studies shown adequate reliability, validity in predicting psychopathology, and factor structure.[33] Internal consistencies were ''adequate to good'' in the current study (see Table 2).

Carver and White's BIS/BAS scale[11] was used to assess BIS and the subscales of BAS. This scale consists of 24 self-descriptive statements. Seven of these pertain to BIS, 4 to fun seeking, 5 to reward responsiveness, and 4 to drive. For all items, participants indicate their response from 1 (very true for me) to 4 (not at all true for me). In this study, we used Persian version of BIS/BAS scale. In Iran, Mohammadi[34] confirmed psychometric properties of the Persian version of BIS/BAS scale using test–retest reliability, Cronbach's alpha, and exploratory factor analysis. Convergent and discriminant validity for the BIS/BAS scales has been supported.[35] Internal consistencies were ''adequate to good'' in the current study (see Table 2).

The Defense Styles Questionnaire (DSQ-40) is a revised version of the DSQ-72 by Andrews et al.[14] that is most widely used as a self-report instrument for defense measurement. It was specifically designed to draw out people styles in dealing with internal conflicts based on the idea that people can accurately remark on their temperamental behavior.[36] The DSQ-40 consists of 40 items and the defenses are hierarchically grouped based on maturity level (neurotic, immature, and mature styles), in a 9-point Likert format. The DSQ-40 has demonstrated good psychometric properties.[14] We apply the Persian version of DSQ-40. Persian version of this questionnaire was translated and back translated by Besharat et al.[37] Test–retest reliability of the Persian version of DSQ-40 was calculated in two occasions over a 2–6 week, and correlation coefficients ranged from 0.73 to 0.87 for mature defense style, 0.71–0.84 for neurotic defense style, and 0.69–0.78 for immature defense.[38] See Table 2 for the Cronbach's alpha coefficient of defense styles in the present study.

3.3. *Data analysis*

Demographic and research variables are presented as mean ± standard deviation or as percentages within specific ranges. The relationship between the EMSs, BIS, and BAS subscales with defense styles was analyzed by the zero-order correlation; multivariate regression was used in order to predict defense styles based on the EMSs, BIS, and BAS subscales, and finally, the independent samples *T*-test was performed to examine sex differences in the means of the responses for each of EMSs, BIS, BAS subscales, and defense styles. If *P* value was less than 0.05 the result was considered as statistically significant. All statistical analyses were performed by using SPSS v. 19.0 for Windows (IBM Corporation, Armonk, NY, USA).

4. Results

The data were first screened based on recommended best practices.[39] There were no missing values. Table 1 shows the participants characteristics including gender, age range, level of education, marital status, and duration of drug usage.

First, we performed a zero-order correlation analysis to explore the relationship among age, gender, EMSs, BIS, BAS subscales, and defense styles. Table 2 shows that all five EMSs were positively correlated with both neurotic and immature defense styles, but impaired limits and over vigilance/inhibition were negatively related to mature defense style, whereas impaired autonomy/performance was negatively associated with gender, and over vigilance/inhibition was positively correlated with gender. In addition, disconnection/rejection and impaired limits were negatively correlated with age, and BIS was positively correlated with both neurotic and immature defense styles, gender, and age. The results show that each of three BAS subscales including BAS-RR, BAS-D, and BAS-FS was positively related to gender and neurotic and immature defense styles, and negatively to mature defense styles. On the other hand, BAS-RR showed a negative

Table 2 – Means and SDs values, and zero-order correlations for the BIS/BAS, and EMSs with defense styles ($N = 316$).

