The Prediction of Drug Abuse Potential (Aptitude) Based on Emotion Regulation Strategies and Brain Behavioral Systems in Adolescents

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Abstract

Purpose The aim of this study is prediction of potential (aptitude) for addiction based on emotion regulation strategies and brain behavioral systems in adolescents.

Methods The method of current study was descriptive and correlation. The statistical population included all male adolescents in Tehran that for sampling 120 adolescents were selected by convenience sampling method and they answered styles of cognitive emotion regulation questionnaire, BAS/BIS questionnaire and readiness to addiction questionnaire and to analyze the data Pearson correlation and multiple regression analysis (simultaneous) were used.

Findings Data analysis showed that the potential for addiction among positive emotion regulation strategies had significant negative relationship with acceptance, positive refocusing and re-focus on planning and had significant positive relationship with all the negative emotion regulation strategies (self-blame, blame others, rumination and catastrophizing). As well as behavioral activation system had significant positive relationship with addiction potential. Regression analysis results showed that emotion regulation strategies and brain behavioral systems can in combination predict 24% variance of addiction potential.

Results The results showed that emotion regulation strategies and brain behavioral systems have an important role in predicting the addiction potential. So we can expect that emotion regulation skills training and recognition people with high behavioral activation system prevent this ruinous problem.

Keywords: Emotion regulation strategies, brain behavioral systems, addiction potential and adolescents.
Introduction

Adolescence is a susceptible age in developing coping behaviors and responding to the environmental needs. This period due to rapid physical, psychological, social, cultural and cognitive changes, is accompanied by numerous problems inconsistent with health. Many factors threatening health and risky behaviors by teens in this age progressively start (1, 2). Risky behavior and its negative implications for adolescents' health can cause serious risks to health throughout life. Alcohol, tobacco and substances use is one of addictive and risky consequences and is associated with many behaviors and changes in adolescence and is a serious threat to personal and community growth (3). Narcotics and other illicit drugs use by adolescents and youth is one of the most important challenges and general- psychosocial health problems which impose personal, social, health and economic problems on communities (4). The adolescents are the most vulnerable people facing with risk behaviors and due to the developmental characteristics of this period, more than other groups attempt to do behaviors which put at risk present and future health. Studies have shown that most high-risk behaviors such as smoking, alcohol and drugs use start before the age of eighteen (5). The high prevalence of drug abuse with more than 8.1 million people in our country makes the importance of this problem more prominent. On the other hand, addiction as a preventable and treatable disease is one of the most important priorities research implementation. Because, the addiction in addition to specific physical problems and consequences such as, AIDS, also entails mental health problems (1). The recent studies have focused on multiple risk and etiological factors. Although social factors are much emphasized in drug abuse potential (tendency), abuse can also be associated with psychological and biological processes (6).

Emotion regulation as one of the psychological variables has been considered by many researchers (9, 8 and 7). Cognitive emotion regulation refers to all cognitive styles that everyone that anyone uses it in order to increase or decrease or maintain his/her own emotion (10).

Emotion regulation is considered in terms of more than two important frameworks, namely 1-emotion regulation strategies which active before or at the beginning of the event, 2- emotion regulation strategies that after the incident of event or after the formation of emotion are activated. Emotion regulation strategies that are activated before the accidence of events, have an important role in controlling negative emotions, because lead to interpretation of event somehow that reduces negative emotional responses (11).

Low levels of emotional regulation resulting from the inability to effectively cope with and manage the emotions, plays a role in the onset of drug use (12, 7). When a person is placed under pressure for drug use by peers, effective emotions management reduces the risk of abuse. The ability to manage emotions causes the individual in situations with high risk for substance abuse, use appropriate coping strategies. People with high emotional regulation, have greater ability to predict the wishes of others. They understand unwanted peer pressures and control their own emotions more appropriately and consequently show more resistance to the drug (13). Gary theory is among the outstanding theories that underlie extensive research on substance, alcohol and tobacco abuse. This theory poses the existence of two systems of behavioral activation system (BAS) and behavioral inhibition system (BIS) (14). Gray’s reinforcement sensitivity theory is a biological-based theory that explains personality differences rooted in differences in individual's reward system. BIS system is sensitive to
signs of punishment and leads person to avoidance behaviors (15). Given that behavioral activation system activity causes pushing someone to do things with the probability of reward (without taking into account possible negative consequences), the sensitivity of this system can be considered as a factor in the spread of drug abuse. In this regard, some authors have proposed the concept of reward deficiency syndrome as a possible factor in the development of disorders associated with substance abuse (16). Some studies have shown the relationship of behavioral activation system (BAS) and behavioral inhibition system (BIS) with problems related to substance abuse (19, 18 and 17). The positive relationship between substance abuse and high activity behavioral activation system has been shown in studies (22, 21 and 20). The role and relationship of behavioral inhibition system sensitivity with substance abuse has been less specified than the role of behavioral activation system. About half of the research on the relationship between substance abuse and behavioral activation and inhibition systems, have reported significant negative relationship between substance abuse and behavioral inhibition system (23, 22, 21, 20 and 17).

