Emotion-Cognition Interactions; A Study on Coping Responses of Methamphetamine Dependent Women

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ABSTRACT

Introduction: Coping responses are complex dynamic behavioral reactions that involve reciprocal influences between emotion and cognition but cognitive studies in Iran have less emphasized coping responses of methamphetamine dependent individuals to distressing situations. To address this aim, the current study was designed to investigate the coping responses of a group of methamphetamine dependent women in comparison with a group of healthy women.

Methods: 80 women with mean age 24(SD=6.8) years who met DSM.IV-TR criteria for methamphetamine dependence were recruited from the department of psychostimulant use treatment program of Rojan psychiatric center and 4 other local clinics in Tehran, Iran and were matched with a sample of 80 non-drug taking women. First, demographics and details of substance use were completed based on items elicited from Addiction Severity Index (ASI), then the Persian version of Billings and Moos Coping Checklist was completed by participants in each group. Data was further analyzed by performing independent sample t-test and logistic regression model in SPSS.v.16.0.

Results: The study findings indicated that the methamphetamine dependent group applied less problem-solving response and had lower reliance on seeking social support and cognitive evaluation compared with the controls. In addition, the methamphetamine dependent group applied significantly more emotional and physical control oriented responses compared with the controls.

Discussion: The study results yielded that coping responses of the methamphetamine dependent group were less problem-focused strategies which show an impaired aspect of cognitive functioning which is subject to clinical and treatment implications. Study in the context of identifying aspects that are fundamental to understanding the neural mechanisms underlying emotion-cognition interactions in the paradigm of coping responses is discussed.

Key Words:
Methamphetamine,
Emotion,
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1. Introduction

Cognitive control of emotion is one of the important cognitive aspects of human functioning. Conscious cognitive processes aimed at regulating emotions can act on the emotion-eliciting stimulus or upon the emotional response. According to Garnefski and colleagues (2001), the former reflects a problem-focused strategy, whereas the latter represents an emotion-focused regulatory strategy (Garnefski et al., 2001). Coping responses can act as strategies to control the negative effects of a distressing condition and can regulate affect. This transactional process consists of both cognition and behavioral aspects (Endler & Parker, 1999; Lazarus & Folkman, 1984).

Coping responses in human individuals have strong underlying neural mechanisms. Some studies shed light on the brain regions that distinguish adaptive versus maladaptive coping responses and show the neural bases of emotion regulation using functional magnetic resonance imaging (fMRI).

Fox example; in a study on the neural bases of coping strategies, 16 participants were asked to focus on negative autobiographical memories using cognitive strategies designed to facilitate (feel strategy) versus undermine (analyze and accept strategies) rumination. In this study, left prefrontal activity was observed during the implementation of all three strategies. Second, activity in a network of regions involved in self-referential processing and emotion, including subgenual anterior cingulate cortex and medial prefrontal cortex, was highest in response to the feel strategy and lowest for the accept strategy. This pattern of activation showed participants' self-reports of negative affect when engaging in each strategy (Kross et al., 2009).

Some neuroimaging studies of non-drug taking healthy individuals using conscious cognitive strategies to regulate affect have generally showed the inhibitory role of lateral and dorsal regions of the prefrontal cortex and dorsal anterior cingulate cortex in modulating neural activity in emotional appraisal systems (Beauregard et al., 2001; Mathews et al, 2004).

Coping responses are cognitive strategies that are classified in to 3 main categories including problem-focused strategies, emotion-focused strategies, and avoidance-focused strategies (Endler & Parker, 1994; 1999).

Problem-focused coping is a strategy to resolve or control the negative effects of a stressful situation. Emotion-focused coping is more emotion-oriented while in avoidance-focused coping, an individual engages in an indirect activity such as social diversion which is not in relation with the stressful situation (Endler & Parker, 1990; Lazarus & Folkman, 1984). Most coping responses are not either adaptive responses or avoidance responses (Roth & Cohen 1986; Suls & Fletcher, 1985) but drug abuse is an example of a temporary coping response that provides short-term relief from distress but leaves the source of the distress without change; thus, it is basically maladaptive (Wills & Shiffman, 1985). Tension reduction models suggest that some individuals use drugs to decrease negative affect (i.e., to cope) (Cox & Klinger, 1988) and a number of studies support this model, particularly for drugs such as marijuana and alcohol abuse (Kaplan et al., 1986; Cooper et al., 1995). Coping responses that a drug dependent individual applies to deal with a distressing situation may be a moderator in subsequent drug abuse.

From the theoretical model of learning, drug dependent individuals develop maladaptive coping skills in dealing with distressing situations (Collier & Marlatt, 1995; Swift, 1997), and self-medicate to cope with stress (Lyden et al., 1995).

