Relationship between BIS/BAS Systems Along With Emotional Regulation Difficulties and Alexithymia

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Original Article

Abstract

Introduction: Studies related to investigating reasons of mental disorders emphasize on role of environmental factors in creation of the disorders. For this reason, in this paper, a research was conducted to investigate the relationship between BIS/BAS systems and emotional regulation difficulties with alexithymia.

Methods: 200 undergraduate students of University of Tabriz in majors including humanities, engineering, and basic science were selected in 2012-2013 academic year through applying multistage random clustering sampling method. The data were collected through questionnaires of Toronto Alexithymia Scale (TAS-20), behavioral activation/inhibition system (Carver and White) and Difficulty Emotion Regulation Scale (Gratz). To analyse the data, Pearson Correlation Coefficient and Stepwise Regression were used.

Results: BIS and BAS systems indicated positive and significant relationship with general Alexithymia and components of difficulty Identifying emotions and externally oriented thinking subscales. Positive and significant relationship was found between Alexithymia and Difficulty Emotional Regulation and its components except subscale of Lack of Emotional Awareness. Positive significant relationship was also found between difficulty Identifying emotions and difficulty describing emotions with all components of emotional regulation difficulty except Lack of emotional clarity.

Conclusion: Results showed that alexithymia has relationship with difficulty in emotion regulation and brain behavioral systems. This relationship can explain reward sensitivity system disorders and emotion regulation problems including addiction, alcoholism, sensitivity inhibitory systems disorders like anorexia nervosa and some personality disorders.

Key words: Alexithymia, Emotion, Brain Behavioral Ssystems

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Introduction:

Alexithymia is a personality characteristic which can be determined through difficulty in identifying and describing emotions and feelings (1). Since Alexithymia is a characteristic which refers to disorder in cognitive combination of emotions (1), it can be noted that this personality characteristic has relation with difficulties related to emotional regulation. Researchers have found that Alexithymia has various dimensions such as external control and inefficient beliefs. And this is considered as an emotional destabilizing factor and unsafe performance in controlling social situations (2,3). However, Alexithymia is not a distinct emotional difficulty, but indicates lower levels of emotional process in a continuous manner in population (4).

Results of the research indicated that Alexithymia indicates cognitive process difficulty

and emotional regulation difficulty, and for this reason, this disorder is considered as one of the emotional regulation disorders (5,6). A study conducted on relationship between Alexithymia and recognition and emotion regulation indicated that emotion recognition has negative correlation with externally oriented thinking, and positive correlation with emotional introspection (7). Individuals with high characteristic of Alexithymia indicated chronic negative mental emotions in autonomic activity regardless of environmental requirements, and empirical investigations indicated that individuals with alexithymia are highly intended to experience negative emotions and suppression of their emotional expressions, which can support the idea that alexithymia, is related to difficulty in emotion regulation (8).

Existence of relationship between alexithymia and difficulty in emotion regulation will be emphasized by considering similarity of these two constructs in the syndrome pattern of difficulties related to mental and physical health, such as hypertension, cardiovascular problems, sleep disorders (9,10), and anxiety disorders such as panic (11).

Among other variables investigated having relationship with difficulty in emotion regulation is sensitivity in brain-behavioral systems, proposed by Gray. The Reinforcement Sensitivity Theory is based on neural-biological basis of personality (12).

This theory introduces three main neural systems including Behavioral Approach System (BAS), Behavioral Inhibition System (BIS), and Flight-Fight-Freeze (FFFS). These systems are the basis of individual differences in field of personality, mental pathology, and sensitivity to reward (13). BAS is a tendency system which responds to conditional and unconditional symptoms of reward (12). Individuals with high extent of BAS indicate impulsive and introspective properties (14). On the contrary, FFFS system is an avoidance copying system which stimulates avoidance and escaping behaviors when coping with unconditional annoying stimuli and it is assumed that this is considered as subbase of fear and fright (13). And finally BIS, has role in settling disputes between mutual goals and it is considered that BIS constitutes the subbase of neuroticism (13).

