Original Article

Relationship between behavioral brain system activity and anxiety sensitivity with mediating role of personality traits

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Abstract

Introduction: Anxiety as a part of modern human life is present in all people at a moderate level and is considered an adaptive response to environmental stimuli. The present study aimed to assess the relationship between behavioral brain system activity and anxiety sensitivity with mediating role of personality traits.

Materials and Methods: The study population consists of all students of Zahedan universities (2020-2021). Among them, 371 students from associate to doctorate levels were selected by non-random and purposeful sampling. They fulfilled Jackson Five Factors Questionnaire, Reiss et al. Anxiety Sensitivity Index (ASI), and Personality Traits Questionnaire (NEO-FFI). The data were analyzed by AMOS statistical program and SPSS 22 version.

Results: The fight-flight-freezing system negatively and significantly predicts anxiety sensitivity ($P< 0.001$, $\beta= -0.43$). At the same time, the behavioral activation and inhibition systems do not significantly predict anxiety sensitivity ($P> 0.05$). Among the predictor variables, neuroticism ($P< 0.001$, $\beta= 0.417$) and conscientiousness ($P< 0.05$, $\beta= 0.117$) positively and agreeableness negatively ($P< 0.05$, $\beta= -0.133$) predict anxiety sensitivity. In contrast, extraversion and openness to experience do not predict anxiety sensitivity ($P> 0.05$). The results show that the overall effect of the behavioral activation system on anxiety sensitivity is not significant.

Conclusion: The findings revealed that personality traits in all five dimensions and behavioral brain systems in some components can predict anxiety sensitivity levels in individuals.

Keywords: Anxiety sensitivity, Behavioral brain systems, Personality traits

Introduction

Anxiety is a middle part of modern human life and is considered an adaptive response to environmental stimuli (1). Anxiety sensitivity is a cognitive variable of individual differences caused by fear of emotional feelings (2,3).

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Anxiety sensitivity causes a variety of cognitive biases about threatening stimuli and increases attention to threatening stimuli (4). Numerous studies have shown that anxiety sensitivity and anxiety in practice have been linked to personality traits (5). This conclusion is consistent with Eysenck's early assumptions that distressed individuals have more grounds for exacerbating their negative experiences of anxiety symptoms (6,7). Therefore, it seems that the nature of anxiety alone is not a sufficient trigger for anxiety (8). Instead, other variables such as the behavioral brain system and personality traits of individuals make some people sensitive to anxiety. The results of a study showed that anxiety and neuroticism significantly predict symptoms of generalized anxiety disorder, obsessive-compulsive disorder, and depression (9). These findings supported the previous studies (10-14).

Lotfi et al. also showed that personality traits such as neuroticism, negative mood, depression, social inhibition, and psychological disturbances could account for up to 70% of anxiety and its consequences (15). Considering the theory of reinforcement to sensitivity is one of the theories of personality strongly related to physiology and individual differences, and the dimensions of this theory represent brain structures. There are endocrine hormones that individual differences in how these systems work and their interactions create the mood of individuals (16-19). Anxiety is an ancient subject, and even the ancient Egyptians and medieval writers considered the existence of anxiety as one of the primary conditions of human life (20). Moreover, according to a recent study by the World Health Organization (WHO), the cost of depression and anxiety disorders in the lost productivity of the global economy is $ 1 trillion each year (21).

Moreover, because research has shown that anxiety is influenced by the brain and neurological factors, personality (22,23), behavioral brain systems, and personality traits are among the psychological components that play an essential role in the development of anxiety and anxiety sensitivity (24). Therefore, the present study is based on the research background and high prevalence of anxiety in the current society, especially in the recent year, aimed to investigate the relationship between behavioral brain system activity and anxiety sensitivity with mediating role of personality traits.

Materials and Methods

This correlational research had a structural equation modeling approach. The statistical population consisted all students of Zahedan universities in 2021-2020. Among them, 371 students of different levels from associate to doctorate were selected by non-random and purposeful sampling method. The sample size was determined based on Multivariate regression analysis and the structural equation modeling (25). Inclusion criteria included not having psychiatric or specific physical disorder, not having addiction to alcohol or any other substance, aged 20-45 years, and being student in associate, or higher degrees. Exclusion criteria included having hypertension or history of cardiovascular diseases, surgery in the last three months and being pregnant based on the self-declaration of individuals.

