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Effectiveness of the Unified Transdiagnostic Treatment on Brain-Behavioral Systems and Anxiety Sensitivity in Female Students with Social Anxiety Symptoms

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The present research was conducted to study effectiveness of the unified transdiagnostic treatment on brain-behavioral systems and anxiety sensitivity in female students with social anxiety symptoms. The statistical population of this study included all undergraduate female students of Ahvaz Jundishapur University of medical sciences. In a pre-posttest experimental design with control group, 32 female students with the diagnosis of social anxiety disorder were selected by random cluster sampling. Then, all of the subjects were randomly allocated into two groups: experimental and control groups (16 students each). Research tools used in this study were Social Phobia Inventory (SPIN), Behavioral Activation/Behavioral Inhibition Scales (BIS/BIS) and Anxiety Sensitivity Inventory (ASI-

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R). Prior to commencement of the intervention, a pretest was performed on each group; then, the experimental group was exposed to transdiagnostic intervention, while the control group received no intervention. At the end of the intervention, a post-test was administrated to each group. The result of covariance analysis showed that the unified transdiagnostic intervention decreased behavioral inhibition and anxiety sensitivity, and increased behavioral activity. With regards to effectiveness of the unified transdiagnostic intervention on social anxiety symptoms, utilization of this therapeutic method is suggested to psychologists and advisors.

Keywords*:* transdiagnostic treatment, brain-behavioral systems, anxiety sensitivity, social anxiety

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Social anxiety, also known as social phobia, is the most prevalent and chronic type of anxiety disorder around the world (Mekuria et al., 2017). The main feature of this disorder is tangible or fierce fear or anxiety about social situations where an individual is carefully assessed by others (American Psychiatric Association, 2013). The social anxiety starts in 13-19 ages, but it can happen in the early childhood (Damercheli, Kakavand & Jalali, 2017) and has large adverse effects on quality of social interactions, educational achievement, and welfare (Haller, Kadosh, Scerif, & Lau, 2015). It is one of the most common anxiety disorders with 6.1% prevalence in advanced countries and 2.1% in advancing countries (Howells et al., 2015). More than 90% of individuals with social anxiety disorder (SAD) report considerable impairment in one or more occupational functions (Himle et al., 2014) and around 70-80 percent of them receive secondary diagnoses of congruence disorders such as specific phobia, agoraphobia, major depression, and drug abuse (Barlow, 2008).Various studies conducted in Iran imply a high degree of prevalence of this disorder, especially among women (Talepasand & Nokani, 2010; Mohammadi et al., 2008). Also,

Epidemiologic studies among students indicate the frequent occurrence of this disorder among students (Bella & Omigbodun, 2009; Salina et al., 2008). Social anxiety seems to be related to the unique models of the brain-behavioral systems activity. Gray's theory was mentioned in examining the relation between anxiety and its neurobiological structures (Asghari, Mashhadi, & Sepehri Shamloo, 2015) where a model is provided for mammal's brain, which explains the fundamental emotional systems at behavioral, cognitive, and neural levels (Cui & Cui, 2011). According to Gray, these brain-behavioral systems are the basis of individual differences and the activities of each one of them would lead to the recalling of various emotional reactions such as phobia and anxiety (Gray & McNaughton, 2000).

Another factor that makes an individual vulnerable to anxiety and anxiety disorders, which have attracted a great deal of scientific attention, is anxiety sensitivity (AS). This increases the possibility of developing morbid anxiety, which is considered as a risk factor in this field. AS is a cognitive variable of individual differences, which is defined as the fear of anxiety-related bodily sensations and symptoms, indicating tendency to catastrophize about consequences of such sensations (Reiss & McNally, 1985; Reiss, 1991; Martin, Kidd, & Seedat, 2016). Some studies have shown that people with SAD suffer higher levels of AS and psychological arousal as compared to their normal counterparts (Anderson & Hope, 2009; Deacon & Abramowitz, 2006). They also show higher scores of fear about being observed by others as compared to the rest of the groups under study (Deacon & Abramowitz, 2006).