The different results in several investigations indicate the further and more accurate research in this field. This study aimed to examine the drug abuse prediction based on the brain behavioral systems and emotion regulation strategies.

Method
Population, sample and sampling method

The present study in terms of aim is fundamental and in terms of data collection is descriptive-correlation. The study population included all male adolescents in Tehran that the reason for male adolescents was the high percentage of their readiness (potential) to addiction as well as the problems of access to female adolescents.

Using convenience sampling, 120 male adolescents were selected as sample and to collect the data, the cognitive emotion regulation styles questionnaire (2001), Carver and White (1994) BAS / BIS questionnaire and addiction readiness (potential) questionnaire (2006) were used. To perform the participants were asked to answer the questionnaires honestly. The data after collection using Pearson correlation; to estimate the relationship between variables as well as simultaneous multivariate regression, to predict the addiction potential with respect to the two predictor variables were analyzed.

Research tools

1) Emotion Regulation Styles Questionnaire (CERQ): This questionnaire has been developed by Garnefski, Mikolajczak and Haven (2001) to assess thinking style after threatening or stressful life events experience. The cognitive emotion regulation styles questionnaire has 36 items that every item is a five-point Likert scale (1 = almost never to 5 = almost always). The CERQ has 9 subscales. Five subscales of the questionnaire are adaptive (positive) cognitive emotion regulation styles and four subscales are maladaptive (negative) cognitive emotion regulation styles.

(A) Adaptive cognitive emotion regulation styles: this coping style, includes five subscales and are considered as normal coping strategies that include: 1-Acceptance: thinking with acceptance content and surrender to the event.
2- Positive refocusing: thinking about the enjoyable and happy subject instead of thinking about the actual incident.

3- Refocusing on planning: thinking about the process of overcoming a negative event or change it.

4- Positive reappraisal: thinking about the positive aspects of event or private promotion.
5- Coping with perspective (putting into perspective): thinking about low importance of the event or to emphasize on its relativity compared with other events.

(B) Maladaptive cognitive emotion regulation styles: This coping strategy includes four subscales and form abnormal coping strategies, which include:

2. Rumination: Preoccupation about emotions and thinking associated with the negative event.
3. Catastrophizing: thinking with the content of the horror of the event.
4. Blame other: thinking with content blame others for of what has happened.

The reliability coefficient of this questionnaire using Cronbach's alpha has been obtained in a range of 0.87 to 0.93 (Garnefski et al., 2001). Yousefi (2006) has studied the validity and reliability of this scale among Iranian adolescents. Cronbach's alpha reliability coefficient for the whole scale has been obtained 0.82. The reliability coefficient of scale has been reported 0.85. Yousefi (2006) has shown that cognitive emotion regulation strategies scale has an appropriate validity and reliability in Iran's culture. In the present study, the questionnaire’s reliability using Cronbach's alpha was obtained 0.86.

2) BAS / BIS questionnaire: In this study, Carver and White BAS / BIS (1994) questionnaire has been used. The questionnaire consists of 24 items that is scored with the Likert method. Of these 24 items, 7 items belong to BIS scale and 13 items for BAS scale. BAS scale consists of three subscales of drive (4 items), the pleasure seeking (4 items) and respond to reward (5 items) and 4 items are also deviant items that are not scored. The reported alpha coefficient for the BIS is 0.77 and for subscales of respond to reward, drive and pleasure seeking are 0.73, 0.76 and 0.71, respectively. In the present study the reliability of questionnaire using Cronbach's alpha for BAS scale was 0.76 and for BAS scale was obtained 0.78.