Understanding the reciprocal interactions between emotion and cognition in the paradigm of coping responses is critical for understanding fundamentals of healthy functioning, as well as changes associated with methamphetamine dependence. An important aspect in this context concerns the role of group differences in emotion-cognition responses, and group variations in vulnerability to distress. Within the realm of healthy emotional responses, some individuals may tend to be more emotionally responsive, while others can regulate better their emotions. Understanding the role of differences between non-drug taking group and methamphetamine dependent group can provide insights into some cognitive and emotional factors that may influence the susceptibility to methamphetamine use, in which unbalanced interactions between emotion and cognition may lead to chronic methamphetamine dependence.

The purpose of the current study is to compare the coping responses of a sample of methamphetamine dependent women with a sample of healthy non-drug taking women.

2. Methods and Materials

2.1. Participants

80 women who met DSM.IV.TR criteria (American Psychiatric Association, 2000) for methamphetamine dependence within the past 6 months and were in the waiting list to enter treatment with the Matrix Model were recruited through referrals from the department of psychostimulant use treatment program of Rojan psychiatric center and through poster presentation in 4 other local clinics in Tehran, Iran. Participants were compensated with retail vouchers for study participation. All participants who met our physician' medical approval on methamphetamine urine screening test entered the study.

All participants were also required to maintain abstinence from alcohol, and all other drugs of abuse except nicotine as confirmed by urine drug screening on the study day. Inclusion criteria were female gender, being in the 18-50 age range, and current route of smoking administration of methamphetamine. Exclusion criteria were poly substance use, a history of or current physical disorder, affective disorders, bipolar disorder, psychotic disorders and positive history of intravenous use of drug. The methamphetamine dependent group was matched with 80 healthy not drug-taking female participants based on gender, age, education, employment, income and scio-economic status and they reported no history of physical, psychiatric or affective disorders, no history or current drug and alcohol use. The written consent form was obtained from each participant. The protocol of the study was approved by the institutional review board of Tehran University of Medical Sciences.

2.2. Study Design

After giving informed consent, potential participants were screened using the MINI International Neuropsychiatric Interview (Sheenhan et al., 1998), a structured interview based on the DSM-IV for assessment of psychiatric and substance use symptoms. Demographics and details of substance use were completed based on items elicited from Addiction Severity Index (ASI) (McLellan et al., 1992).

The Persian version of Billings and Moos Coping Checklist (1984) which has been revised by Hosseini Ghadamgahi (1997) in Iran was administered in this study. It includes 32 questions and measures using coping responses in 5 domains including problem solving (3 questions), emotional control (11 questions), cognitive evaluation (5 questions), physical control (9 questions) and social support (4 questions). The reliability of this questionnaire via test-retest within a week was (r=0.79) and in the present study, the reliability of this questionnaire via test-retest within 2 weeks was quite acceptable (r=0.83).

2.3. Data analysis

Data was analyzed by performing independent sample t-test and logistic regression model in SPSS.v.16.0.

3. Results

Participants were between 22 to 32 years of age. No participant was poly substance user at the onset of our study. Almost half of the sample had 12 years of education while the remaining had primary and high school education or were university students respectively. Onset age of methamphetamine smoking was 21(SD=4.8) years and the length of methamphetamine dependence was 5(SD=6.1) years indicating long years of methamphetamine abuse and dependence in the methamphetamine group while the healthy group reported no history of drug use (See Table1).

Data analysis by performing independent sample t-test showed that in some subscales of the Billings and Moos Coping Checklist including problem solving responses (5.15±1.8), seeking social support (4.37±2.6) and cognitive evaluation (10.51±2.1), the methamphetamine dependent group received lower scores compared with the controls but the scores received by the methamphetamine dependent group in responses related to emotion control (15.14±4.8), and physical control (6.23±4.9) were significantly higher compared with the scores received by the controls.

Further data analysis with performing logistic regression model showed that problem solving strategy (β= 0.73 p=0.001), seeking social support (β= 0.39 p=0.001) and cognitive evaluation (β= 0.33 p=0.002) positively and emotional control (β= -0.66 p=0.001) and physical control (β=-0.41 p=0.001) negatively were the predictors of being in the methamphetamine dependent group compared with the controls (See Table3).