	Gender	Age	BIS	BAS-RR	BAS-D	BAS-FS	Disconnection/ rejection	Impaired autonomy and performance	Impaired limits	Other-directedness	Over-vigilance/ inhibition	Neurotic	Mature	Immature
Gender	–													
Age	−0.29**	–												
BIS and BAS subscales														
BIS	0.16**	0.18**	–											
BAS-RR	0.36**	−0.19**	−0.32**	–										
BAS-D	0.23**	−0.02	−0.31**	0.50**	–									
BAS-FS	0.18**	−0.01	−0.12*	0.49**	0.38**	–								
EMSs														
Disconnection/rejection	0.02	−0.23**	−0.22**	0.25**	0.20**	0.13*	–							
Impaired autonomy and performance	−0.21**	−0.04	−0.03	0.09	0.03	0.02	0.67**	–						
Impaired limits	0.02	−0.19**	−0.26**	0.06	0.18**	0.26**	0.29**	0.35**	–					
Other-directedness	−0.10	−0.01	−0.09	0.08	0.14**	0.10	0.57**	0.64**	0.23**	–				
Over-vigilance/inhibition	0.14**	−0.09	−0.29**	0.15**	0.24**	0.16**	0.54**	0.49**	0.37**	0.55**	–			
Defense styles														
Neurotic	0.10	−0.10	0.27**	0.24**	0.31**	0.20**	0.24**	0.22**	0.16**	0.38**	0.42**	–		
Mature	0.04	0.06	0.01	−0.27**	−0.31**	−0.11*	−0.02	−0.02	−0.14*	−0.10	−0.17**	0.51**	–	
Immature	0.23**	−0.12*	0.35**	0.27**	0.48**	0.18**	0.24**	0.28**	0.39**	0.40**	0.57**	0.56**	0.46**	–
Means	1.31	33.00	18.23	13.79	10.55	10.65	95.59	68.79	36.54	37.08	38.40	42.65	44.49	130.50
SD	0.49	6.03	2.65	2.94	2.42	2.52	20.90	16.55	7.26	8.18	7.76	9.01	9.27	26.22
Cronbach's α	–	–	0.68	0.88	0.86	0.85	0.88	0.86	0.83	0.89	0.87	0.78	0.79	0.83

Gender (males – 1, females – 2).

* $P < 0.05$ (two tailed).

** $P < 0.01$ (two tailed).

Table 3 – Defense styles regressed based on EMSs (N = 316).

Predictors	B	SE	β	t	R^2	Adj. R^2	f^2
Neurotic defense style (criterion)							
Age	−1.62	0.49	−0.18	−3.29			<0.001***
Gender	2.26	1.02	0.12	2.21			<0.05*
Disconnection/rejection	0.001	0.03	0.001	0.01			0.99
Impaired autonomy and performance	0.04	0.04	0.08	1.01			0.31
Impaired limits	0.06	0.07	0.05	0.92			0.36
Other-directedness	0.29	0.08	0.26	3.76			<0.001***
Over-vigilance/inhibition	0.34	0.08	0.30	4.46			<0.001***
					0.25	0.23	
Mature defense style (criterion)							
Age	0.41	0.56	0.08	1.27			0.21
Gender	0.17	1.16	0.009	0.15			0.88
Disconnection/rejection	−0.05	0.03	−0.11	−1.41			0.16
Impaired autonomy and performance	−0.10	0.05	−0.18	−2.11			<0.05*
Impaired limits	−0.18	0.08	−0.14	−2.37			<0.01**
Other-directedness	−0.16	0.09	−0.14	−1.81			0.07
Over-vigilance/inhibition	−0.24	0.09	−0.20	−2.77			<0.01**
					0.08	0.06	
Immature defense style (criterion)							
Age	−0.42	1.82	0.02	0.33			0.74
Gender	9.16	2.65	0.17	3.46			<0.001***
Disconnection/rejection	0.06	0.08	0.05	0.70			0.48
Impaired autonomy and performance	0.16	0.11	0.10	1.50			0.14
Impaired limits	0.82	0.18	0.23	4.61			<0.001**
Other-directedness	0.61	0.20	0.19	3.04			<0.01**
Over-vigilance/inhibition	1.29	0.20	0.38	6.44			<0.001***
					0.40	0.39	

β – standardized coefficient.
* $P < 0.05$.
** $P < 0.01$.
*** $P < 0.001$.

correlation with age. Thus, the present findings were consistent with first hypothesis.