3) Addiction potential (readiness) questionnaire: the questionnaire has been by made Weed and Butcher (1992) and some efforts have taken place to determine its validity in Iran. In this study the Iranian scale of mentioned questionnaire was used which has been made by Zargar (2006) according to the psycho-social aspects of Iranian society. This questionnaire consists of two factors and 36 items plus 5 lie detector items. The scoring of each question is on a continuum from zero (strongly disagree) to 3 (strongly agree). The measure the validity of the scale two methods was used. In the criterion validity, the addiction potential questionnaire has distinguished addict and non-addict people well from each other. The reliability of
questionnaire was calculated using Cronbach's alpha (Zargar, 2010). In this study, the reliability of questionnaire using Cronbach's alpha was obtained 0.79.

Findings

In order to analyze research data, both descriptive and inferential statistical methods were used. In this study, 120 adolescents with mean age of 16/8 and 2/4 standard deviation participated.

Table 1 The mean, standard deviation and correlation coefficients of variables studied by addiction potential

<table>
<thead>
<tr>
<th>Row</th>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acceptance</td>
<td>7/1</td>
<td>3/51</td>
<td>-0/30*</td>
</tr>
<tr>
<td>2</td>
<td>Positive refocusing</td>
<td>7/9</td>
<td>3/46</td>
<td>-0/33**</td>
</tr>
<tr>
<td>3</td>
<td>Positive reappraisal</td>
<td>6/5</td>
<td>3/36</td>
<td>-0/29</td>
</tr>
<tr>
<td>4</td>
<td>Planning refocusing</td>
<td>12/2</td>
<td>4/21</td>
<td>-0/31*</td>
</tr>
<tr>
<td>5</td>
<td>Cope with perspective</td>
<td>6/1</td>
<td>3/34</td>
<td>-0/27</td>
</tr>
<tr>
<td>6</td>
<td>Positive strategies</td>
<td>39/8</td>
<td>8/71</td>
<td>-0/30*</td>
</tr>
<tr>
<td>7</td>
<td>Self-blame</td>
<td>14/3</td>
<td>3/81</td>
<td>-0/36**</td>
</tr>
<tr>
<td>8</td>
<td>Blame others</td>
<td>10/1</td>
<td>3/62</td>
<td>-0/31*</td>
</tr>
<tr>
<td>9</td>
<td>Rumination</td>
<td>13/4</td>
<td>3/41</td>
<td>-0/34**</td>
</tr>
<tr>
<td>10</td>
<td>Catastrophizing</td>
<td>12/9</td>
<td>3/49</td>
<td>-0/32*</td>
</tr>
<tr>
<td>11</td>
<td>Negative strategies</td>
<td>50/7</td>
<td>10/12</td>
<td>-0/34**</td>
</tr>
<tr>
<td>12</td>
<td>Behavioral Inhibition System</td>
<td>9/35</td>
<td>4/20</td>
<td>-0/23</td>
</tr>
<tr>
<td>13</td>
<td>Behavioral activation system</td>
<td>10/12</td>
<td>5/34</td>
<td>0/56</td>
</tr>
<tr>
<td>14</td>
<td>Addiction potential (readiness)</td>
<td>38/21</td>
<td>12/1</td>
<td>1</td>
</tr>
</tbody>
</table>

*P<0/05  **P<0/01

The results of above table show that among positive emotion regulation strategies, acceptance, positive refocusing and planning re-focus on have significant negative relationship with addiction potential (readiness). The results also show that negative emotion regulation strategies (self-blame, blame other, rumination and catastrophizing) have positive significant relationship with addiction potential (readiness). As well as the behavioral activation system has significant positive relationship with addiction potential (readiness), but in contrast with previous conducted research, in this study no significant relationship between behavioral inhibition system and addiction potential (readiness) was observed.