Although few studies have considered relationship between difficulties in emotion regulation and brain-behavioral systems, studies have shown that these sub-systems have relationship with especial behaviors which are considered as basis and origin of difficulties in emotion regulation. For example, findings of Randles et al. (15) indicated that sensitivity in BIS-FFFS has positive relationship with rumination. Findings of Hundt et al. (16) also indicated that sensitivity in BIS-FFFS has negative relationship with drug abuse, while sensitivity in BAS has positive relationship with alcohol and drug consumption. Other findings indicated that relationship between BIS-FFFS and personality disorders depend on capacity of self-regulation (17).

According to the foregoing information it can be observed that existence of a probable relationship between alexithymia and sensitive-to-reward system has not been independently investigated. This study has been conducted with purpose of investigating relationship between brain activation and inhibition systems along with emotion regulation systems and alexithymia.

Methods:

The present research is of descriptive-correlational type. Statistical population of the present research includes all undergraduate students of University of Tabriz in 2012-2013 academic year.

In order to implement this research, 200 students (120 male and 80 female) of University of Tabriz from different education majors such as humanities, technical, and basic science, were selected by applying multistage random clustering method.

Average age of the subjects was 25.8 years with standard deviation equal to 6.6. For analyzing the data, Pearson product moment correlation method and stepwise regression method which is based on multiple regressions were used.

Research Instrument

Toronto Alexithymia Scale: This is a 20-item questionnaire which evaluates three subsets of difficulty identifying emotions (DIE) including 7 items, difficulty describing emotions (DDE) including 5 items, and externally oriented thinking including 8 items, in Likert 5-point scale ranging from 1 (completely disagree) to 5 (completely agree). Also a general score is calculated for sum of scores of the three subscales for alexithymia (18).

Psychological properties of Toronto alexithymia scale (15) has been investigated and verified in various research (19, 20). Besharat (21) provided Toronto alexithymia scale and reported Cronbach's

alpha coefficient for general alexithymia and the three subscales of difficulty Identifying emotions, difficulty describing emotions, and externally oriented thinking respectively as 0.85, 0.82, 0.75, and 0.72, which indicate appropriate internal consistency in the scale. In this research, alpha coefficient for this scale was obtained as 0.79.

Emotion Regulation Questionnaire:

This questionnaire which was created in 2004 by Gratz is a multi-dimensional 36-item questionnaire which evaluates emotion regulation patterns of individuals and is created of six subscales. These subscales are non-acceptance of emotional responses, difficulty participating in behaviors reaching goal, impulse control difficultys, lack of emotional awareness, lack of access to emotion regulation strategies, and lack of emotion clearness (22).

This questionnaire has an appropriate internal consistency (0.93) and reliability of its subscales with Cronbach's alpha of more than 0.8 for each subscale is very appropriate.

In the present research, reliability of the questionnaire of emotion regulation with method of Cronbach's alpha was obtained as 0.86.

White and Carver Behavioral Activation / Inhibition Systems Questionnaire:

This is a 24-item questionnaire having BAS and BIS scales and also 4 deviatory items. BAS scale has three subscales which include responding to reward, drive, and fun seeking. Internal stability for BIS was reported as 0.74 and for subscales of BAS was reported as equal to 0.47, 0.73, 0.60, and 0.18, respectively. Choobdar (23) and Abdollahi (24) have reported reliability by using retest method for BIS as 0.7 and for BAS as 0.81.

In this research, internal reliability scale for BIS was obtained as 0.72 and for BAS and its subscales

was obtained as 0.79, 0.74, 0.73, and 0.68, respectively.

Results:

In order to become familiar with descriptive information of this research, first, mean value and standard deviation of research variables were investigated. Table 1 indicates descriptive information of variables of this research.

Also before implementing regression analysis, in order to analyze relationship between brain-behavioral systems along with emotion regulation and alexithymia, correlation relations between research variables were investigated through correlation matrix. Results related to this analysis are provided in table 2.

According to information provided in table 2, BAS and BIS systems indicated positive and significant relationship with general alexithymia and components such as difficulty identifying emotions, externally oriented thinking, but no relationship was found between difficulty describing emotions and brain-behavioral systems.