Second, we performed a set of regression analyses to examine the hypothesized relation between the EMSs, BIS, and BAS subscales to defense styles. Since gender and age correlated strongly with defense styles, they were included in the models as covariates. This is especially relevant to the positive relation between age to BIS, and the negative association with BAS-RR, disconnection/rejection, impaired limits, and immature defense style. Also, this is related to the positive correlation between gender with BIS, all BAS subscales, over-vigilance/inhibition, and immature defense style, and the negative association with impaired autonomy and performance. Therefore, in these models, we included age and gender as control variables.

Table 3 shows the regression models for variables explaining defense styles based on the five EMSs. In model one, neurotic defense style was the criterion variable, age and gender were as covariates, and the EMSs were tested as the predictors. The full model accounted for 25% (Adj. $R^2 = 0.23$) of the criterion variable variance. The model revealed that over-vigilance/inhibition ($t = 4.46$), other-directedness ($t = 3.76$), age ($t = -3.29$) ($P < 0.001$), and gender ($t = 2.21$, $P < 0.05$) were strong contributors to the explanation of neurotic defense style respectively; in model two, mature defense style was the criterion variable, age and gender were as covariates, and the EMSs were tested as the predictors. The full model accounted for 8% (Adj. $R^2 = 0.06$) of the criterion variable variance. The results of the model showed that over-vigilance/inhibition ($t = -2.77$), impaired limits ($t = -2.37$) ($P < 0.01$), and impaired autonomy and performance ($t = -2.11$, $P < 0.05$) strongly explained the mature defense style respectively; and finally in model three, immature defense style was the criterion variable, age and gender were as covariates, and the EMSs were tested as the predictors. The full model accounted for 40% (Adj. $R^2 = 0.39$) of the criterion variable variance. The results in Table 3 revealed that over-vigilance/inhibition ($t = 6.44$), impaired limits ($t = 4.61$), gender ($t = 3.46$) ($P < 0.001$), other-directedness ($t = 3.04$, $P < 0.01$) strongly predicted the immature defense style respectively (see Table 3).

Table 4 shows the regression models for variables explaining defense styles based on the BIS and BAS subscales. In model one, neurotic defense style was the criterion variable, age and gender were as covariates, and the BIS and BAS subscales were tested as the predictors. The full model accounted for 16% (Adj. $R^2 = 0.14$) of the criterion variable variance. The results of the model showed that BIS ($t = 3.57$, $P < 0.001$), age ($t = -2.96$), and BAS-D ($t = 2.67$) ($P < 0.01$) strongly explained the neurotic defense style respectively; in model two, mature defense style was the criterion variable, age and gender were as covariates, and the BIS and BAS subscales were tested as the predictors. The full model accounted for 14% (Adj. $R^2 = 0.12$) of the criterion variable variance. As can be seen from Table 3, BAS-D ($t = -4.26$, $P < 0.001$), BAS-RR ($t = -3.40$, $P < 0.01$), and BIS ($t = -2.01$, $P < 0.05$) strongly predicted the mature defense style; and

Table 4 – Defense styles regressed based on BAS-subscales and BIS (N = 316).

Predictors	B	SE	β	t	R^2	Adj. R^2	f^2
Neurotic defense style (criterion)							
Age	−1.52	0.51	−0.17	−2.96			<0.01**
Gender	0.78	1.07	0.04	0.73			0.47
BIS	0.69	0.19	0.20	3.57			<0.001***
BAS-D	0.63	0.23	0.17	2.67			<0.01**
BAS-RR	0.23	0.21	0.07	1.09			0.28
BAS-FS	0.23	0.22	0.06	1.06			0.29
					0.16	0.14	
Mature defense style (criterion)							
Age	0.60	0.53	0.06	1.12			0.26
Gender	−1.11	1.11	−0.06	−0.99			0.32
BIS	−0.40	0.20	−0.11	−2.01			<0.05*
BAS-D	−1.33	0.25	−0.27	−4.26			<0.001***
BAS-RR	−0.75	0.22	−0.24	−3.40			<0.01**
BAS-FS	−0.30	0.23	−0.08	−1.35			0.17
					0.14	0.12	
Immature defense style (criterion)							
Age	−1.97	1.37	−0.07	−1.43			0.15
Gender	5.24	2.86	0.10	1.83			0.06
BIS	2.08	0.52	0.21	4.02			<0.001***
BAS-D	4.62	0.63	0.43	7.32			<0.001***
BAS-RR	0.59	0.57	0.07	1.04			0.30
BAS-FS	0.06	0.58	0.005	0.10			0.92
					0.30	0.28	