Among the different methods proposed by mental health experts for the treatment of social anxiety, the most useful are cognitive-behavioral treatments. They have exclusively

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published many therapeutic instructions and protocols for emotional disorders and many studies have proved the effectiveness of these interventions as well (Butler, Chapman, Forman, & Beck, 2006). However, despite this effectiveness, publishing numerous therapeutic instructions exclusively for each emotional disorder, lack of time and consideration of cost efficiency by experts in using these different therapeutic instructions or protocols, passing lengthy and numerous internship courses for treating each disorder, clinical experts' confusion in choosing proper instructions for the patients, and finally, complexity of the therapeutic instruction compilation process for authors have created limitations for behavioral-cognitive interventions (Nathan & Gorman, 2015).

As a result to these mentioned limitations, several programs, including core CBT strategies used to treat all anxiety disorders and related disorders (transdiagnostic), have been examined and developed. Among these interventions, the one which has attracted the attention of experts and researchers' equally is the Unified Protocol (UP) by Barlow et al. (2011, Nathan & Gorman, 2015), developed for the transdiagnostic treatment of emotional disorders. UP is a transdiagnostic behavioral-cognitive intervention that focuses on emotions. Although it has roots in the traditional cognitive behavioral principles, it is still unique and singular due to the particular emphasis it exerts on the manner of experimenting and a patient's response to his own emotions. The effectiveness of this intervention has been examined and approved by different studies on the treatment of emotional disorders. The results of the study conducted by Laposa, Mancuso, Abraham1, and Loli-Dano (2016) to examine the effectiveness of unified transdiagnostic with individuals with comorbid anxiety disorder symptoms showed that unified

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transdiagnostic treatment decreases social anxiety, worry, depression, general anxiety, panic, and negative affect, and increases positive affect. In the study carried out by Roushani, Bassak Nejad, Arshadi, Mehrabizade Honarmand, and Fakhri (2016), it was observed that the unified transdiagnostic treatment reduces social anxiety and negative affect and increases positive affect in students with social anxiety symptoms. Also, the research results of Ornelas Maia, Nardi, and Cardoso (2015) indicated that compared to pharmacotherapy, transdiagnostic treatment is more effective while dealing with anxiety and depression disorders. Durability of the effects of transdiagnostic intervention on emotional disorders was examined by Bullis, Fortune, Farchione, & Barlow (2014). Their findings provided the first support in favor of the permanence of broad treatment benefits following transdiagnostic treatment. The resultsof a study done by Abdi, Bakhshi, and Mahmoud Alilou (2013) also showed that unified transdiagnostic treatment reduces the intensity of symptoms among people with generalized anxiety disorder accompanied by comorbid emotional disorder. In a research, Boswell et al. (2013) examined and approved the effectiveness of transdiagnostic treatment in reducing anxiety sensitivity symptoms. Moreover, the effectiveness of transdiagnostic intervention on negative affection and negative reaction to emotions was examined by Sauer-Zavala et al. (2012). The results of their research showed that transdiagnostic treatment reduced the frequency of negative emotions and negative reactivity to emotions. Also, the results of studies conducted by Norton and Barrera (2012), and Riccardi (2012) indicate that transdiagnostic intervention is an effective treatment for individuals suffering from a range of anxiety disorders such

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as social anxiety disorder, generalized anxiety disorder, and panic disorder.

This study aimed to investigate the effectiveness of unified transdiagnostic treatment on brain-behavioral systems and anxiety sensitivity among female students with social anxiety symptoms. This research was carried out due to the above-said points and the transdiagnostic protocols, including the unified transdiagnostic treatment protocol of Barlow's team (2011) designed to target cognitive-behavioral processes involved in a broad spectrum of psychological disorders, and also since social anxiety is an emotional disorder that is considered among the most prevalent psychological disorders within the student population (Bella & Omigbodun, 2009; Salina et al., 2008), which may lead to a lot of side-effects for the quality of social interactions, educational achievement and welfare.

