Original Article

Relationship between personality factors and health anxiety with the mediating role of source of health control

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ABSTRACT

In Health anxiety, an individual either believes they have a serious illness or fears they may develop one. It is characterized by excessive concern about health, leading to extreme and often inconsistent behaviors aimed at maintaining well-being. This research aimed to explore the structural causal relationships between personality factors and health anxiety, with cognitive emotion regulation strategies and health locus of control serving as mediating variables. Given the nature of the topic and objectives, the study was fundamental in scope and correlational in design. The statistical population consisted of all students at Tabriz University during the 2022-2023 academic year, totaling 23,000 individuals. Using Cochran's formula, a sample size of 378 was determined through stratified random sampling. Data collection instruments included the Shai Health Questionnaire, the NEO Personality Factors Questionnaire, and the Multidimensional Health Locus of Control (MHLC). Structural equation modeling was applied to test the research hypotheses, with calculations conducted using SPSS (version 18) and Amos (version 22). The results indicated that neuroticism and openness to experience had a positive and significant effect on health anxiety, whereas extraversion, conscientiousness, and agreeableness showed an inverse, significant effect. Furthermore, internal health locus of control negatively impacted health anxiety, while external health control and chance health control had positive, significant effects.

Keywords: Personality factors, Health anxiety, Source of health control, SEM

Introduction

Physical health has been a concern for humanity since the emergence of self-awareness, and most people occasionally have thoughts and concerns about their health [1]. However, some individuals experience intense worry and anxiety about their physical health despite not being at risk or suffering from a specific illness. These individuals often interpret simple physical symptoms as signs of serious disease [2].

Health anxiety is categorized as illness anxiety disorder in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) and classified under somatic symptom and related disorders. According to the DSM-5, health anxiety is defined as the belief that an individual either has or is at risk of developing a serious illness. This condition is characterized by excessive health-related worry and extreme, maladaptive behaviors aimed at maintaining health [3].

The relationship between the Big Five personality traits and various anxiety disorders has been well-documented in research. For instance, Olakook *et al*. (2020) found that neurotic individuals tend to exhibit traits such as anxiety [4], tension, rumination, hostility, impulsivity, shyness, irrational thinking, depression, and low self-esteem. These negative emotions contribute to maladjustment and increased anxiety. Conversely, Kubilinska *et al*. (2022) showed that conscientiousness and a sense of duty are associated with higher levels of adaptability [5], reducing anxiety. Moreover, Nikcevic *et al*. (2021) found that extroverted individuals cope better with daily stressors and are more likely to seek support from others during challenges [6]. These personality traits help foster a positive outlook on life and reduce health anxiety.

Based on theoretical and research evidence, it can be inferred that one of the psychological factors influencing the relationship between personality traits and health anxiety is the health locus of control. Studies [4, 7] have shown that there is a relationship between personality traits and health locus of control on one

hand, and findings from other research [8; Lekfuangfu et al., 2015) indicate a connection between health locus of control and health anxiety on the other.

The health locus of control is defined as "an individual's belief that their health is controlled either by their behaviors or by external forces" [8]. In this context, Naviuks *et al*. (2020) suggested that high neuroticism combined with high conscientiousness leads individuals to pay more attention to bodily symptoms [7]. If the individual has an external health locus of control, these symptoms are often interpreted excessively and unrealistically as signs of illness, resulting in heightened anxiety. Furthermore, the study by Olakook *et al*. (2020) found that emotional stability [4], coupled with high conscientiousness and extraversion, contributes to the development of an internal health locus of control, thereby ensuring psychological well-being. However, significant ambiguities remain regarding these relationships. Therefore, the research question arises: Can the health locus of control mediate the relationship between personality traits and health anxiety?

Materials and Methods

This study is classified as fundamental research due to the nature of the topic and its defined objectives. Additionally, it is correlational. The statistical population includes all students of the University of Tabriz during the 2022–2023 academic year. According to data obtained from the Student Affairs Office, the total number of students was approximately 23,000. To determine the sample size, Cochran's formula was used. With a sampling error of 5% and a confidence level of 95%, the sample size was calculated to be 378 participants.

$$n = \frac{Nz^2pq}{Nd^2 + z^2pq} = \frac{23000 \times 1.96^2 \times 0.5 \times 0.5}{23000 \times 0.05^2 + 1.96^2 \times 0.5 \times 0.5} = 378$$

In Cochran's formula: **n** represents the sample size; **N** represents the population size; **Z** is the z-value corresponding to the 95% confidence level under the standard normal curve; **p** is the proportion of the population with a specific characteristic; **q** is the proportion of the population without that characteristic; **d** is the margin of error considered for sampling.

To prevent a reduction in the sample size, 400 questionnaires were distributed, and ultimately, 381 questionnaires were collected. The sampling method used was stratified random sampling. Each faculty was considered a stratum, and sampling was conducted proportionally to the number of students in each faculty. The necessary data were gathered using the Shai Health Anxiety Questionnaire, the NEO Personality Inventory, and the Multidimensional Health Locus of Control (MHLC) scale.