Positive and significant relationship was found between general alexithymia and difficulty emotion regulation along with its components, except component of lack of emotion awareness.

Also positive and significant relationship was found between components of difficulty identifying emotions along with difficulty describing emotions and all components of emotion regulation except component of lack of emotion awareness. And finally, positive and significant relationship was found between component of externally oriented thinking and all emotion regulation components.

In order to predict alexithymia, considering emotion regulation and sensitive-to-reward system, stepwise regression method was used. Results of variance analysis and statistical characteristics of regression are provided in tables 3, 4, and 5.

Table 1- Mean and standard deviation of research variables

Variables	Mean	Standard Deviation	Minimum Score	Maximum Score
Behavioral Inhibition	20.81	2.45	15	26
Responding to Reward	17.09	2.42	12	20
Drive	12.36	2.13	7	16
Fun seeking	10.84	1.94	7	15
Behavioral Stimulator	40.29	4.93	28	50
Alexithymia	55.53	10.42	34	81
Difficulty Identifying Emotions	18.64	6.06	7	34
Difficulty Describing Emotions	13.62	3.78	5	33
Externally Oriented Thinking	23.28	3.28	14	31
Difficulty Regulating Emotions	100.09	17.46	58	142
Non-Acceptance of Emotion Responses	15.22	5.33	6	29
Difficulty Participating in Behaviors Reaching Goal	14.98	3.46	6	23
Impulse control difficultys	15.67	3.90	7	25
Lack of Emotion Awareness	20.72	3.55	13	29
Lack of access to emotion regulation strategies	20.61	5.61	10	36
Lack of Emotion Clearness	12.88	2.27	7	18

According to these results and 48% of variance related to sensitive-to-reward system, lack of access to emotion regulation strategies, behavioral inhibition, and impulse control difficulty are defined by fun seeking (R^2=0.48).

According to information provided in table 4, the following components could predict alexithymia significantly with values reported as follows:

Fun seeking, B=0.42; lack of access to emotion regulation strategies, B=0.26; and Impulse control difficulty, B=0.18.

Positive and significant relationship was found between general alexithymia and difficulty emotion regulation along with its components, except component of lack of emotion awareness. Also positive and significant relationship was found between components of difficulty identifying emotions along with difficulty describing emotions and all components of emotion regulation except component of lack of emotion awareness. And

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Table 2- Results of Pearson Correlation Coefficients between scores of subjects in research variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Behavioral Inhibition	1														
Responding to Reward	0.40**	1													
Drive	0.35**	0.50**	1												
Fun seeking	0.20**	0.30**	0.24**	1											
Behavioral Stimulator	0.43**	0.83**	0.77**	0.64**	1										
Alexithymia	0.33**	0.27**	0.22**	0.55**	0.45**	1									
Difficulty Identifying Emotions	0.22**	0.21**	0.18**	0.38**	0.33**	0.91**	1								
Difficulty Describing Emotions	0.17	-0.4	-0.1	0.22**	0.6	0.76**	0.59**	1							
Externally Oriented Thinking	0.60**	0.53**	0.3600	0.78**	0.73**	0.59**	0.37**	0.42**	1						
Difficulty Regulating Emotions	0.16*	0.22**	-0.08	0.30**	0.22**	0.47**	0.46**	0.25**	0.35**	1					
Non-Acceptance of Emotion Responses	0.11	0.13	0.04	0.27**	0.17**	0.42**	0.50**	0.25**	0.28**	0.79**	1				
Difficulty Participating in Behaviors Reaching Goal	0.19**	0.17*	0.02	0.19**	0.16*	0.43**	0.40**	0.31**	0.28**	0.74**	0.56**	1			
Impulse control difficultys	0.9	0.20**	0.6	0.21**	0.21**	0.44**	0.43**	0.29**	0.25**	0.76**	0.54**	0.58**	1		
Lack of Emotion Awareness	0.13	0.20**	0.7	0.11	0.17*	-0.3	0.00	0.23**	0.18*	0.44**	0.22	0.15	0.19**	1	
Lack of access to emotion regulation strategies	0.17*	0.20**	0.3	0.26**	0.21**	0.50**	0.50**	0.29**	0.31**	0.82**	0.59**	0.63**	0.64**	0.18**	1
Lack of access to emotion regulation strategies	0.9	0.7	-0.12	0.18**	0.5*	0.25**	0.24**	0.13	0.21**	0.48**	0.36**	0.28**	0.29**	0.14**	1