Method

The statistical population of this study included all undergraduate female students of the Ahvaz Jundishapur University of medical sciences. At first, according to the Krejcie and Morgan Table (1970), 300 students were examined with the help of social anxiety inventory through random cluster sampling in order to select the sample of this study. To do so, two faculties (paramedical and health care) were randomly selected out of four, three fields of study were selected in each faculty, and three classes were selected for each field. Social Phobia Inventory (SPIN) copies were handed out to the female students of each class. Among 300 students, 113 achieved the score of 19 and above. Clinical interview was conducted with 83 students using a structured clinical interview designed for DSM-IV disorders (SCID). According to the results of these interviews and also the

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inclusion and exclusion criteria, 61 students were found to be suffering from social anxiety symptoms and the rest were excluded from the sampling process. Finally, 32 students with social anxiety symptoms were selected through simple random method and were randomly divided into two groups of 16; the experimental and the control group. Table 1 shows the demographic variables.

Table 1

Demographic Variables

Variable		Frequency	Percent
Marital Situation	Single	24	80
	Married	6	20
Field of study	Nutrition Sciences	6	20
	Environmental Health	8	26.7
	Public Health	6	20
	Health Services Management	4	13.3
	Laboratory Sciences	3	10
	Health Information Technology	3	10
Educational Year	Second	15	50
	Third	12	40
	Fourth	3	10

After the study and its conditions were explained to the subjects, their written informed consent was taken and other study tools (BAS/BIS and ASI-R questionnaires) were applied. After pretest, interventions were carried out on the experimental group collectively during 8 weekly sessions of 90 minutes, while the control group did not receive any treatment. After the intervention process was completed, posttest was carried out on both groups.

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Considering that 3 absences during all sessions were among exclusion criteria, data associated to 2 individuals from experimental group and 1 individual from control group were not included in the final analysis and ultimately, data associated to 29 individuals from experimental group (14) and control group (15) were statistically analyzed. It is important to mention that all the intervention sessions and interviews based on the implementation questionnaires were conducted by the first author. At the end of the study, some of the subjects from the control group voluntarily participated in this treatment procedure. The summary of the sessions has been discussed below.

Content of Therapeutic Intervention (Barlow et al., 2011)

Session 1	Motivation Enhancement: Intervention structure, process, and model were introduced in this session. Also intervention logic and purpose (in order to increase the rate of participation and maintain the individual's motivation for treatment engagement) were presented.
Session 2	Psycho-education: This session included psycho-education around the nature and function of emotions
Session 3	Emotional awareness training: This session was held to increase non-judgmental, present-focused awareness of their emotional experiences and to learn observing emotional experiences (emotions and responses to emotions), especially using mindfulness techniques.

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Session 4	Correction of cognitive appraisals: Reciprocal influence between thoughts and emotions, identification of automatic maladaptive appraisals, and common thinking traps and cognitive reappraisal and increasing flexibility were addressed in this session.
Session 5	Identifying patterns of emotion avoidance: Concept of emotion avoidance and types of emotion avoidance strategies and their effects on emotional experiences and also awareness about paradoxical effects of emotion avoidance were described.
Session 6	Examining Emotion-Driven Behaviors (EDBs): Getting familiar and identifying Emotion-Driven Behaviors and understanding their effect on emotional experiences, identifying maladaptive EDBs, and creating inconsistent behaviors and emotional exposure were examined in this session.
Session 7&8	Interceptive and situation-based emotional exposures: These sessions focused on awareness and tolerance of physical sensations, exposure to both internal (including physical sensations) and external emotional triggers and helping individuals increase their tolerance of emotions and create new contextual learning. At the end, in order to relapse prevention, individuals were encouraged to use therapeutic technics to improve progression in reaching short-term and long-term goals.

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Instruments

Social Phobia Inventory (SPIN)

This questionnaire is a self-rating tool that includes 17 items, consisted of three sub-scales of fear (6 items), avoidance (7 items), and physiologic arousal (4 items). Every item of this questionnaire is scored according to Likert's 5-degree scale "not at all=0, a little bit=1, somewhat=2, very much=3, extremely=4". Reliability of this questionnaire through test-retest method in groups with SAD diagnosis has been ranging from .78 to .89 and the internal consistency with alpha coefficient in a group of normal individuals for the whole scale is .94, and .89, .91, and .8 for sub-scales of fear, avoidance, and physiologic arousal respectively (Connor et al., 2000). Validity and reliability of this questionnaire were calculated for a non-clinical sample in Iran. Alpha coefficient of the said questionnaire was .94 for the whole scale, and .94, .93, and .93 for factors of phobia, complaint, and avoidance respectively (Hassanvand Amouzadeh, 2014). Besides, reliability of the said questionnaire was calculated by Cronbach's Alpha method in the present study, where the result was .71.