After obtaining the necessary permits to conduct research, including university approval and the code of ethics, the subjects were selected according to the inclusion criteria. Of course, it should be noted that all the ethical aspects of the research were first explained to the participants, and they participated in this intervention with satisfaction and awareness. Then they fulfilled the questionnaires and the data were analyzed by AMOS statistical program and SPSS 22 version.

Research instruments

A) Jackson Five-Factor Questionnaire: The Persian version of the Jackson Five-Factor Questionnaire was used to assess behavioral brain systems in the present study. This questionnaire has 30 items and measures five subscales. Jackson (2009) developed it for proper r-RST measurement. This questionnaire includes five subscales of the Behavioral Activation System (BAS), Behavioral Inhibition System (BIS), Fight, Flight, and Freezing. For each subscale, r-RST material is considered. Jackson calculated its reliability by Cronbach's alpha method for each of these systems, which is as follows: Behavioral activation system, 0.83 behavioral inhibition system, 0.76 total fight-flight-freezing system (0.74 for each one of the subsystems are 0.78; 0.74; 0.70, respectively). Hasani, Salehi,

and Rasouli Azad examined the reliability and validity of the Iranian version of this scale from the perspective of internal consistency, correlation of material sets, retesting, factor analysis, the correlation between subscales. They reported the Cronbach's alpha ranged 0.72 to 0.78 and for total questionnaire 0.28 to 0.68 (26).

B) Anxiety Sensitivity Index (ASI): This 16-item self-report questionnaire was developed by Reiss et al. Each item is scored based on five-point Likert scale. The structure of this questionnaire consists of three factors: fear of physical anxiety (8 items), fear of not having cognitive control (4 items), and fear of being observed anxiety by others (4 items). Its internal consistency was reported 0.80 to 0.90. Its validity in the Iranian population was calculated based on three methods of internal consistency, retesting, and halving. For the whole scale, the coefficients of validity were 0.93, 0.95%, and 0.97, respectively (27).

C) Personality Traits Questionnaire (NEO-FFI): This questionnaire was first introduced by Costa and McCrae in 1985 as the NEO-FFI Personality Questionnaire with 180 questions. Then new forms were designed, which included two long forms of 240 questions and a short form of 60 questions. In this research, a short form has been used, and each question is scored on a five-point Likert scale. Each factor is measured with 12 questions, and some questions are scored in reverse. The range of scores for each of the five personality components is between 12 and 60. The higher score indicate that a person has this type of trait more likely.

The Cronbach's alpha coefficient ranges from 0.73 (for agreeableness) to 0.87 (for neuroticism). Costa and McCrae also reported an alpha coefficient of between 0.68 (for agreeableness) to 0.86 (for neuroticism).

Garoosi Farshi (2001) standardized this questionnaire on 2000 students from medical universities of Tabriz and Shiraz cities and reported the correlation coefficient of the five dimensions 0.56 to 0.87. Cronbach's alpha coefficients of neuroticism, extroversion, openness, agreeableness, and conscientiousness were 0.86, 0.73, 0.56, 0.68, and 0.87, respectively (28).

Results

Of 371 participants in this study, 35 (9.4%) were male, and 336 were female (90.6%). The mean age of the participants was 22.22 ± 5.46 years. The minimum age of the participants was 18 years, and the maximum was 40 years. Moreover, seven doctoral students (1.9%), of which 253 were single (68.2%) and 118 were married (31.8%). Regarding having a job, 318 people only stated that they are students and have no job (85.7%) and 51 people (13.7%) were government employees, and two people (05%) were private-sector employees. Twenty-two participants reported take medication for anxiety and related diseases (5.9%), and 249 people (94.1%) do not take any medication. Regarding the economic situation, two excellent people (05%), 103 people (27.8%) were good, 247 people (6.66%) moderate, and 19 people (5.1%) reported their economic situation as poor.

