Original Article

Investigation of the relationship between type D personality and sensitivity to reinforcement and latent anxiety

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Abstract

Introduction: Gray has provided a bio-ecological model of the character and personality based on brain-behavioral system, which constitutes basis for individual variants, and activities of each of them leads to different emotional responses, such as anxiety and other emotional states. The present study aimed to investigate the relationship between type D personality and sensitivity to reinforcement and latent anxiety in students with type D personality.

Materials and Methods: For this purpose, 600 students (240 boys and 360 girls) from various faculties of Persian Gulf University who were studying in 2013-2014 academic year, were selected randomly using cluster sampling stage, completed type D personality scale, Jackson sensitivity to reinforcement (2009) and Spielberger Anxiety Inventories (1970). After screening, 111 patients were identified as type D personality, and finally, statistical data were analyzed through regression analysis.

Results: The results obtained from regression analysis showed that type D personality has positive and significant relationship with variables of behavioral inhibition system and fight-flight and freeze system, and had negative significant correlation with behavioral activation system. Also, regression analysis results showed that type D personality had a positive and significant associated with latent anxiety in students.

Conclusion: According to the findings, determining the exact position of type D personality in personality systems which are based on bio-behavioral model, increase our understanding of mechanisms underlying properties of type D personality, emotions and emotional response.

Keywords: Anxiety, Screening Sensitivity, Type D personality.

Introduction

Personality includes structures and processes underlying experience and individual behavior, and every person due to his/her character structure shows special behavior and emotion when faced with major life events. Character and personality characteristics can affect the relationship between mental health and stress, so that in recent years special attention has been paid to the role of type D personality, more than other personality constructs, in moderating the relationship between stress and health (1).

Type D personality is a new construct, which is characterized by two general personality traits: negative affect (NA), and social inhibition (SI) (2). Negative affect refers to tendency of individuals to experience unpleasant affects and emotions, and has a significant role in creating and developing long-term negative consequences**,** while social inhibition notes to inhibition of the expression of negative emotions in social interactions because of fear of rejection. People with this personality type, are more likely to experience negative emotions, and expression of these negative emotions in social interactions are mainly inhibited. These personality characteristics are stable, and in the long run lead to chronic emotional stress and decrease mental health. Unlike depression and anxiety that are periodically changed over time, these properties are largely stable (3).

Negative emotions are also associated with experiencing negative affect (4), negative self-evaluating, and hypersensitivity to contradictory and damaging stimuli (5). Once exposed to stressful events, people with high levels of negative emotion react more severely than others (6). Research suggests that emotion regulation strategies play an important role in coping with stressful events and coping after that (7). An emotional, maladjusted strategy, which increases the intensity of negative affective experience in individuals with type D personality, is social inhibition (SI), which makes person to failed in dealing with stressful events and situations (8), because it is the constant factor in the inhibition of negative emotion in social interaction, even though there is an urgent need to support and help others (9-11). So, one of the most important risks that threats people with type D personality is higher levels of perceived stress associated with health risks, loneliness and lack of emotional support (12). Loneliness of people with type D personality can show itself at home, school, workplace and community as social isolation or emotional loneliness (10).

Type D personality has been mentioned as a factor affecting health decline, and subsequent death of patients in cardiovascular disease (11). There is also evidence that shows type D personality negatively affects on life quality of cardiovascular patients and their emotional well-being (12). Distressed personality (type D) principally is used for identification of heart patients who are at risk of extreme vulnerability or that have had emotional and interpersonal problems (13). So, persons with type D personality experience negative emotions, such as anger, frustration and fear, without willing to share them, and express their words in their interactions (14). Type D personality has a detrimental effect on mental health. Also, people with type D personality see their around world as risky, and therefore communicate less with other people, and use more emotional and avoidance strategies (15). Then, regarding what was previously considered, it should be noted that in many researches about health and cardiovascular diseases has been focused on type D personality.

Type D personality, with factors such as lack of social support, job boredom, and other psychosocial factors can affect the severity of cardiovascular disease (16). Type D personality has positive and significant relationship with emotional disorders such as PTSD, anxiety (16), social isolation and loss of daily function and activity, depression and sadness symptoms in elderly people with cardiovascular and chronic diseases (17). Social loneliness (18), low quality of social support received from family and close friends (19), increased anxiety, and depression.

According to Gray (1994), the brain-behavioral systems are key factors in the individual variants and calling positive or negative emotional response in people. Accordingly, Gray has provided a biological model of personality and personality-based system based on three brain-behavioral patterns, which constitute the basis of personal differences, and their activity that calls different emotional reactions such as anxiety (20). Thus, several researches try to explain type D personality and its effects by brain and behavioral systems. On this basis, we can find more information about neuropsychological mechanisms of type D personality by examining its precise positioning in personality systems which designed mainly based on bio-behavioral foundation (21).