Structured Clinical Interview for DSM-IV Disorders (SCID)

SCID is a structured interview used to fulfill research and medical needs in diagnosing mental disorders of axis I and II in DSM (First, Spitzer, Gibbon & Williams, 1997). SCID-I is administrated in a single session and its completion takes about 45 to 90 minutes. Reliability and feasibility of the Persian version of this diagnostic tool were already determined to be fair to good for most diagnostic categories (kappa>.6) (Sharifi et al., 2004). SCID-II was also compiled to diagnose personality disorders. It contains 119 yes/no questions and its completion takes less than

20 minutes. The content validity of the Persian version has been approved by a number of psychological professors (Zargar et al., 2012) and its reliability through test-retest with a one week interval was .87 (Fava et al., 2005).

Behavioral Activation and Inhibition Systems Scale (BAS/BIS)

This scale is a self-reporting tool designed by Carver & White (1994), and consisted of 24 items. The BIS includes 7 items, and BAS includes 13 (reward responsiveness, 5 items; drive, 4 items; and fun seeking, 4 items). 4 items also include trick questions. Scoring of this scale based on Likert's scoring method ranges from "*disagree strongly*" (1) to "*agree strongly*" (4) where higher scores show higher sensitivities. Carver and White (1994) have reported internal stability of BIS scale to be .74 and .73, .76, and .66 respectively, for sub-scales of BAS. Mohammadi (2008) reports psychometric features of Persian version of this scale in Iran to be desirable among students in Shiraz city. In his study, reliability was reported as being .68 for BAS through test-retest method, and .71 for BIS. Also, in the present study, reliability of the scale was calculated to be .54 and .66 for BAS and BIS respectively, using Cronbach's alpha formula.

Anxiety Sensitivity Index-Revised (ASI-R)

The early questionnaire of anxiety sensitivity was designed by Reiss, Peterson, Gursky, and McNally (1986) and included 16 items and 3 sub-scales. Taylor and Cox (1998) catered for the revised form of this tool, substituting its irrelevant, ambiguous, and unintelligible questions with more suitable ones, increasing the size of the questionnaire from 3 to 4 dimensions and its items from 16 to 36. After psychometric features of this tool in Iran

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were examined, items 5, 11, 12, 25, 30, 31 were excluded from the analysis due to their incongruity with factors thereby included (Moradimanesh, Mirjafari, Goodarzi, & Mohammadi, 2007). Hence, the short form of ASI-R including 30 items was used in the present study. This questionnaire includes 4 sub-scales of fear of cardiac-vascular-gastric-intestinal symptoms, fear of respiratory symptoms, fear of publicly observable anxiety reactions and fear of lack of cognitive control, scored respectively from 0 "*very little*" to 4 "*very much*" based on Likert's scale. Reliability of this tool was calculated based on internal consistency, test-retest and split half methods, where validity coefficients of .93, .95, and .97 were calculated respectively for the main scale (Moradimanesh et al., 2007). Also in this research, reliability of the tool was calculated through Cronbach's alpha to be .89 for the main scale.

Results

Table 2 shows the mean and standard deviation of the brain-behavioral systems (BAS/BIS) and anxiety sensitivity (AS) in experimental and control groups at pretest and posttest stage.

To make sure that data of this study fulfill assumptions of covariance analysis, data related to the hypotheses were examined before being analyzed. Leven test was used to examine homogeneity of the variable's variance. Results of this test are shown in Table 3. These results confirm the assumption of homogeneity of variances.