Table 1. Mean and standard deviation of scores of a behavioral activation system, inhibition system, fight, flight and freezing system

Variable	Frequency	Mean	SD	The highest score	The lowest score
BAS Female	336	13.33	2.89	27	6
Male	35	12.40	2.63	19	7
Total	371	13.24	2.88	27	6
BIS Female	336	11.83	3.57	25	6
Male	35	11.65	3.21	22	7
Total	371	11.81	3.53	25	6
FFFS Female	336	52.28	9.92	78	29
Male	35	57.51	12.04	81	31
Total	371	52.77	10.24	81	29

According to Table 1, the mean scores in the behavior activation and inhibition system are higher in women, and the fight-flight-freezing system is higher in men. According to Table 2, the mean scores of personality traits in women are higher than in men.

Table 2. Mean and standard deviation of personality traits scores

Personality trait	Gender	Frequency	Mean	SD	The highest score	The lowest score
Neuroticism	Female	336	34.53	7.55	55	14
	Male	35	35.57	7.51	56	22
	Total	371	34.63	7.55	56	14
Extroversion	Female	336	40.32	6.73	54	19
	Male	35	40.45	6.34	52	26
	Total	371	33.40	6.86	54	19
Openness to experience	Female	336	38.80	4.18	49	28
	Male	35	37.80	4.99	52	28
	Total	371	38.71	4.27	52	28
Agreeableness	Female	336	40.87	4.32	53	28
	Male	35	40.65	4.22	51	32
	Total	371	40.85	4.30	53	28
Conscientiousness	Female	336	44.54	4.98	55	28
	Male	35	44.48	5.55	53	34
	Total	371	44.53	5.03	55	28

Table 3. Mean and standard deviation of scores of anxiety sensitivity components

	Gender	Frequency	Mean	SD	The highest score	The lowest score
Fear of cardiovascular symptoms	Female	336	14	5.02	30	6
	Male	35	14.74	5.34	28	6
	Total	371	14.07	5.05	30	6
Fear of respiratory symptoms	Female	336	16.98	5.35	35	7
	Male	35	17.82	4.97	29	9
	Total	371	17.06	5.31	35	7
Fear of gastrointestinal symptoms	Female	336	9.88	3.68	20	4
	Male	35	9.28	3.31	17	4
	Total	371	9.82	3.65	20	4
Fear of seeing anxiety by others	Female	336	17.49	6.31	40	8
	Male	35	18.51	7.24	38	8
	Total	371	17.59	6.40	40	8
Fear of neurological symptoms	Female	336	12.31	4.71	30	6
	Male	35	13.80	5.02	25	6
	Total	371	17.45	4.75	30	6
Fear of lack of cognitive control	Female	336	10.51	3.97	25	5
	Male	35	10.68	3.75	21	5
	Total	371	10.53	3.94	25	5

Table 4. Results of multiple regression analysis to predict anxiety sensitivity based on the behavioral brain system

Predictive variable	B	T	Beta	standard error	B	Semi-discriminant correlation coefficient
BIS	0.51	1.14	0.055	0.445	0.51	
BAS	-0.21	-0.566	-0.028	0.374	-0.21	0.059
FFFS	-1.11	-8.875	-0.43	0.125	-1.11	-0.030
Constant	135.79	15.78		8.6	135.79	-0.42

As shown in Table 4. Based on the results of multiple regression analysis among the predictor variables, the war-escape-freezing system negatively and significantly predicts anxiety sensitivity ($P< 0.001$, $\beta= -0.43$). At the same time, the behavioral activation and inhibition systems do not significantly predict anxiety sensitivity ($P> 0.05$).

Table 5. Results of multiple regression analysis to predict anxiety sensitivity based on personality traits

Predictive variable	B	P	T	Beta	standard error	Semi-discriminant correlation coefficient
Neuroticism	1.457	<0.001	6.737	0.417	0.216	0.333
Extroversion	0.108	0.662	0.438	0.027	0.247	0.023
Openness to experience	-0.250	0.392	-0.856	-0.040	0.292	-0.045
Agreeableness	-0.816	0.015	-2.433	-0.133	0.335	-0.126
Conscientiousness	0.615	0.029	2.193	0.117	0.280	0.114
Constant	42.335	<0.001	1.747		24.237	

As can be seen in Table 5, based on the results of multiple regression analysis, among the predictor variables, neuroticism ($P< 0.001$, $\beta= 0.417$) and conscientiousness ($P< 0.05$, $\beta= 0.117$) were positive.

