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The Effectiveness of Emotion Regulation Training on Impulsivity and Cognitive Emotion Regulation in Substance Abusers in Sanandaj Province

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ABSTRACT

Objective: Deficits in emotion regulation, which arise from difficulties in effectively managing and coping with emotions, play a significant role in the initiation and persistence of substance abuse. The present study aimed to investigate the effectiveness of emotion regulation training based on Gross's model in reducing impulsivity and improving emotion regulation in men with substance use disorders. **Method:** This experimental study employed a pretest–posttest design with a control group. The statistical population consisted of all individuals receiving treatment in addiction rehabilitation centers in Sanandaj. A total of 30 participants were selected and randomly assigned to two groups: an experimental group (n = 15) and a control group (n = 15). Data were analyzed using analysis of covariance (ANCOVA). **Results:** Findings revealed that emotion regulation training significantly reduced impulsivity and improved emotion regulation in the experimental group compared to the control group ($p < 0.0001$). **Conclusion:** Since male substance abusers are frequently exposed to negative emotions and tend to act impulsively and without planning in such situations, emotion regulation training can be considered an effective therapeutic intervention. Enhancing their ability to regulate emotions improves self-control and reduces maladaptive behaviors associated with drug abuse.

1. INTRODUCTION

Substance abuse alters both brain function and behavior, often leading to a loss of control over drug consumption [1]. One of the most prominent behavioral characteristics observed in individuals with addiction is impulsivity, yet despite its significance, it has not been extensively examined [2]. Impulsivity is typically defined as acting without forethought or consideration of consequences.

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Drug use can be motivated by various factors, one of which is the artificial stimulation of excitement and pleasure produced by psychoactive substances [3]. Impulsivity is especially prevalent among users of alcohol, cocaine, and amphetamines, and it is considered a major risk factor for the onset and persistence of substance dependence [4].

Excitement-seeking exists along a continuum, with most individuals positioned at intermediate levels. At the extremes, individuals are classified as either high or low excitement seekers. High excitement seekers are characterized by their strong drive for new experiences and their willingness to take significant risks to obtain them, including jeopardizing their health, safety, or social standing [5]. In contrast, low excitement seekers show little interest in novelty or risk-taking.

Negative emotional states and difficulties in emotion regulation are also recognized as important triggers of substance use. Cognitive emotion regulation, in particular, has been identified in several studies as a critical factor underlying vulnerability to substance abuse [6]. Over the past five decades, numerous studies have attempted to clarify the relationship between addictive behaviors and personality traits [7]. Among these traits, sensation-seeking has consistently emerged as a central feature [8].

Cognitive emotion regulation, understood as both a personality trait and a biologically rooted motivational tendency, is associated with the pursuit of novel, complex, and intense experiences. Its behavioral manifestations vary according to gender and life experiences. Sensation seekers tend to pursue stimulation to meet their internal needs, not necessarily to influence others but rather to satisfy their own drive for arousal. Recent findings suggest that heightened levels of excitement-seeking substantially increase vulnerability to substance and alcohol dependence [9].

Given these findings, the present study was designed to investigate whether emotion regulation training, based on Gross's model, can effectively reduce impulsivity and improve cognitive emotion regulation in individuals with substance dependence in Sanandaj Province.

2. MATERIALS AND METHODS

This study employed a quasi-experimental design with pretest, posttest, and follow-up assessments, using a control group for comparison.

The research population comprised all individuals attending substance dependence treatment centers in Sanandaj, located in western Iran, between 2019 and 2021. In total, 420 individuals were identified. From this population, 30 participants were randomly selected and assigned equally to experimental and control groups The experimental group received emotion regulation training based on Gross's model.

Inclusion criteria were as follows: being male, aged between 15 and 30 years, undergoing methadone maintenance therapy, meeting DSM-IV-TR diagnostic criteria for substance dependence, having at least a diploma-level education, and residing in Sanandaj.

Exclusion criteria included the presence of severe psychiatric disorders such as schizophrenia or major depressive disorder (verified by clinical assessment), medical conditions that would prevent participation in emotion regulation training sessions, engagement in other psychological treatments during the study, and missing more than two training sessions.