Gray (1987) has introduced a three brain-behavioral system to explain personality and individual differences, which has provided basis for other researches. Thus, one of the most

important areas of focus in recent years, and underlying behavioral tendencies, emotional and stable personality traits, is emotional system, or in the other word, sensitivity to reinforcement. So, neuro-developmental theory discussed in this context, is Reinforcement Sensitivity Theory (22). Based on this theory, there are three important brain-behavioral systems, which considered as activator and inhibitor of high-risk behaviors and emotions, particularly, risky behaviors and emotions: (1) behavior activation system (BAS), (2) behavior inhibition system (BIS), (3) fight- flight and freeze system (FFFS). According to what was said about the role of the brain-behavioral system in outbreak of emotional behavior and negative affect, and also due to the fact that type D personality has two main components that play an important role in development of negative affect and behavioral inhibition, and the importance of research results, the present study was conducted to investigate the following research questions:

(1) Does type D personality can have significant positive correlation with components of sensitivity to reinforcement?

(2) How can type D personality be a significant positive predictor of students' anxiety?

Materials and Methods

The study was a descriptive and correlational, which was administered to determine the relationship between personality type D, sensitivity to reinforcement and trait anxiety.

The study sample was Persian Gulf University students who were studying in 2013-14 academic year. After determining the final cluster, researcher referred to class with permission of the faculty and coordination with master and after providing a general description of study asks students to complete the questionnaires. In order to overcome the limitation of being able to conduct research in two stages, due to the lack of cooperation of teachers and students (distribution of type D personality questionnaire and then distribution of reinforcement sensitivity and trait anxiety questionnaire in individuals screened for type D), samples with high volume were studied.

In order to investigate questions of this study, 600 students (360 females and 240 males) of Persian Gulf University selected through stage random cluster sampling. Thus, from various faculties (Faculties of humanities, basic sciences and engineering) 3 fields selected randomly, and then three entries from any discipline and a class from any entries was selected as the final cluster. All students participating in the study filled out type D personality, sensitivity to reinforcement and trait anxiety questionnaires, finally because the samples were non-clinical, after screening, the questionnaires completed by the participants, 111 students were diagnosed as type D personality. Then data were analyzed through SPSS software version 21. The mean age of the samples is 21.35 ± 3.25 years. Table 1 shows the distribution of subjects diagnosed as type D personality after screening.

Table 1. Distribution of subjects

Gender	Management	Psychology	Accounting	Chemistry engineering	Electrical engineering	Electrical engineering	Statistics	Biology	Physics	Total
Girl	6	7	8	10	6	11	11	1	4	63
Boy	4	1	10	5	4	8	4	3	8	48
Total	10	8	18	15	10	19	15	4	12	111

Research instrument

A) Type D Personality Questionnaire: This 22-items scale consists of five factors that include: depression, anxiety, anger, irritability, social constraints and verbal retention. The regression

coefficient of type D personality scale with Donellet type D scale was 0.95, with the General Health Questionnaire (GHQ) was 0.55, and with Gallas sub-scale of negative social interaction

questionnaire was 0.52. These findings show that the validity of this scale is quite acceptable (23). About the reliability of the made scale, Cronbach's alpha, test-retest and split-half were used, and the correlation coefficients were 0.85, 0.92 and 0.74 respectively (24).

B) Jackson Sensitivity to Reinforcement (2009): This questionnaire provides a scale for appropriate measuring of revised reinforcement sensitivity theory. The questionnaire consists of 30 items, and for each subscale there are six items, and it has been regulated on the basis of Likert scale (1= strongly disagree, 2= disagree, 3= no idea (neutral), 4= agree, 5= strongly agree). Jackson questionnaire consists of five subscales (behavioral activation, behavioral inhibition, fight, flight and freezing). Jackson, in a study of 972 participants through exploratory and confirmatory factor analysis indicated that the questionnaire's internal consistency and construct validity is favorable. In that research, internal consistency by Cranach's alpha was 0.70. The internal consistency of this questionnaire, after its normalization in Iran (25), with Cronbach's alpha was 0.67, indicating good internal validity of this tool in the Iranian population.

C) Spielberger Anxiety Inventory (STAI): This questionnaire was developed by Spielberger (1970), and has 40 statements that 20 words measure state anxiety, and 20 words measure trait anxiety. Mahram made a research in Mashhad in 1993 for standardization of the STAI test. He examined alpha coefficient between normal and criterion groups, separately.