Significance and agreement negatively and significantly ($P< 0.05$, $\beta= -0.133$) predict anxiety sensitivity. In contrast, extroversion and openness to experience do not predict anxiety sensitivity ($P> 0.05$).

Table 6. Results of evaluating the direct and indirect pathways of the behavioral activation system to personality traits

	Route	β	The standard error	P	Confidence level
Total	BAS to anxiety sensitivity	0.124	0.12	0.243	(0.374) (-0.075)
Direct	BAS to anxiety sensitivity	0.125	0.242	0.254	(0.469) (-0.085)
	BAS to personality traits	0.209	0.128	0.060	(0.504) (-0.011)
Indirect	BAS to anxiety sensitivity	-0.001	0.112	0.998	(0.079) (-0.151)

According to the findings of the table above, the results show that the overall effect of the behavioral activation system on anxiety sensitivity is not significant ($P> 0.05$, $\beta= 0.124$). Also, the direct effect of the behavioral activation system on anxiety sensitivity is not significant ($P> 0.05$, $\beta= 0.125$). Thus, personality traits do not mediate the relationship between the activation-behavioral system and anxiety sensitivity.

Discussion

This study aimed to investigate the relationship between the activity of behavioral brain systems and anxiety sensitivity with the mediating role of personality traits. The findings of this study show that the dimensions of the behavioral inhibition system and the system of fight, flight, and freezing have a significant relationship with anxiety sensitivity. However, no significant relationship was found between the activation system and

anxiety sensitivity. It can be said that anxiety sensitivity refers to the fear of anxiety-related emotions and anxiety symptoms, and it is thought that these symptoms have potential social, physical, and psychological consequences. Moreover, it indicates a tendency to be catastrophic about the consequences of such feelings (10).

In a study conducted by Balazadeh et al. in 2020 on 250 patients with asthma, the results showed that the behavioral brain system affected the psychological vulnerability of these patients through anxiety sensitivity and the effects of direct and indirect pathways on 74% of the psychological vulnerability variable. The brain system can explain behavioral and anxiety sensitivity (29). This research finding that the behavioral inhibition system is directly related to the behavioral activation system is negatively related to anxiety sensitivity can also be explained by neuroimaging of the brain, as various studies have confirmed the defect of the brain inhibitory system in people with anxiety sensitivity (9,10,23). Also, Nelson et al., in a study of 50 patients with anxiety disorders, showed that increased activity of the behavioral inhibition system is associated with anxiety, while the activity of the behavioral activation system is associated with relaxation (30). These findings are consistent with the results of the present study. Another explanation is that when people use behavioral activation systems such as reward and reinforcement, they can use effective strategies such as metacognitive, memory, and compensatory strategies to solve the anxiety problem (31).

The results showed a negative relationship between the behavioral activation system and neuroticism and extroversion and no significant correlation between the agreeableness, openness to experience, and conscientiousness. There is also a significant negative correlation between the inhibition system and neuroticism and agreeableness. Also, in the fight, flight, and freezing system, the findings indicate that all components of personality traits and this system are significant. This finding is consistent with the research of Agah et al. (32), Amiri (33), and Nojar Khodabakhsh (19). In a study by Jafari and Ahmadi in 2020 on 120 patients with heart failure, the results showed that emotional dysregulation had a negative relationship with the behavioral

activation system and a positive and significant relationship between inhibition and flight systems (34). Also, in the study of Karami et al., on 400 addicts in 2020, the results indicated that the behavioral activation system had a negative and significant relationship with extroversion, agreeableness, and conscientiousness (35). This finding is consistent with the results of the present study.

In a study by Hosseini Abolmaali and Mohammadi Kasbegari, the results showed that high levels of neuroticism increase stress sensitivity and the incidence of stress-related disorders, while extroversion and conscientiousness increase resilience to stress (36). Also, according to the findings of this study, there is a significant relationship between the components of fight, flight, freezing, and behavioral inhibition system and neuroticism. This confirms the adverse reactions in these people. It can be said that if a person has an irritable limbic system, he/she will probably experience repeated periods of excitement, especially emotions related to flight and fight (35,36). Also, in new theories, personality is defined as an emotional, emotional, cognitive, and emotional system of the individual, which explains the unique reactions of humans to the environment (3).