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Table 2

Mean and Standard Deviation of BAS/BIS and AS

Variable	Group		Pre-test		Post-test	
		N	M	SD	M	SD
BIS	experimental	14	21.43	2.28	15.78	2.15
	control	15	20.4	1.92	20.26	2.12
BAS	experimental	14	37	3.3	43.57	2.98
	control	15	37.53	4.95	37.93	4.89
AS	experimental	14	33.71	9.91	20.35	9.36
	control	15	35.53	11.72	35.86	11.68

Table 3

Levene's Test of Equality of Error Variances

Variable	F	df1	df2	Sig.
BIS	.94	1	27	.34
BAS	2.11	1	27	.16
AS	.34	1	27	.56

Also, the assumption of homogeneity of regression slopes is a key factor in covariance. In this study, equality existed between covariate variables (BAS/BIS and AS pretests) and dependent variables (BAS/BIS and AS posttests) at all factor levels (experimental and control groups). Moreover, an insignificant interaction was observed between dependent and covariate variables. Therefore the assumption of homogeneity of regression gradient was also approved. Results of this test are shown in Table 4.

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Table 4
Results of Homogeneity of Regression Slopes

Source	F	Sig
group ×BIS	.90	.42
group ×BAS	.21	.81
group × AS	.08	.92

Table 5 shows the results of multivariate analysis of covariance (MANCOVA) on posttest scores along with controlling pretests of dependent variables of the study (BAS/BIS and AS).

Table 5
Multivariate Analysis of Covariance (MANCOVA)

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Statistical Power
Pillai's trace	.94	134.11	3	22	.0001	.95	1
Wilks' lambda	.05	134.11	3	22	.0001	.95	1
Hotelling's trace	18.28	134.11	3	22	.0001	.95	1
Roy's largest root	18.28	134.11	3	22	.0001	.95	1

Contents of Table 5 shows, there is a significant difference between experimental and control groups in terms of at least one dependent variables. One-way analysis of covariance in

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MANCOVA text on dependent variables (BAS/BIS and AS) was made to examine the point of difference. Results of this analysis are shown in Table 5.

Table 6
One-way Analysis of Covariance in MANCOVA Text

Dependent Variable	Sum of Squares	df.	Mean Square	F	Sig.	Partial Eta Squared
BIS	193.41	1	193.41	229.73	.0001	.90
BAS	250.01	1	250.01	148.36	.0001	.86
AS	1282.16	1	1282.16	47.83	.0001	.66

Results shown in Table 6 show that One-way analysis of covariance in BIS (F=229.73 and P=.0001), BAS (F=148.36 and P=.0001) and AS variables (F=47.83 and P=.0001) are significant. To understand circumstances of this difference, we would need to compare the adjusted mean in experimental and control groups in terms of the said dependent variables.

Table 7
Adjusted Means of BAS/BIS and AS

Dependent Variable	Experimental	Control
BIS	15.273	20.745
BAS	43.873	37.652
AS	21.093	35.180

Contents of Table 7 show that adjusted mean scores of BIS and AS of experimental group in posttest have reduced compared to control group. Also, adjusted mean scores of BAS of

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experimental group in posttest have increased compared to control group.

Discussion

The results on effectiveness of the unified transdiagnostic intervention on BAS/BIS showed that it leads to the reduction of BIS and increase of BAS in the patients as compared to the control group participants. The findings of this study are in line with those of Abdi et al. (2013). They showed that the unified transdiagnostic intervention has enough efficiency in the simultaneous reduction of transdiagnostic causing factors and the symptoms related to emotional disorders. Since Gray model was proposed, researchers have raised the assumption that BAS/BIS abnormal sensitivity shows readiness and potency in different types of mental traumas (Fowles, 1993; Meyer, Johnson & Winters, 2001) .For example, BAS sensitivity causes recalling of positive emotions, and acute BAS sensitivity is implicated in bipolar disorder and predicting increased impulsivity and mania, and acute levels of BIS sensitivity are associated with increased risk for anxiety and depressive disorders (Reese, Zielinski, & Veilleux, 2015) and being related with social anxiety (Panayiotou, Karekla, & Panayiotou, 2014; Hasanvand Amouzadeh and Roshan Chesly, 2013). According to Clark & Wells (1995), individuals with social anxiety shift their attention to themselves, using self-care and extensive self-observation, when facing social threats. Studies based on brain radiographic methods (such as Tillfors, Furmark, Marteinsdottir, & Fredrikson, 2002) show that the activity of brain regions related to BIS is higher among individuals with social anxiety. Also, the blood pressure near these regions increase under threatening social situations. Social anxiety creates numerous problems to the