β – standardized coefficient.
* $P < 0.05$.
** $P < 0.01$.
*** $P < 0.001$.

finally in model three, immature defense style was the criterion variable, age and gender were as covariates, and the BIS and BAS subscales were tested as the predictors. The full model accounted for 30% (Adj. $R^2 = 0.28$) of the criterion variable variance. Table 4 shows that BAS-D ($t = 7.32$) and BIS ($t = 4.02$) ($P < 0.001$) were strong contributors to the explanation of immature defense style respectively.

Three, we executed a comparison of BIS, BAS subscales, EMSs, and defense styles for males and females. As Table 5 shows, there were significant sex differences in BIS, BAS subscales, EMSs, and immature defense styles, so that females earned higher scores on BIS and males on all BAS subscales. Also, the results revealed that males gained higher scores on impaired autonomy and performance, and females showed higher means on over-vigilance/inhibition, and no significant differences were observed in other EMSs. Finally, females' scores were higher on immature defense style, with no significant differences in the mature or neurotic defense styles. Thus, the present findings are consistent with second hypothesis.

Table 5 – Comparison of BIS and BAS subscales, EMSs, and defense styles for male and female addictions (N = 316).

	Males N (SD)	Females N (SD)	df	t	P-value	Eta
BIS and BAS subscales						
BIS	17.91 (2.85)	18.75 (3.20)	314	−2.80	<0.01*	0.02
BAS-RR	15.31 (3.07)	13.12 (2.51)	314	−6.90	<0.001**	0.13
BAS-D	11.25 (2.69)	10.11 (2.12)	314	−4.16	<0.001**	0.05
BAS-FS	11.23 (2.78)	10.29 (2.28)	314	−3.27	<0.001**	0.03
EMSs						
Disconnection/rejection	95.32 (15.90)	96.30 (27.10)	314	−0.29	0.76	0.000
Impaired autonomy and performance	71.68 (13.49)	64.66 (9.37)	314	3.74	<0.001**	0.04
Impaired limits	36.45 (6.28)	36.67 (8.61)	314	−0.26	0.79	0.000
Other-directedness	37.71 (6.79)	36.07 (6.90)	314	1.75	0.08	0.00
Over vigilance/inhibition	37.55 (6.44)	39.75 (9.37)	314	−2.48	<0.01*	0.02
Defense styles						
Neurotic defense style	41.91 (8.49)	43.82 (9.67)	314	−1.85	0.07	0.00
Mature defense style	44.20 (8.15)	44.95 (10.81)	314	−0.70	0.48	0.000
Immature defense style	125.81 (20.95)	137.95 (31.59)	314	−4.11	<0.001**	0.05

* $P < 0.01$ (two tailed).
** $P < 0.001$ (two tailed).

5. Discussion

This study examined the relationship between EMSs, BIS, and BAS subscales to defense styles in the abusers of natural drug. The current finding that EMSs associated with maladaptive defense styles (i.e., neurotic and immature) is in line with the previous researches.[16–19] It is believed that drug abuse is one of the coping strategies that a person uses to avoid negative effects of the activated EMSs.[4] In support of this finding, the bilateral pattern of schema-focused therapy[40] describes addiction as a primary disorder. This model describes the activation of EMSs and adaptive avoidance as predisposing risk factors of continuation or recurrence in addicts. Drug in addicts is used to reduce the emotional annoying state or as a defense style associated with the internal conflict.[41] According to Young[19], when the EMSs are excited, people experience high levels of (negative) feelings such as severe resentment, anxiety, distress or feeling guilty. This severity of excitement is usually unpleasant. Therefore, people almost use maladaptive behaviors such as abusing drugs in order to avoid the exciting EMSs and the feeling of excitement associated with these EMSs.[15]