Personality factors defined by the "five-factor model" explain the biological traits of personality based on some brain activity (32).

One of the limitations of this research is filling in the questionnaires electronically, in which case there were no questions and answers about the questions between the researcher and the participants. On the other hand, given that the target group was students, it may not be possible to generalize the results to a larger community. Another major limitation was self-report instruments, so it is suggested that in future research, in addition to the variables of the present study, other variables should be performed in different target groups. Finally, the results of the studies should be compared with those of similar studies for further study.

Conclusion
The findings revealed that personality traits in all five dimensions and behavioral brain systems in some components can be a predictor of levels of anxiety sensitivity in individuals.

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References

1. Caulfield JI, Caruso MJ, Bourne RA, Chirichella NR, Klein LC, Craig T, et al. Asthma induction during development and adult lung function, behavior and brain gene expression. Front Behav Neurosci 2018; 12(2): 188.
2. Abbasi Asl R, Naderi H, Akbari A. Predicting social anxiety of female students based on personality traits. Journal of fundamentals of mental health 2016; 18(6): 343-9.
3. Taghavi Garamaleki M, Moheb N. [The effectiveness of cognitive-behavioral therapy on rumination, worry and anxiety sensitivity in people with symptoms of anxiety disorders]. Journal of educational sciences 2021; 14: 13-29. (Persian)
4. Ibrahim GM, Cassel D, Morgan BR, Smith ML, Otsubo H, Ochi A, et al. Resilience of developing brain networks to interictal epileptiform discharges is associated with cognitive outcome. J Neurol Brain 2014; 137(10): 2690-702.
6. Costa Jr PT, McCrae RR. Reply to Eysenck. Pers Individ Dif 1992; 13(8): 861.
7. Ashouri A, Mohammadzadeh A, Najafi N, Zeraatkar L. [Relationship between personality traits and religious/spiritual well-being with schizotypal traits]. Iranian journal of psychiatry and clinical psychology 2016; 22(3): 230-9. (Persian)
8. Aghabagheri H, Mohammadkhani P, Omrani S, Farahmand S. [The effectiveness of mindfulness-based cognitive group therapy on increasing mental well-being and hope of patients with MS]. Journal of clinical psychology 2012; 4(1): 23-31. (Persian)
9. Wauthia E, Lefebvre L, Huet K, Blekic W, El Bouragui K, Rossignol M. Examining the hierarchical influences of the big-five dimensions and anxiety sensitivity on anxiety symptoms in children. Front Psychol 2019; 14(2): 451-9.
10. Bilodeau-Houle A, Bouchard V, Morand-Beaulieu S, Herringa RJ, Milad MR, Marin M-F. Anxiety sensitivity moderates the association between father-child relationship security and fear transmission. Front Psychol 2020; 11: 579514.
11. Seçer İ, Ulaş S. The mediator role of academic resilience in the relationship of anxiety sensitivity, social and adaptive functioning, and school refusal with school attachment in high school students. Front Psychol 2020; 11: 557.
12. Han Y, Zhu J, Li L, Zhou H, Li S, Zhang J, et al. Psychometric properties of the Chinese version of anxiety sensitivity index-3 in women diagnosed with breast cancer. Front Psychol 2020; 7(11): 12.
13. Wells A, Cartwright-Hatton S. A short form of the metacognitions questionnaire: Properties of the MCQ-30. Behav Res Ther 2004; 42(4): 385-96.
14. Besharat MA, Zahedi K, Noor Bala AA. [Comparison of emotional dysfunction and emotion regulation strategies in physical patients, anxiety patients and normal people]. Journal of contemporary psychology 2013; 16(2): 6-13. (Persian)
15. Lotfi R, Alipoor A, Tarkhan M, Farzad V, Maleki M. Predicting changes in perception of itching in chronic skin diseases by personality characteristics, anxiety, and depression. Journal of fundamentals of mental health 2015; 17(6): 278-83.
16. Abbasi B, Alilo M, Jafari A. [Predicting internet addiction based on brain-behavioral systems, components of behavioral activation and emotion systems]. Journal of psychological studies and educational sciences 2021; 7(1): 1129-38. (Persian)
17. Gray JA. Three fundamental emotion systems. In: Ekman P, Davidson RJ. (editors). The nature of emotion: Fundamental questions. Oxford: Oxford University; 1994.
18. Gray JA. [A general model of the limbic system and basal ganglia: applications to schizophrenia and compulsive behavior of the obsessive type]. Rev Neurol (Paris) 1994; 150(8-9): 605-13. (French)
19. Nojar Khodabakhsh S, Turkan H, Abdianian M. [Investigating the predictive role of anxiety sensitivity, sensory processing sensitivity, brain-behavioral systems and mood dyslexia on dental anxiety]. Isfahan dental quarterly 2019; 15(4): 392-405. (Persian)
20. Ritchie H, Roser M. Mental health. [cited 2018]. Available from: http//OurWorldInData.Org.
21. World Health Organization. Depression and other common mental disorders: Global health estimates. World Health Organization; 2017.
22. Pasha A, Bahrainian SA, Farahani H. [The relationship between type D personality and the stress level of life events, personality traits and anxiety sensitivity in people with breast cancer]. Ann Med Psychol (Paris) 2022; 180(6): 527-32. (French)