Table 1. Demographic characteristics of participants (n=160)

Variable		Methamphetamine	Controls
Gender (Female)		80 (100%)	80 (100%)
Age (Year)		24 (SD=6.8)	25 (SD=6.2)
Education	Less than 12 years	26(32.5%)	25(31.2%)
	12 years	41(51.2%)	43(53.7%)
	More than 12 years	13(16.2%)	12(15%)
Employment	Unemployed	41(51.2%)	37(46.2%)
	Employed	39(48.7%)	43(53.7%)
Onset age of methamphetamine smoking (Year)		21(SD=4.8)	-
Length of dependence (Year)		5(SD=6.1)	-
Number of days using methamphetamine (within the past 6 months)		29(SD=3.2)	-
Positive lifetime use of other drugs		23(28.7%)	-

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Table 2. Demographic characteristics of participants (n=160)

Variable	Subscales	Methamphetamine		Controls		p value
		Mean	SD	Mean	SD	
Coping responses	Problem solving	5.15	1.8	6.49	1.3	0.000
	Cognitive evaluation	10.51	2.1	12.13	2.2	0.001
	Social support	4.37	2.6	6.78	1.8	0.001
	Emotional control	15.14	4.8	10.52	2.6	0.00
	Physical control	6.23	4.9	2.41	1.8	0.001

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Table 3. Logistic regression analysis of the coping responses of the 2 groups (n=160)

Variable	β	Standard Error	p value	Ratio
Problem solving	0.73	0.12	0.001	2.10
Cognitive evaluation	0.33	0.08	0.002	1.31
Social support	0.39	0.09	0.001	1.42
Emotional control	-.066	0.06	0.001	0.67
Physical control	-.041	0.08	0.001	0.61

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4. Discussion

The findings from this study indicate that the methamphetamine dependent group self-reported applying less problem-focused coping responses and reported seeking less social support in distressing situations. In addition, when compared with the controls, the methamphetamine dependent group reported lower self-efficacy in controlling their emotional and physical responses in dealing with difficult circumstances compared with the controls.

One important aspect of our study findings was this notion that the methamphetamine dependent women were significantly more emotional-oriented and they reported escape from problem-focused evaluation of difficult situations. This notion would facilitate their pathways to continue methamphetamine use as an emotional coping response rather seeking a problem-focused coping response.

The current study findings are consistent with the beliefs of some clinicians with a social learning orientation who revealed that individuals who had abuse pattern of drinking were different from healthy drinkers in coping with everyday problems and in their beliefs about alcohol (Abrams & Niaura, 1987).

In addition, our study findings are consistent with a part of the study of Pelissier and colleagues (2006) on a sample of 1,189 male and 300 female offenders. They revealed that the female participants reported less self-efficacy to remain abstinent in high-risk situations, and had more escaping from distressing situations as compared with the male participants.

The importance of problem-focused coping response to difficult situations is the contribution that this concern may have in the reliance on drug abuse as an emotional response, and subsequently to the enhancement and maintenance of drug abuse problem among drug using individuals (Cooper et al., 1992).

The current study emphasizes necessity for teaching appropriate problem-focused coping responses to our methamphetamine dependent participants. In fact, given that the ability to cope with difficult situations may be a moderator in drug abuse, teaching adaptive ways of coping with stress in drug dependent individuals is a necessity (Collier & Marlatt, 1995; Swift, 1997).

Stress-coping models in addiction studies have also emphasized the importance of effective coping responses as a mediator of the effects of stress. For example, studies have revealed that positive coping skills enhancement basically improve the ability of drug users to control drug craving and to remain abstinent despite severe distressing circumstances (Brown et al., 2001; Rask et al., 2006). Alternatively, coping responses associated with negative emotions are associated with relapse phenomena (Weaver et al., 2000).

Ample evidence has also linked negative emotions, stress, and ineffective coping to drug dependence, relapse and to extend relapse episodes (Fiorentine et al., 1997).

It must be noted that emotion regulation in the paradigm of coping responses includes the initiation of new emotional responses and constant alteration of current emotions in response to rapidly changing environmental conditions. The capacity to effectively implement emotion regulation strategies is important for cognitive functioning and health. These findings are considered in the context of related concepts of emotion perception and emotion generation, with discussion of the likely cognitive neuropsychological contributions to emotion regulation and the implications for psychiatric disorders.

There were several recognized limitations when completing this study. The first limitation was that the sample size was small and the study had a cross-sectional design. Only one type of coping questionnaire was utilized in this study. Subjects were studied from only a limited number of psychostimulant use treatment centers. Because there were not comparisons from multiple treatment centers from various parts of Tehran, the sample was not representative of the general methamphetamine dependent population in Tehran. The subjects in this study were methamphetamine dependent women who were seeking treatment; however, there are many methamphetamine dependent women who do not seek treatment, so our study results may not be applied to the female methamphetamine dependent general population in Tehran.

To sum up, from a cognitive perspective, initial perceptual processing of emotionally important situations is critical in the generation of emotional responses within both central and autonomic nervous systems and thus influences higher order cortical processing. Aberration in early perceptual or autonomic responding during initial stages of emotion processing has the potential to disrupt efficient emotion regulation and may manifest in applying impaired coping responses in methamphetamine dependent individuals. Future research within a social cognitive neuroscience framework is necessary to elucidate specific abnormalities in the neural mechanisms of emotion regulation that support psychological processes of methamphetamine dependence.

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