2.1. Questionnaires and Research Tools

Data collection in this study was conducted using two standardized instruments: the Barratt Impulsiveness Scale (2004) and the Zuckerman Sensation Seeking Scale (1996), adapted here as a measure of cognitive regulation of emotion.

The Impulsivity Questionnaire consisted of 15 items designed to assess three dimensions of impulsivity: cognitive, motor, and non-planning. The instrument was structured as a multiple-choice test with a maximum score of 120. Scores ranging from 52 to 71 represented normal levels of impulsivity; scores above 72 indicated high

impulsivity; and scores below 52 suggested either prior self-control interventions or unreliable responses. The validity and reliability of this scale have been confirmed in prior studies [13].

The Zuckerman Cognitive Regulation of Emotion Questionnaire (short form) comprised 14 dichotomous items, where participants selected one of two possible responses for each item. Scoring was based on a standardized key, and the internal consistency of the instrument has been reported at 0.83, indicating good reliability.

2.2. Procedure

Initially, the records of all individuals undergoing treatment in addiction rehabilitation centers in Sanandaj during 2020–2021 were reviewed. With the cooperation of center administrators, 30 eligible participants were randomly selected and assigned to experimental (n = 15) and control (n = 15) groups.

The intervention consisted of Gross's Emotion Regulation Training Protocol, a widely used program designed to enhance individuals' ability to identify, manage, and regulate their emotions. The program was delivered in group format across eight sessions, each lasting 90 minutes.

The study began with two introductory sessions in which participants were informed about the objectives of the research and the importance of their cooperation. During this stage, participants completed the Zuckerman Impulsivity Scale. Following this, participants were randomly allocated to the control or experimental group.

Members of the experimental group attended all training sessions, while the control group received no intervention during the study period. Upon completion of the eight training sessions, both groups were reassessed using posttest measures.

Data were analyzed using SPSS version 26. To examine group differences, multivariate covariance analysis (MANCOVA) was employed, with a 95% confidence level to ensure high statistical power in hypothesis testing.

Table 1 presents a summary of the content covered in each session of Gross's Emotion Regulation Training protocol.

Table 1. Summary of the contents of ER training based on the Gross model

Session	Explanation
1st	Acquainting substance abusers with each other and beginning the interaction between counselor and the members of the group; 2) stating the primary and secondary goals and providing conversation between the members over personal and collaborative goals; 3) stating the logic and stages of interventional treatments; and 4) stating the framework and rules related to attending in the group's session.
2nd	Selecting the situation, the goals: presenting emotional training. The agenda of sessions: recognizing emotion and provocative situations via training different functions of emotions, concentrating on information related to different dimensions of emotion and long-and short-term effects of emotions.
3rd	Selecting the situation, the goals: evaluation of vulnerability and emotional skills of the members. The agenda of the session: addressing different functions of emotions in the process of human being's adaption and their merits, highlighting the role of emotions in establishing a relationship with other people and impressing them, also organizing and galvanizing human behaviors among the members and putting forward some examples of their actual experiences.
4th	Modifying the situation, the goal: changing the situation of emotional stimulants. The agenda of the session: 1) preventing the individuals from social outcrossing and avoidance; 2) training problem-solving strategy; and 3) training interpersonal skills (conversation, self-expression, and problem solving).
5th	Developing attention, the goal: changing the attention. The agenda for the session: 1) stopping the rumination and anxiety; and 2) training attention.
6th	Modifying the response, the goal: changing in the cognitive assessments. The agenda for the session: 1) identifying the incorrect assessments and their effects on emotion status; and 2) training of reassessment strategies.

7th	Modifying the responses, the goals: changing the behavioral and physiological consequences of a given emotion. The agenda for the session: 1) identifying the rate and how-to use the inhibition strategies, and investigating its emotional consequences; 2) confronting; 3) training how to express emotions; 4) modifying the behavior through changing in environmental enhancers; and 5) training emotional discharging, relaxation, and inverse action.
8th	Assessment and function, the goals: reassessment and solving the problems of function. The agenda for the session: 1) assessing the rate of attaining the personal and collaborative goals; 2) applying the acquired skills in the natural conditions out of the session; and 3) reviewing and solving the problems over doing the tasks.

3. RESULTS

According to the results of MANCOVA, a significant difference at least for a given trait was found between control and experimental groups at the posttest in terms of training ER based on the Gross model. In order to evaluate this difference, ANCOVA was used in the context of MANCOVA and the results were presented in Table 4.