** P=0.01   * P=0.05

Table 3- Statistical test of alexithymia regression model

Model	R	R^2	SE
1. Fun seeking	0.00	0.30	8.71
2. Fun seeking lack of access to emotion regulation strategies	0.66	0.43	7.82
3. Fun seeking lack of access to emotion regulation strategies Behavioral Inhibition	0.68	0.46	7.61
4. Fun seeking lack of access to emotion regulation strategies Behavioral Inhibition	0.70	0.48	7.49

Table 4- Regression variance analysis for variables

		Sum of squares	Mean square	df	F	Sig
	Regression	6607.80	6607.80	1	87.03	0.00
1	Residual	15032.1	75.91	198		
	Total	21636.32		199		
	Regression	9574.14	4787.07	2	78.16	0.00
2	Residual	12065.67	61.24	197		
	Total	21636.32		199		
	Regression	10266.63	3422.21	3	58.97	0.00
3	Residual	11373.18	25.02	196		
	Total	21639.32		199		
	Regression	10917.94	2667.96	4	47.43	0.00
4	Residual	10712.14	51.24	195		
	Total	21639.32		199		

Table 5- Determining values of each of the predictor variables in predicting sensitivity-to-reward

Model	Unstandardized coefficients		Standardized error	t-value	Significance level
	B Value	Standard error	Beta coefficients		
1. Fum seeking	2.96		0.55	9.32	0.00
2. Fun seeking	2.42		0.45	8.21	0.00
Lack of access to emotion regulation strategies	0.71		0.38	6.95	0.00
3. Fun seeking	0.94		0.42	7.72	0.00
lack of access to emotion regulation strategies	2.25		0.36	6.67	0.00
Behavioral Inhibition			0.18	3.45	0.001
4. Fun seeking			0.41	7.63	0.00
lack of access to emotion regulation strategies			0.24	3.65	0.00
Behavioral Inhibition			0.18	3.59	0.00
Impulse control difficulty			0.17	2.69	0.008

Dependent Variable: Alexithymia

Conclusion:

Results of the research indicated that alexithymia and components such as difficulty identifying emotion and externally oriented thinking have relationship with BIS and BAS.

The results also indicated that alexithymia has relationship with emotion regulation and its components, except lack of emotion awareness. The relationship indicates that by increasing extent of inhibition, behavioral stimulation, and difficulty in emotion regulation, alexithymia increases.

The previous theoretical views which considered alexithymia as a disorder in emotion regulation, are confirmed by results obtained from this research and the past research (1, 5, 6, 8).

These findings indicate that alexithymia indicates that emotion regulation difficulty has various characteristics such as non-acceptance of emotion responses, lack of emotion clearness, difficulty participating in behaviors reaching goal, impulse control difficultys, and lack of access to emotion regulation strategies.

According to findings of this research, there is a relationship between emotion awareness, and component of difficulty describing emotions, externally oriented thinking. High correlation between emotion awareness and difficulty describing emotions and results obtained for the previous research are in the same direction.

The present finding about relationship between difficulties emotion regulation and sensitive-to-reward system indicated that fun seeking and responding to reward have direct relationship with emotion regulation.

This finding is in the same direction with the research which have considered fun seeking as in

relation with inconsistent emotion regulation strategies (25, 26) and inefficient impulsion (27, 28).

Also results of the research indicated that inhibition system indicates the foregoing relationship with alexithymia. Relationship between difficulty in drive control and externally oriented thinking, defines existence of objectivism. Furthermore, relationship between inhibition system and difficulty identifying emotions along with externally oriented thinking can refer to edge-seeking behavior and defense state of an individual when coping with emotional conditions. Relationship between response-to-reward along with fun seeking and impulsive behaviors, define lack of success in distinction between emotions and inability in emotion clearness.