Our results revealed that BIS and BAS subscales were positively correlated with both neurotic and immature defense styles, and BAS subscales were negatively related to mature defense style. These data were consistent with Atashkar et al.,[26] that argued BIS positively correlates with both neurotic and immature defense styles and they were in contrast with Atashkar et al.,[26] that suggested BAS positively correlates with mature defense style. The reason for this inconsistency is because Atashkar et al.[26] have achieved their findings as a result of the study conducted on a non-clinical sample, while our results were achieved via a clinical sample. In accordance with Riso et al.[4] drug abuse is a maladaptive defense style. Maladaptive self-regulatory processes increase one's vulnerability to develop psychopathology.[42] Thus in our study, the positive correlation between BIS and BAS subscales with neurotic and immature defense styles revealed that the high BIS and BAS subscales are strongly associated with drug abuse. These findings are consistent with the previous studies that argued about high levels of BAS related to drug abuse.[5,8,22,23] Individuals with a strong BAS are thought to be sensitive to reinforcement and are motivated to approach rewards.[10] High BAS in addicts suggests intense sensation seeking and impulsivity. A strong relationship was also shown among impulsivity, drug dependence, and BAS.[25] Eysenck has suggested that personality, such as personality of impulsivity,[43] plays a prominent vulnerability role to addiction.[44]

Our finding showed that BIS was positively related to both neurotic and immature defense styles, which was inconsistent with past studies.[5,8,22,23] This finding can be related to cultural differences in the expression of emotions and behaviors. For example, in Iranians' traditional culture, based on some of the negative stereotypes, the emphasis is on the most control and suppression of emotions and behaviors, especially regarding women. Excessive long-term behavioral inhibition also can be accumulated within the individual and in the long term leads to using maladaptive defense styles such as drug abuse. BIS activation is present in a broader range of psychiatric conditions.[45] Another research points to BIS, as a problematic and risk factor, as individuals with a strong BIS may be prone to experience negative moods and therefore may engage in risky behaviors as a mood regulation strategy.[9]

Our results indicated that the schema of over-vigilance/inhibition strongly emerged in explaining each of the three mature (reversely), neurotic, and immature defense styles in the abusers of natural drug. People, who are in the area of over-vigilance/inhibition schema, repress spontaneous feelings and impulses. They are trying to act in accordance with their internalized and inflexible rules, even at the cost of losing happiness, expression, peace of mind, intimate relationships or health. So, we can say that addicts consume drug as a defense style to get rid of the unpleasant states and effects caused by the repressed feelings and impulses. This finding goes along with the theory of Young schema that assumes EMSs directly or indirectly cause some problems and psychological disorders and behaviors like alcoholism and drug addiction.[19] Also, our findings suggested that BAS-D appeared strongly in predicting the three defense styles. These findings were also coordinated with the previous studies which had demonstrated that BAS-D is elevated in a clinical sample of drug dependent patients.[5,24,25] High BAS-D people reported higher levels of physical activity. This result is compatible with the research reported by Ekkekakis et al.[46]

Moreover, our results revealed that males gained higher scores on impaired autonomy and performance, and females showed higher means on over-vigilance/inhibition.

According to the results of this study, the scores of females were higher on BIS than males, and the scores of males were higher on BAS subscales than females. This finding is consistent with the previous researches.[28]

Our results, furthermore, showed that female's scores were higher on immature defense style. Consistent with these findings, there are some researches that suggest women may have a higher biological vulnerability to negative effects of stressful life events, and may be more emotionally reactive in general.[47]

The present study has some limitations in generalizability of the results. Although this study provides evidence about the relationship between EMSs, BIS, and BAS subscales to defense styles in the abusers of natural drug, its cross-sectional design prevents an understanding of the exact nature of the relationships, particularly with respect to causality. Also, these results have been achieved in the Iranian culture and one should be cautious in generalizing the results. Finally, the research was conducted only on the abusers of natural drug such as opium and opium sap, henbane and marijuana, and has not investigated other drugs such as hashish, tobacco, morphine, mescaline, and etc. Therefore, we must be cautious in generalizing them.