Table 2. Descriptive statistics of the research population

Variables		**Frequency**
Age	20-15	7
	31-30	38
	41-50	15
Educational Level	Diploma	37
	Associate degree	17
	Bachelor degree	6
Marital status	Single	43
	Married	17
Inhabitance in Sanandej	Inhabitant	52
	Non-Inhabitant	8

According to table 4, the amount of F in MANCOVA for impulsivity and Cognitive regulation of emotion in the different groups of ER training based on the Gross model was F=123.6 and F=97.99, respectively. This result revealed that ER training could lead to a significant difference between control and experimental groups in terms of impulsivity and Cognitive regulation of emotion; hence, the hypothesis of this research is confirmed. In order to verify the other hypothesis of this research and to find the probably differences between dependent variables, Bonferroni post hoc test was used and the results were brought in Table 4.

Table 3. Mean, Standard Deviation (SD), the highest scores of impulsivities and Cognitive regulation of emotion in the individuals withdrawing substance abuse based on the Gross model at the pretest and posttest

Variables	**Intervention**	**Test's stage**	**Mean**	**SD**	**Minimum**	**Maximum**
Impulsivity	ER training	Pretest	23	1.74	20	26
		Posttest	19.11	1.84	16	22
Cognitive regulation of emotion		Pretest	55.5	3.51	50	63
		Posttest	52.11	3.51	47	30

As shown in Table 5, the modified mean and SD of impulsivity variable in the experiment receiving ER training based on the Gross model were as 18.86 and 0.20 and in the control were 22.7 and 0.21, respectively. The modified mean and standard deviation in the variable of Cognitive regulation of emotion were 52.57 and 0.19 for the experiment group and 55.88 and 0.2 for the control group, respectively. Moreover, the data presented in Table 5 exhibits a comparison between both groups in terms of impulsivity and Cognitive regulation of emotion variables using Bonferroni post hoc test.

Table 4. The result of Multivariate Analysis of Covariance (MANCOVA)

Variable	DF	SS	MS	F	*P*-value	Etta value
Impulsivity	2	181.4	90.7	123.6	0.001	0.84
Cognitive regulation of emotion	2	132.25	66.62	97.99	0.001	0.8

4. DISCUSSION

This study was designed to examine the effectiveness of emotion regulation (ER) training, based on the Gross model, on impulsivity and cognitive regulation of emotion among individuals with substance dependence undergoing methadone maintenance treatment. The findings revealed a significant difference between the experimental and control groups in impulsivity outcomes following the ER intervention. Specifically, results of the MANCOVA indicated that ER training grounded in the Gross model produced a substantial reduction in impulsivity within the experimental group at the posttest stage.

These results suggest that ER training contributes to notable changes in impulsivity from pretest to posttest compared with the control condition. The strong statistical power observed further confirms both the robustness of the findings and the adequacy of the sample size. As shown in Table 5, ER training demonstrated considerable effectiveness in reducing impulsivity among substance-dependent individuals.

Table 5. Modified mean, Standard Deviation (SD), Minimum and Maximum scores in different groups at different stages

Variable	Group	Mean	SD	Minimum	Maximum
Impulsivity	ER training	18.86	0.2	18.44	19.27
	control	22.7	0.21	22.27	23.14
Cognitive regulation of emotion	ER training	52.57	0.19	52.17	52.97
	control	55.88	0.2	55.46	56.29

Impulsive behaviors constitute a core component of numerous psychological disorders, including attention-deficit hyperactivity disorder, conduct disorder, impulse control disorder, substance abuse, bulimia, suicidal behaviors, personality disorders, and learning disabilities. The findings of this study are consistent with those of many previous investigations [4, 7, 13, 16, 17, 19]. For instance, Schreiber et al. [9] demonstrated that individuals with lower emotion regulation (ER) skills scored higher on the cognitive and avoidant dimensions of impulsivity, highlighting the strong association between deficient ER and impulsivity. This underscores the central role of ER in vulnerability to addiction.