Shai health anxiety questionnaire

The Shai Health Anxiety Questionnaire was designed by Salkovskis and Warwick in 2002 [2]. This questionnaire is a self-report scale consisting of 18 items, each with four response options. When scoring, a value between 0 and 3 is assigned to the chosen option. The score range of this test is between 0 and 54, with higher scores indicating greater health anxiety. In the study by Salkovskis and Warwick (2002), the test-retest reliability of the questionnaire was found to be 0.90 [2]. Additionally, the Cronbach's alpha coefficient was calculated to be 0.82. The Shai Health Anxiety Questionnaire was standardized in Iran by Nargesi et al. (2017) [9]. The Cronbach's alpha coefficient in this study was 0.79, indicating a good level of reliability.

Short Form of the NEO Personality Inventory (NEO-FFI)

In 1989, Costa and McCrae designed the short form of the Five-Factor Personality Questionnaire to assess the five main personality traits. This questionnaire consists of 60 items and evaluates five personality traits: neuroticism, extraversion, openness, agreeableness, and conscientiousness. Scoring for the questionnaire ranges from 0 to 4, and some questions are reverse scored. Additionally, in a seven-year longitudinal study, reliability coefficients ranged from 0.51 to 0.82 for the 18 subscales of neuroticism, extraversion, and openness, and from 0.63 to 0.81 for the five main factors in both men and women (Costa & McCrae, 1992). A study by Anisi et al. (2012) examining the reliability of this questionnaire using Cronbach's alpha method showed that conscientiousness and neuroticism had alpha values of 0.83 and 0.80, respectively, while agreeableness and extraversion had alpha values of 0.60 and 0.58, respectively. However, the trait of openness showed poor internal consistency with an alpha of 0.39.

The Multidimensional Health Locus of Control (MHCL) scale

This questionnaire was designed by Wallston *et al*. (1994). The items are scored using a Likert scale ranging from "Strongly Agree" (6) to "Strongly Disagree" (1). The interpretation involves summing the scores of each scale. It consists of 18 questions. Six items (questions 1, 6, 8, 12, 13, 17) assess individuals' beliefs about internal health locus of control, six items (questions 3, 5, 7, 10, 14, 18) measure external health control, and six items (questions 2, 4, 9, 11, 15, 16) assess the chance control of health. The reliability of the questionnaire was found to range from 0.62 to 0.76, as reported by Wallston *et al*. (1994).

Results and Discussion

The central and dispersion indices of the variables are presented in Table 1. The contents of Table 1 indicate that the level of variability in health anxiety is at a desirable and moderately high level. The variability in external, internal, and chance health

locus of control is at a moderate level. The variability in neuroticism, extraversion, openness, agreeableness, and conscientiousness is at a desirable level.

Table 1. Central and Dispersion Indices of the Variables

Variable index	Average	Standard deviation	Lowest score	Highest score	Skewness	kurtosis
Health anxiety	24.78	9.92	0	54	-0.06	0.08
External health locus of control	17.64	8.03	6	34	-0.32	-1.25
Health locus of control by chance	21.36	7.42	6	36	-0.24	-0.96
Neuroticism	17.32	8.74	1	43	0.38	-0.38
Extraversion	32.81	7.60	5	48	-0.15	-0.06
Openness	31.96	8.47	16	48	-0.13	-0.97
Agreeableness	33.56	7.68	13	48	-0.35	-0.58
Conscientiousness	33.11	7.14	17	48	-0.05	-0.56

In this section, structural equation modeling (SEM) was used to test the hypotheses and answer the research questions. First, the correlation matrix of the variables was calculated and plotted, followed by the confirmatory factor analysis of the measurement model using AMOS software. The results are presented in Table 2 and Confirmatory Model (1).