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patients by limiting their abilities. These patients assess their own performance under social situations more negatively than non-anxious individuals and deem their social skills to be improper for reaching social goals and standards. They try to avoid situations where they might be assessed by others and where they might reveal anxiety symptoms, even when there is a difference in their real function (Davison, Neale, & Kring, 2004). Therefore, one of their most prominent characteristics is avoidance, which takes place in a passive way against challenging events and new situations, causing continued fear of social situations. In a study conducted on neural predictors and cognitive behavior-therapy mechanisms of processing threats in social anxiety disorder, Klumpp, Fitzgerald, & Phan (2013) showed that utilizing this method (CBT) leads to the decline in signals and changes of the brain functions of individuals with social anxiety. Also, Abdi et al. (2013) pointed out that the effects of confrontation, in addition to the existence of brain-neural bases in this factor, justifies effectiveness of UP on the changes in BIS activity scores. Indeed, numerous confrontations with fearsome situations without utilizing any type of immune or avoiding behavior is one of the most effective methods of overcoming social anxiety (Hofmann and Otto, 2008). This is used as a therapeutic strategy in treating UP, where the patients learn to eliminate their tendency to avoid with the help of the confrontation processes, after they identify those behaviors. Also, results of the study conducted by Asghari et al. (2015) showed that repeated confrontation breaks the vicious circle of social anxiety and leads to triggering of BIS. There are also a few evidences concordantly showing that individuals with social anxiety have social skills deficient (Hofmann & Otto, 2008) and they consider their social skills to be insufficient to reach their goals. In transdiagnostic

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intervention, individuals receive help to change their negative beliefs by paying attention to alternative interpretations and examining evidences that help in denying these automatic negative thoughts. They are also assisted in getting rid of rigid thinking patterns involving the past and future by training mindfulness, non-judgmental, and present focused emotional awareness to facilitate exploration of their thoughts and emotions. In addition to helping individuals stop considering themselves as victims of inner and outer threats, this process leads to the improvement of brain-behavioral systems.

The results of this study showed that the unified transdiagnostic treatment reduces AS. The observations of this study are in line with those conducted by Boswell et al. (2013) and Sauer-Zavala et al. (2012). To clarify this finding, one may say that, according to a number of researchers, what makes AS move in the direction of anxiety somehow depends on how individuals screen and manage physical, cognitive, and behavioral symptoms of their anxiety (Fardaeni Sofla, Karsazi, Imami Ezzat, & Bakhsipour Roudsari, 2015). Increasing reaction towards physiological sensations is among the many characteristics of anxiety disorders, which often leads to the utilization of incompatible strategies to reduce such emotions. One of the cognitive-behavioral strategies that targets sensitivity of the physical sensations of anxiety is interceptive exposure, which includes repeated arousal of physiological sensations related to anxiety and fear in order to increase endurance and decrease the anxiety related to these symptoms (Craske & Barlow, 2007). In UP, patients learn to recognize thoughts and behaviors as a part of emotional reaction and understand how physiological sensations can be involved in these emotions. It has also been emphasized that the way of thinking and experiencing

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physiological sensations may help their emotional response. One of the main skills in this treatment is to increase awareness and tolerance of physical sensations during interceptive exposure, where patients are asked to do exercises aimed at arousing their physical sensations that are similar to those experienced by the patient when anxious. By doing these exercises, individuals understand the role of physical sensations in their thoughts and behaviors, and their reciprocal effect on physical sensations. Subsequently, through interceptive confrontations they increase their tolerance of these feelings (Barlow et al., 2011). The results of studies carried out by Boswell et al. (2013) also indicate that interceptive exposure method, as one of the main skills of UP, is a useful therapeutic strategy for a wide range of anxiety disorders, including anxiety sensitivity.

It should be noted that as this study was conducted on undergraduate students, therefore generalization of its results to the students of other education systems must be handled with care. Also, this study has only been conducted on women, and therefore, enough care must be paid in generalizing the results for men as well. Moreover, other limitations of this study was the lack of a follow-up stage and placebo group.

Finally, it is recommended for future studies to examine this intervention on different samples such as children and elderly and in different levels such as school and families.

Regarding that the sample of the present study included only women, it is recommended to make future studies on men too. It is also recommended to use this method more aiming at preventing formation of emotional disorders.

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