Among the variables considered to predict alexithymia, variables such as fun seeking, lack of access to emotion regulation strategies, behavioral inhibition, and lack of impulse control, have the highest variance related to alexithymia so that all of these factors are in relation with characteristics related to alexithymia, including objectivism, difficulty identifying emotions, difficulty describing emotions, unavailability of emotions, emotional and behavioral edge-seeking in coping with emotional situations, and following that, the principle of enjoying rather than considering latent meanings of facts.

In brief, results of the research indicated that emotion regulation and brain-behavioral systems are in relationship with alexithymia and in this regard, amusement or environmental motions searching, lack of access to emotion regulation strategies, behavioral inhibition, and impulse control difficulty, are predicting variables of alexithymia.

Acknowledgment:

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رابطه سیستم‌های مغزی – رفتاری و مشکلات تنظیم هیجانی با الکسی تایمیا

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چکیده

مقدمه: مطالعات مربوط به سبب شناسی اختلالات روانی به نقش عوامل زیستی محیطی در بروز اختلالات توجه دارند. در این راستا، این پژوهش با هدف تعیین رابطه بین سیستم‌های مغزی –رفتاری و مشکلات تنظیم هیجانی با صفت الکسی تایمیا انجام گرفت.

روش‌کار: ۲۰۰ دانشجوی مقطع کارشناسی دانشگاه تبریز در رشته‌های علوم انسانی، فنی و مهندسی و علوم پایه در سال تحصیلی ۹۲-۹۱ با روش نمونه‌گیری خوشه‌ای تصادفی چند مرحله‌ای انتخاب شدند. جمع‌آوری داده‌ها از طریق پرسشنامه‌های ناگویی هیجانی تورنتو، پرسش‌نامه سیستم‌های بازداری / فعال‌سازی رفتاری وایت و کارور و پرسشنامه مشکلات تنظیم هیجانی گراتز انجام گرفت. نوع مطالعه توصیفی –همبستگی بود و برای تحلیل داده‌ها از ضرایب همبستگی پیرسون و رگرسیون به شیوه گام به گام استفاده شد.

نتایج: سیستم‌های مغزی BAS و BIS رابطه مثبت و معنی‌داری را با الکسی تایمیای کل و مؤلفه‌های مشکل در شناسایی هیجان‌ها و جهت گیری بیرونی در تفکر نشان دادند. بین الکسی تایمیای کل و مشکل در تنظیم هیجان و مؤلفه‌های آن به غیر از مؤلفه کمبود آگاهی هیجانی رابطه مثبت و معنی‌دار و بین مؤلفه‌های مشکل در شناسایی هیجان‌ها و مشکل در توصیف هیجان‌های الکسی تایمیا با تمام مؤلفه‌های تنظیم هیجان به غیر از مؤلفه کمبود آگاهی هیجانی رابطه مثبت و معنی‌دار بدست آمد. بین مؤلفه جهت گیری بیرونی در تفکر و تمامی مؤلفه‌های تنظیم هیجانی رابطه معنی‌دار مثبت وجود داشت. زیر مقیاس های جستجوی سرگرمی، محدودیت در دستیابی به راهکارهای تنظیم هیجان، بازداری رفتاری و مشکل در کنترل تکانه، ۰/۴۸ درصد از واریانس ناگویی هیجانی را پیش بینی می‌کنند.

نتیجه‌گیری: ارتباط بین الکسی تایمیا با مشکلات مربوط به تنظیم هیجان و سیستم‌های مغزی رفتاری می‌تواند در تبیین سبب شناسی اختلالات مرتبط با سیستم حساس به پاداش و مشکلات تنظیم هیجانی از جمله اعتیاد، الکلیسم و اختلالات مربوط به حساسیت در سیستم بازدارنده مثل پرخوری عصبی و اختلالات شخصیتی کمک کننده باشد.

کلیدواژه‌ها: الکسی تایمیا، هیجانی، سیستم‌های مغزی رفتاری

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