The reliability for the normal group (600 patients), the Trait Anxiety scale, based on Cronbach's alpha were 0.90 and 0.90 respectively, and in the control group (N= 130) was equal to 0.94. In addition, the reliability of the test, was calculated through the ratio of true score variance to observed variance, and its value in the normal group was 0.945. Standard error of measurement was equal to 64.4. The observed correlation between true score, and the scores of error was calculated as 0.234 and 0.972, respectively. In addition, the study has concurrent validity. For calculating validity, proportion with criteria of sample size (130 anxious individuals by psychiatrist diagnosis), 130 subjects (with respect of gender, age groups of members) were randomly selected. Then, to study the validity of the test, means of trait anxiety and state anxiety, and finally sum of two anxieties' means separately calculated in two levels of 0.95 and 0.99, and significance were 95% and 99%. Normative criteria, the separation of different occupations and qualifications in the areas of state anxiety, and trait anxiety are other results of this research (26). For all tests, the reliabilities have been reported 0.94. The validity has been confirmed by concurrent criterion validity method (27).

Results

For familiarity with descriptive information of this research, variables' means and standard deviations have been studied. Table 2 shows research descriptive information.

Table 2. Descriptive statistics of means and standard deviation of variables

Variables	Mean	Standard deviation	Minimum	Maximum	N
Type D	44.29	7.35	28	83	111
Behavioral activation	16.65	6.44	6	30	111
Behavioral inhibition	18.08	6.99	6	30	111
Freeze	21.87	2.81	11	26	111
Flight	18.50	1.87	24	13	111
Fight	30.17	3.48	51	13	111
Trait anxiety	52.26	8.91	42	77	111

Simple regression was used for investigating type D role, in predicting sensitivity to reinforcement variable, analysis results are presented in tables 3, 4, and 5.

Table 3. The results of type D regression analysis on behavioral activation system (BAS)

Model	Sum of squares	Freedom level	Square means	F	Significance level	R	R²	Standard error
Regression	621.868	1	621.864	17.18	0.001	0.37	0.13	6.01
The remaining	3943.721	109	36.181					

Independent variable	Non-standard coefficient		Standard coefficient		
	B	Std. Error	β	t	Sig
Type D personality	-0.32	0.07	-0.36	-4.14	0.001

As seen in Table 3, type D personality predicts behavioral activation system in students, negatively and significantly (β= -0.36, *P*<0.001).

Table 4. The results of regression analysis of variables of type D personality on behavioral inhibition system (BIS)

Model	Sum of squares	Freedom level	Square means	F	Significance level	R	R²	Standard error
Regression	1135.821	1	1135.821	29.21	0.001	0.46	0.21	6.24
The remaining variables	4237.278	109	38.874					

Independent variable	Non-standard coefficient		Standard coefficient		
	B	Std. Error	β	t	Sig
Type D personality	0.43	0.08	0.46	5.40	0.001

As seen in Table 3, type D personality predicts behavioral inhibition system in students, positively and significantly (β= 0.46, *P*<0.001).

Table 5. The results of regression analysis on variables of type D personality on fight, flight, and freeze system (FFFS)

Model	Sum of squares	Freedom level	Square means	F	Significance level	R	R²	Standard error
regression	137.544	1	137.544	6.07	0.005	0.23	0.05	4.07
The remaining	2469.826	109	22.659					

Independent variable	Non-standard coefficient		Standard coefficient		
	B	Std. Error	β	t	Sig
Type D personality	0.15	0.06	0.23	2.46	0.005

As seen in Table 5, type D personality predicts behavioral inhibition system, positively and significantly in students (β= 0.23, *P*<0.005).

Table 6. The results of type D personality regression analysis on trait anxiety variable

Model	Sum of squares	Freedom level	Square means	F	Significance level	R	R^2	Standard error
Regression	476.715	1	476.715	6.25	0.005	0.23	0.05	8.72
The remaining variable	8230.639	108	76.210					
	B		Std. Error		β		t	
Type D personality	0.28		0.11		0.23		2.50	0.005

As seen in Table 6, regression analysis results show that type D personality predicts trait anxiety in students, positively and significantly (β= 0.23, *P*<0.005).