Table 2 Multiple regression analysis (simultaneous) of addiction potential prediction based on the studied variables

<table>
<thead>
<tr>
<th>Criterion variable</th>
<th>Predictor variables</th>
<th>R</th>
<th>R²</th>
<th>F</th>
<th>B</th>
<th>SE</th>
<th>Beta</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addiction potential (readiness)</td>
<td>Constant value</td>
<td>0/49</td>
<td>0/24</td>
<td>28/62**</td>
<td>2/71</td>
<td>2/64</td>
<td>-</td>
<td>1/01**</td>
</tr>
<tr>
<td></td>
<td>Positive strategies</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0/42</td>
<td>0/18</td>
<td>-0/22</td>
<td>-2/43*</td>
</tr>
</tbody>
</table>

http://www.ijhcs.com/index.php/ijhcs/index
The results of table 2 show that 24 percent of the total variance of addiction potential (readiness) is explained by emotion regulation strategies and brain-behavioral systems. The proportion (p<0.01, F=28.62) also shows that the regression of addiction potential (readiness) based on emotion regulation strategies and brain-behavioral systems is significant. So, positive and negative emotion regulation strategies and brain-behavioral systems can in combination predict the addiction potential (readiness). Results of regression coefficients also show that positive emotion regulation strategies can negatively (inverse) and significantly predict addiction potential (readiness). As well as the negative emotion regulation strategies and Behavioral Activation System can positively (direct) and significantly predict addiction potential (readiness).

**Discussion and conclusion**

This study aimed to predict the addiction potential (readiness) based on emotion regulation strategies and brain-behavioral systems. As the results showed, among positive emotion regulation strategies had significant negative relationship with acceptance, positive refocusing and re-focus on planning and had significant positive relationship with all the negative emotion regulation strategies (self-blame, blame others, rumination and catastrophizing). Also, multiple regression analysis showed that positive emotion regulation strategies significantly and negatively (inverse) and negative emotion regulation strategies positively (direct) and significantly predict addiction potential (readiness). These results are consistent with the results of some studies such as Goleman (1995), Parker, Taylor and Bagby (2001), Trinidad and Johnson (2002), Husing and Owyee (2007) and Parker et al. (2008). These results can be explained such that low levels of emotional regulation resulting from the inability to effectively cope with emotions and management them, plays a role in the onset of drug use (12, 7). When a person is placed under pressure for drug use by peers, effective emotions management reduces the risk of abuse. The ability to manage emotions causes the individual in situations with high risk for substance abuse, use appropriate coping strategies. People with high emotional regulation, have greater ability to predict the wishes of others. They understand unwanted peer pressures and control their own emotions more appropriately and consequently show more resistance to the drug. In contrast, those who have a low positive emotional regulation, to deal with their negative emotions, generally are drawn towards drug use (13).

On the other hand, the results showed that the brain-behavioral systems are able to predict adolescents’ addiction. Behavioral activation system has positive and significant relationship with addiction potential (readiness). The results of regression coefficients also showed that behavioral activation system can positively (direct) and significantly predict addiction
potential (readiness). These results are consistent with the results of studies by others such as Franken and Morris, Hunt et al., Jeremy and colleagues, Kimberly et al, Simons, Diowark, Batini and Azadfallah. In the field of addiction the most attention is focused on the activity of behavioral activation system and the most findings on this system’s activity in human, comes from studies of the neurotransmitter dopamine (Azadfallah, 2000). Given that behavioral activation system activity causes pushing someone to do things with the probability of reward (without taking into account possible negative consequences), the sensitivity of this system can be considered as a factor in the spread of drug abuse. But unlike previous conducted research in this study no significant relationship between behavioral inhibition system and addiction potential (readiness) was observed.

According to the results of this study can be stated that one possible reason for the tendency of individuals to drug use, is the wide problems and shortcomings in the field of emotions. Emotional disorders in the people facing with stressful events are the basic core of psychopathology. Another possible reason also is that they want to be free from annoying and demanding emotional states. In other words, they apply drug use as a negative and inefficient avoidance coping strategy to reduce their own problems. Based on these results, firstly it is recommended to the families, schools, mass media, etc. take special attention to the positive emotional regulation skills training in young people and acquaint them with the effects of negative emotion regulation. Also, by identifying people who have more active behavioral activation system than normal people, high-risk groups are identified and special behavioral and educational programs for the prevention of drug abuse provided to them.

Given the current study was conducted in male adolescents in Tehran it is proposed to generalize the results, similar studies in larger communities which contain girls and different ethnicities and ages to be performed. As well as among other restrictions, collecting data based on self-report measures, which due to the unconscious defends and prejudices and offering an optimum picture may be distorted and sampling available due to existing limitations can be referred.
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