The present study may have important implications. The results of this study provide a better understanding of the effective factors correlated with defense styles and drug abuse. These results support the existing findings and theories concerning the EMSs, BIS, BAS subscales, defense styles, as well as theories related to drug abuse. The present study informs clinicians, psychiatrists, and psychologists about the effective variables in developing and/or maintaining drug abuse. Moreover, this study identifies people who have a very

high BIS, BAS, and EMSs and may be among at-risk groups. Finally, it provides some treatment programs and specific trainings to prevent drug use tendencies in these groups.

6. Conclusions

The results of the present study showed that there are significant correlations between the EMSs, BIS, and BAS subscales with defense styles. Therefore, EMSs, excess BIS and BAS subscales are important variables in using maladaptive defense styles and subsequently in tending toward natural drug abuse in the abusers of natural drug. Also, BIS, in contrast, was positively associated with maladaptive defense styles, which suggests that excessive BIS can be a risk factor for personality in the abusers of natural drug.

Contributors

The first author designed the study and wrote the manuscript. All authors were involved in the statistical analyses and data collection of the study. All authors contributed to and have approved the final manuscript.

Conflict of interest

None declared.

REFERENCES

1. Angres DH, Bettinardi-Angres K. The disease of addiction: origins, treatment, and recovery. *Dis Mon*. 2008;54(10):696–721. http://dx.doi.org/10.1016/j.disamonth.2008.07.002.
2. Zhang D, He H. Personality traits and life satisfaction: a Chinese case study. *Soc Behav Pers*. 2010;38:1119–1122. http://dx.doi.org/10.2224/sbp.2010.38.8.1119.
3. Zargar M, Kakavand AR, Jalali MR, Salavati M. Comparison of maladaptive early schemas and avoidance behaviors in opioid dependent men and non-dependent men. *J Appl Psychol*. 2011;5:69–84.
4. Riso LP, Toit PLD, Stein DJ, Young JE, eds. In: *Cognitive Schemas and Core Beliefs in Psychological Problems*. Washington: APA; 2013.
5. Franken IH, Muris P. BIS/BAS personality characteristics and college students' substance use. *Pers Individ Differ*. 2006;40:1497–1503. http://dx.doi.org/10.1016/j.paid.2005.12.005.
6. Carver CS. Approach, avoidance, and the self-regulation of affect and action. *Motiv Emotion*. 2006;30:105–110. http://dx.doi.org/10.1007/s11031-006-9044-7.
7. Gray JA. Brain systems that mediate both emotion and cognition. *Cogn Emotion*. 1990;4:269–288. http://dx.doi.org/10.1080/02699939008410799.
8. Gray JA. Framework for a taxonomy of psychiatric disorder. In: van Gozen S, van de Poll N, Sergeant JA, eds. In: *Emotions: Essays on Emotion Theory*. New Jersey: Lawrence Erlbaum Associates Inc.; 1993:29–59.
9. Voigt DC, Dillard JP, Braddock KH, Anderson JW, Sopory P, Stephenson MT. Carver and White's (1994) BIS/BAS scales and their relationship to risky health behaviours. *Pers Individ Differ*. 2009;47:89–93. http://dx.doi.org/10.1016/j.paid.2009.02.003.
10. Corr PJ. Reinforcement sensitivity theory and personality. *Neurosci Biobehav Rev*. 2004;28:317–332. http://dx.doi.org/10.1016/j.neubiorev.2004.01.005.