Similarly, Sezar [7] reported that ER training significantly reduced smoking obsession, negative emotions, and attentional bias toward smoking cues. These results support the higher effectiveness of ER strategies in reducing substance-related problems compared with other interventions. Moreover, research on substance abusers with varying levels of reactivity revealed that individuals with high reactivity experienced greater negative emotions than those with low reactivity, who were better able to draw upon positive affect. These findings point to reactivity, high impulsivity, and negative emotions as critical risk factors in substance abuse.

The social perspective of impulsivity and social learning theory [5] further help explain these outcomes, suggesting that individuals acquire behavioral patterns from family and environmental contexts. Such learned behaviors may lead them to respond impulsively to immediate desires, impacting not only themselves but also others around them. Prior research has consistently documented the link between impulsivity and substance abuse (20]. Users of alcohol and stimulants, for example, often demonstrate higher impulsivity and poorer inhibitory control. Conversely, individuals with stronger ER capacities can anticipate social demands, better manage external pressures, and regulate their emotional responses, which enhances their resistance to substance use [21].

Evidence also shows that attending ER training sessions equips substance abusers with strategies to better manage their emotions, thereby lowering both impulsivity and drug-seeking tendencies [22]. Importantly, impulsive

behaviors, often categorized as risky behaviors, emerge prematurely and with limited forethought, carrying significant risks to health, social status, and overall wellbeing [13]. Because chronic substance abuse exacerbates impulsivity, individuals frequently struggle to regulate their emotions. In this respect, ER training based on the Gross model appears to play a crucial role in mitigating impulsive behaviors, as confirmed by the present study.

In contemporary psychology, impulsivity is conceptualized as a multidimensional cognitive construct characterized by reduced inhibitory control and impaired decision-making [3]. It is recognized as a key factor across various types of addiction, with some individuals displaying impulsivity across all contexts, while others exhibit it only in specific situations [19]. Reactivity is one of the primary drivers of this process: individuals with high reactivity often resort to maladaptive ER strategies, which in turn increases their vulnerability to substance abuse [23]. Those with poor ER skills are especially likely to use substances to alleviate negative emotions, a pattern supported by findings that link low ER to higher relapse rates. Pharmacological treatments such as methadone may alleviate some symptoms, but they do not address maladaptive ER strategies directly. Thus, interventions like ER training are essential complements to pharmacotherapy [22].

In this study, a significant difference was also observed between the experimental and control groups in cognitive regulation of emotion, as measured by MANCOVA. Specifically, ER training based on the Gross model significantly reduced cognitive regulation of emotion scores in the experimental group, findings consistent with prior research [13, 15, 16, 17]. For example, Azami et al. [13] emphasized that cognitive regulation of emotion is a key risk factor in substance dependence and relapse, recommending ER strategies as a means to reduce this vulnerability.

Sensation seeking, another closely related construct, is often a driving force behind experimentation with drugs. Sensation seekers are motivated by curiosity and a desire for novel experiences, which may push them to use substances even in high-risk situations. Pirjalian (2014) similarly demonstrated that ER training significantly reduced experience-seeking, disinhibition, and sensitivity to monotony, ultimately lowering overall cognitive regulation of emotion scores among substance abusers [7]. Individuals high in sensation seeking often believe that "everything is worth trying at least once," a mindset that, when combined with risk-taking tendencies, greatly increases the likelihood of addiction.

5. CONCLUSION

Given the strong interrelationship between substance abuse, craving, impulsivity, and addiction severity factors that critically influence treatment success or failure there is a clear need to integrate complementary interventions alongside methadone therapy. ER training based on the Gross model offers an effective approach for improving self-control, reducing impulsivity, and managing emotional vulnerabilities in substance-dependent individuals.

Despite its promising findings, the present study had several limitations, including the use of an all-male sample, restriction of participants to treatment centers in Sanandaj city, and reliance on self-report measures. Future research should address these limitations by including female participants, expanding to more diverse populations, and incorporating additional objective measures of emotional and behavioral regulation. Such efforts would further enhance our understanding of ER training as a therapeutic adjunct in substance abuse treatment.

Declaration

We acknowledge that we used ChatGPT to enhance the academic writing of our manuscript while ensuring the originality and integrity of our work.

Transparency Statement

The data supporting this study are available upon reasonable request to the corresponding author, subject to ethical and confidentiality considerations.

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Declaration of Interest

The authors declare that they have no competing interests.

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