23. Gray JA, McNaughton N. The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system. New York: Oxford University; 2000: 234-45.

24. Abdi R. [Predicting the dimensions of emotional distress based on the model of abnormal dimensions of personality]. Journal of psychiatry and clinical psychology 2016; 22(3): 222-9. (Persian)

25. Delavar A. [Research methods in psychology and educational sciences]. 5th ed. Tehran: Virayesh; 2021. (Persian)

26. Hasani J, Salehi S, Rasoli Azad M. [Psychometric properties of Jackson's Five Factor Questionnaire: Scales of revised Reinforcement Sensitivity Theory (r-RST). Journal of research in psychological health 2012; 6(3): 60-73. (Persian)

27. Moradimanesh F, Mirjafari A, Goodarzi M, Mohammadi N. [A study of psychometric properties of the revised anxiety sensitivity index]. Journal of psychology 2007; 11(4): 426-46. (Persian)

28. Garoosi Farshi MT, Chalabianloo GR. [The relationship between NEO five factor personality test and SCL-90 test]. Journal of behavioral sciences 2001; 4(1): 51-8. (Persian)

29. Balazadeh L, Mirzaian B, Hasanzadeh R. [Relationships of brain behavioral system and anxiety sensitivity with psychological vulnerability in people with asthma under intensive care]. Journal of critical care nursing 2020; 13(4): 34-43. (Persian)

30. Nelson LH, Lenz KM. The immune system as a novel regulator of sex differences in brain and behavioral development. J Neurosci Res 2017; 95(1-2): 447-61.

31. Hovenkamp-Hermelink JH, van der Veen DC, Oude Voshaar RC, Batelaan NM, Penninx BW, Jeronimus BF, et al. Anxiety sensitivity, its stability and longitudinal association with severity of anxiety symptoms. Sci Rep 2019; 9(1): 1-7.

32. Agah Haris M, Ramezani N. [Comparing personality traits and anxiety sensivity among patients with and without psoriasis]. Quarterly journal of health psychology 2019; 7: 67-82. (Persian)

33. Amiri S, Soleimani E, Rafiei Z. [The role of personality dimensions based on behavioral brain systems in adolescent internalization and externalization disorders]. Journal of personality and clinical psychology 2017; 15(2): 144-55. (Persian)

34. Jafari R, Ahmadi E. [Investigating the relationship between behavioral and metacognitive brain systems and emotional disorder in patients with emotional regulation]. Journal of Khatam healing 2020; 9(4): 30-39. (Persian)

35. Karami N, Amini N, Behrozi M, Jafarinia G. [The prediction of distress tolerance based on brain-behavioral systems, HEXACO personality characteristics and social isolation in substance-dependent individuals]. Research in addiction 2021; 14: 265-90. (Persian)

36. Hosseini Abolmaali K, Mohammadi Kasbegari F. [The role of mothers' personality traits and psychological well-being in girls' anxiety and depression]. Journal of women and family cultural education 2016; 37: 113-32. (Persian)