11. Carver CS, White TL. Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: the BIS/BAS scales. *J Pers Soc Psychol*. 1994;67:319–333. http://dx.doi.org/10.1037/0022-3514.67.2.319.
12. Cramer P. Defense mechanisms and physiological reactivity to stress. *J Pers*. 2003;71(2):221–244. http://dx.doi.org/10.1111/1467-6494.710201.
13. Munroe RL. *Schools of Psychoanalytic Thought: An Exposition, Critique, and Attempt at Integration*. New York: The Dryden Press; 1955.
14. Andrews G, Singh M, Bond M. The defense style questionnaire. *J Nerv Ment Dis*. 1993;181(4):246–256. http://dx.doi.org/10.1097/00005053-199304000-00006.
15. Yount KM, Li L. Domestic violence against married women in Egypt. *Sex Roles*. 2010;63:332–347. http://dx.doi.org/10.1007/s11199-010-9793-3.
16. Samkhaniyani E, Khalatbari J, Arkiyan F. The relationship between the disconnection and rejection domain of early maladaptive schemas with Defense mechanisms in individuals with gender identity disorder. *Life Sci J*. 2013;10(1s):436–440.
17. Young JE, Klosko JS, Weishaarm M. *Schema Therapy: A Practitioner's Guide*. New York: Guilford Press; 2003.
18. Mairet K, Boag S, Warburton W. How important is temperament? The relationship between coping styles, early maladaptive schemas, and social anxiety. *Int J Psychol Psychol Ther*. 2014;14:171–190.
19. Young JE. *Cognitive Therapy for Personality Disorders: A Schema-Focused Approach*. Sarasota, FL: Professional Resource Press; 1999.
20. Shorey RC, Stuart GL, Anderson S. The early maladaptive schemas of an opioid-dependent sample of treatment seeking young adults: a descriptive investigation. *J Subst Abuse Treat*. 2012;42(3):271–278. http://dx.doi.org/10.1016/j.jsat.2011.08.004.
21. Wang CE, Halvorsen M, Eisemann M, Waterloo K. Stability of dysfunctional attitudes and early maladaptive schemas: a 9-year follow-up study of clinically depressed subjects. *J Behav Ther Exp Psychiatry*. 2010;41(4):389–396. http://dx.doi.org/10.1016/j.jbtep.2010.04.002.
22. Kimbrel NA, Nelson-Gray RO, Mitchell JT. Reinforcement sensitivity and maternal style as predictors of psychopathology. *Pers Individ Differ*. 2007;42:1139–1149. http://dx.doi.org/10.1016/j.paid.2006.06.028.
23. Simons JS, Dvorak RD, Batien BD. Methamphetamine use in a rural college population: associations with marijuana use, sensitivity to punishment, and sensitivity to reward. *Psychol Addict Behav*. 2008;22(3):444–449. http://dx.doi.org/10.1037/0893-164X.22.3.444.
24. Franken IHA, Muris P, Georgieva I. Gray's model of personality and addiction. *Addict Behav*. 2006;31(3):399–403. http://dx.doi.org/10.1016/j.addbeh.2005.05.022.
25. Dawe S, Loxton N. The role of impulsivity in the development of substance use and eating disorders. *Neurosci Biobehav Rev*. 2004;28(3):343–351. http://dx.doi.org/10.1016/j.neubiorev.2004.03.007.
26. Atashkar R, Fathi-Ashtieani A, Azadfallah P. The relation between defense styles and mechanisms with brain/behavioral systems. *Iran J Clin Psychol*. 2013;4:63–73.
27. Carroll ME, Lynch WJ, Roth ME, Morgan AD, Cosgrove KP. Sex and estrogen influence drug abuse. *Trends Pharmacol Sci*. 2004;25(5):273–279. http://dx.doi.org/10.1016/j.tips.2004.03.011.
28. Heponiemi T, Keltikangas-Järvinen L, Puttonen S, Ravaja N. BIS/BAS sensitivity and self-rated affects during