Discussion

As stated in the introduction, this study aimed to investigate the relationship between type D personality and sensitivity to reinforcement and trait anxiety. In other words, this study aims to answer two important research questions: The first research question was, whether type D personality can have a significant positive correlation with variable components of sensitivity to reinforcement in students, how? There is also the question of whether type D personality can be a predictor of trait anxiety in students? In relation to the first research question about the role of type D personality variable on related behavioral activation system (BAS), regression results showed that type D personality is a negative and significant predictor of students' behavioral activation system. The results of this study are consistent with Harting and Mosbrogr findings (28), that in their study showed behavioral activation system has negative relationship with neurosis and negative affect (one of the two structural characteristics of individuals with type D), and are inconsistent with previous findings (24), that in their study showed type D personality didn't significantly decrease behavioral activation system activity. In explaining the present findings that there is negative relationship between type D personality and behavioral activation system can be also said that based on RST theory, BAS is a brain motivational system, and its role is stimulation of behaviors in response to pleasant conditional and non-conditional stimuli, and this system has a role in experiencing positive emotions, and has converse relationship with negative emotions (16). On the other hand, type D personality decreases positive emotions, and results in social inhibition, and people with type D personality are prohibited from positive and enjoyable behaviors and activities (23). Generally, we should study negative relationship between type D personality and behavioral activation system or in the other word reward system and positive emotions in type D personality trait. On this basis, two main components of type D personality, negative affect (NA) and social inhibition (SI) are determinants of individuals' behaviors and activities.

Negative affect refers to individual's tendency for experiencing negative impressions, such as anger, anxiety, worry, and unpleasant emotions in different situations, also social inhibition refers to individuals' tendency in avoidance of negative emotions. Behavioral activation system unlike these two components of type D personality, in one hand is defined as a system of experiencing positive emotions and encouragement (23), and in the other hand this system can be responsible for responses and behaviors, and showing negative emotions (12,21).

Behavioral activation system basically can be considered as a stable personality trait (22). So, we can say negative relationship between behavioral activation system, which is essentially based on reward (26), and type D personality, which is recognized by two components of negative affect and social inhibition (14), is explainable and justifiable.

Regarding the second research question about the role of type D personality in predicting

behavioral inhibition system, regression analysis results showed that type D predicts behavioral inhibition system in students, positively and significantly. This research findings are consistent with Mosbrogr and Harting findings (16,21), that showed BIS activity is positively associated with negative affect and neurosis, and also with findings of Zoljanaee and Vafaee (2,6) findings, that showed type D personality is associated with increased activity of BIS. In explaining these findings we can say that over-activity of parietal-hippocampal system or considering environmental stimuli as threatening, concludes in dominant behaviors inhibition, and replacement of risk evaluating and increased associations, and situation negative evaluating.

Also we can say that activity of behavioral inhibition system results in state anxiety and behavior inhibition, passive avoidance and extinction (25). Individuals with type D personality have a sense of insecurity in communicating with others, less talking, lack of energy, lack of tendency to communicate with others, anxiety in social interactions, lack of social attraction results in using avoidance strategies, and this can intensify the effect of negative emotion experience. In fact, social isolation, and experiencing negative emotions, are reflections of individual differences in behavioral inhibition system (BIS), and along with this system, negative affects result in more vulnerability (18).

Also, in relation to the other research questions about the relationship between type D personality and fight, flight and freeze, regression analysis results show that there is positive and significant relationship. Research findings are consistent with findings of Wilson Vengi (22), that mentioned in his research the positive and significant relationship between negative emotion and neurosis and fight- flight freeze. In explaining these findings we can say that individuals with type D personality tend to experience emotions such as anger, hate and inhibition, and they use avoidance strategies because of high levels of perceived threat of environment (26).

However, in relation to the other research questions about relationship between type D personality and trait anxiety, regression analysis

showes that type D has positive and significant relationship with trait anxiety. In explaining these findings we can say two components of negative affect and social inhibition have main role in experiencing negative emotions such as worry, anger, and anxiety. According to negative affect component, people with type D personality tend to experience unpleasant and negative emotions, such as anxiety and anger, and on the basis of social inhibition, these people do not express their negative emotions and feelings (15). So, it can be inferred that despite people with type D personality experience negative emotions such as anxiety, at the same time they refrain from expressing these emotions, and in fact digest their anxiety, and sadness, and somehow they suppress them negatively. Also regarding that type D personality is associated with increased behavioral inhibition system activity (11,16), we can say that this system activities would call the emotional state of anxiety and experiencing unpleasant emotions (11,17,21).

Therefore, it is possible that this system involves in increasing trait anxiety, and not expressing negative emotions in people with type D personality. One of the most important limitations of this research is that because the studied population has been non-clinical, we should be cautious about generalizing research findings to large population, specifically clinical groups.

It is suggested that in line with previous researches about main effects of type D personality on quality of life and mental health in clinical samples as well as in line with the purpose of the present study, future researches focus on examining the relationship between sensitivity to reinforcement, type D personality and trait anxiety in other nonclinical samples (including the elderly, etc.) by screening, and also in clinical samples such as cardiovascular disease, cancer, anxiety disorders, and mood.

Conclusion

According to research findings, determining the exact position of type D personality in personality systems which are based on bio-behavioral model, increase our understanding of mechanisms underlying properties of type D personality, emotions and emotional response.

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