experimentally induced stress. *Pers Individ Differ*. 2003;34 (6):943–957. http://dx.doi.org/10.1016/S0191-8869(02)00079-X.
29. Watson DC, Sinha BK. Gender, age, and cultural differences in the Defense Style Questionnaire-40. *J Clin Psychol*. 1998;54 (1):67–75. http://dx.doi.org/10.1002/(SICI)1097-4679(199801)54:13.0.CO;2-R.
30. Young JF. *The Young Schema Questionnaire: Short Form*. New York: Cognitive Therapy Center; 1998.
31. Yousefi N, Shirbagi N. Validating the Young Early Maladaptive Schema Questionnaire (YEMSQ) among Students. *Iran J Psychiatry Behav Sci*. 2010;4(1):38–46 http://ijpbs.mazums.ac.ir/browse.php?a_code=A-10-2-70&slc_lang=en&sid=1.
32. Sadooghi Z, Aguilar-Vafaie ME, Rasoulzadeh Tabatabaie K, Esfehanian N. Factor analysis of the young schema questionnaire-short form in a nonclinical Iranian sample. *IJPCP*. 2008;14(2):214–219 http://ijpcp.iums.ac.ir/browse.php?a_code=A-10-1-301& slc_lang=en&sid=1.
33. Calvete E, Estevez A, Lopez de Arroyabe E, Ruiz P. The schema questionnaire-short form: structure and relationship with automatic thoughts and symptoms of affective disorders. *Eur J Psychol Assess*. 2005;21(2):90–99. http://dx.doi.org/10.1027/1015-5759.21.2.90.
34. Mohammadi N. The psychometric properties of the Behavioral Inhibition System (BIS) and Behavioral Activation System (BAS) scales among students of Shiraz University. *CPAP*. 2008;1(28):61–68 http://cpap.shahed.ac.ir/browse.php?a_code=A-10-1-250&slc_lang=en&sid=1.
35. Jorm AF, Christensen HH, Henderson AS, Jacomb PA, Korten AE, Rodgers BB. Using the BIS/BAS scales to measure behavioural inhibition and behavioural activation: factor structure, validity and norms in a large community sample. *Pers Individ Differ*. 1999;26(1):49–58. http://dx.doi.org/10.1016/S0191-8869(98)00143-3.
36. Hyphantis T. The Greek version of the Defense Style Questionnaire: psychometric properties in 3 different samples. *Compr Psychiatry*. 2010;51(6):618–629. http://dx.doi.org/10.1016/j.comppsych.2010.03.005.
37. Besharat MA, Sharifi M, Irvani M. Investigating the relationship between attachment and defense style (Persian text). *Ir J Psychol*. 2001;19:277–289.
38. Besharat MA. *Psychometric Properties of Defense Style Questionnaire*. Tehran: University of Tehran (Farsi); 2007 [Unpublished research report].
39. Kline RB. *Becoming a Behavioral Science Researcher: A Guide to Producing Research That Matters*. New York: Guilford Press; 2009.
40. Ball SA, Young JE. Dual focus schema therapy for personality disorders and substance dependence: case study results. *Cogn Behav Pract*. 2000;7:270–281. http://dx.doi.org/10.1016/S1077-7229(00)80083-8.
41. Rosenhan DL, Seligman ME. *Abnormal Psychology*. New York: W.W. Norton; 1995.
42. Calkins SD, Fox NA. Self-regulatory processes in early personality development: a multilevel approach to the study of childhood social withdrawal and aggression. *Dev Psychopathol*. 2002;14(3):477–498. http://dx.doi.org/10.1017/S095457940200305X.
43. Verdejo-García A, Lawrence AJ, Clark L. Impulsivity as a vulnerability marker for substance-use disorders: review of findings from high-risk research, problem gamblers and genetic association studies. *Neurosci Biobehav Rev*. 2008;32:777–810. http://dx.doi.org/10.1016/j.neubiorev.2007.11.003.
44. Eysenck HJ. Addiction, personality and motivation. *Hum Psychopharmacol Clin Exp*. 1997;12:79–87. http://dx.doi.org/10.1002/(SICI)1099-1077(199706)12:2+<S79:AID-HUP905>3.0.CO;2-T.
45. Scholten MR, Van Honk J, Aleman A, Kahn RS. Behavioral Inhibition system (BIS) and the Behavioral Activation System (BAS) and schizophrenia: relationship with psychopathology and physiology. *J Psychiatr Res*. 2006;40 (7):638–645. http://dx.doi.org/10.1016/j.jpsychires.2006.03.005.
46. Ekkekakis P, Hall EE, Petruzzello SJ. Some like it vigorous: measuring individual differences in the preference for and tolerance of exercise intensity. *J Sport Exerc Psychol*. 2005;27:350–374.
47. Bianchin M, Angrilli A. Gender differences in emotional responses: a psychophysiological study. *Physiol Behav*. 2012;105(4):925–932. http://dx.doi.org/10.1016/j.physbeh.2011.10.03.