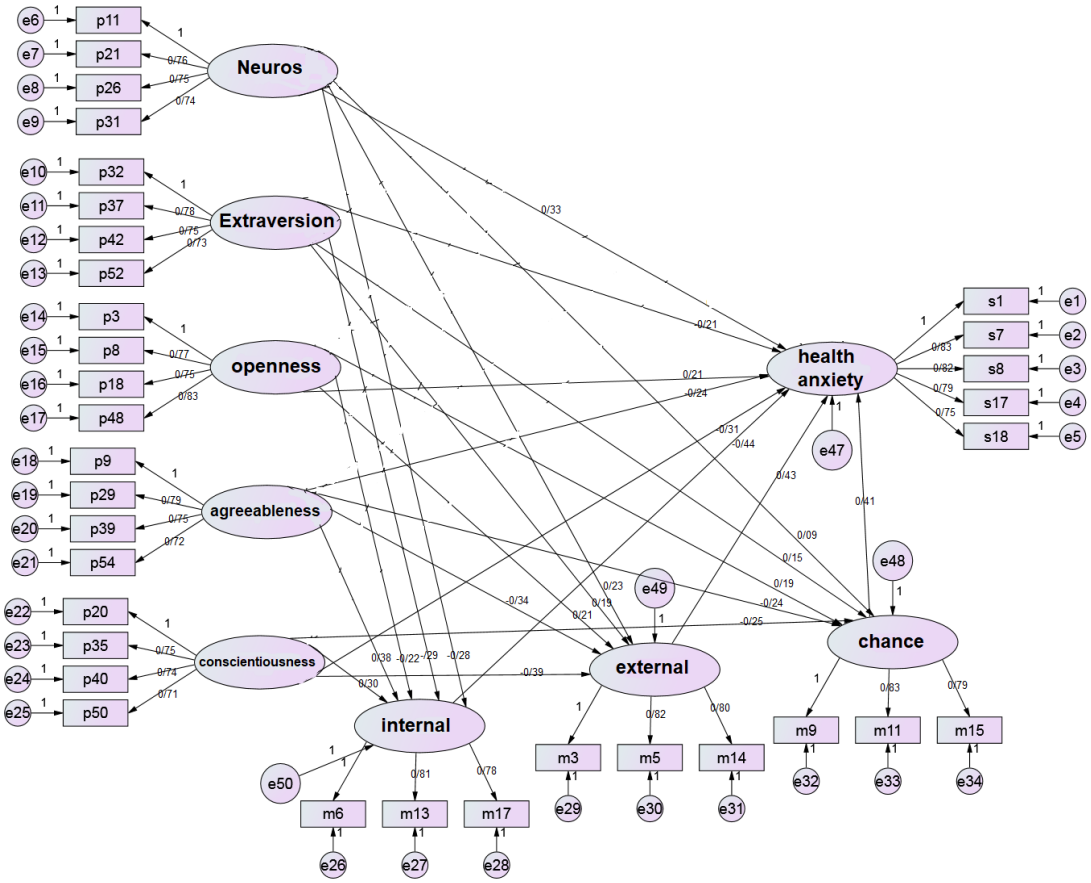
Table 2. Correlation Matrix of the Studied Variables

Variable	1	2	3	4	5	6	7	8	9
Health anxiety	1								
Internal locus of control	-0.43**	1							
External locus of control	0.41**	-0.21*	1						
Chance locus of control	0.38**	-0.24*	0.22*	1					
Neuroticism	0.44**	-0.38**	0.32**	0.34**	1				
Extraversion	-0.28**	-0.36**	0.40**	0.31**	-0.24*	1			
Openness to experience	-0.25**	-0.35**	0.34**	0.29**	-0.20*	0.21	1		
Agreeableness	-0.22**	0.39**	-0.39**	-0.34**	-0.18*	0.18	0.16	1	
Conscientiousness	-0.18**	0.44**	-0.34**	-0.31**	-0.17*	0.19	0.17	0.19	1

P<0/01**

The contents of Table 4 indicate that:

The contents of Table 4 indicate that there are significant and moderate correlations between personality traits and health anxiety, as well as between personality traits and health locus of control. Additionally, there are high correlations between health locus of control and health anxiety. To fit the measured model with the theoretical model, structural equation modeling with causal relationships was used, as outlined in Model (1).



Structural Model (1): Structural Equation Modeling of Exogenous Variables with Health Anxiety Disorder Symptoms.

The contents of the causal-structural model indicate that the theoretical model fits well with the measured model, as all model fit indices are in the desirable range. Specifically, the Root Mean Square Error of Approximation (RMSEA) is at an optimal level (less than 0.05). Additionally, the Chi-square/df ratio is at a desirable level (equal to or less than 5), and the

Goodness of Fit Index (GFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), and Tucker-Lewis Index (TLI) are all at acceptable levels (equal to or greater than 0.90).

Direct effects

The direct effects of the endogenous variables on the exogenous variables are presented in Table 3.

Table 3. Summary of Direct Effects of Independent Variables

Independent variable	Dependent variable	Effect size	t	Significance
Neuroticism	Health anxiety	0.33	5/81	0.001
Extraversion	Health anxiety	-0.21	-3.08	0.01
Openness to experience	Health anxiety	0.21	3.09	0.01
Conscientiousness	Health anxiety	-0.31	-5.72	0.001
Agreeableness	Health anxiety	-0.24	-3.55	0.001
Internal control	Health anxiety	-0.44	-7.45	0.001
Internal control	Health anxiety	0.43	7.29	0.001
Chance control	Health anxiety	0.41	6.89	0.001
Neuroticism	Internal control	-0.28	-5.22	0.001
Extraversion	Internal control	-0.29	-5.38	0.001
Openness to experience	Internal control	-0.22	-3.17	0.01
Conscientiousness	Internal control	0.30	5.48	0.001
Agreeableness	Internal control	0.38	6.50	0.001
Neuroticism	Internal control	0.23	3.27	0.001
Extraversion	Internal control	0.19	2.90	0.01
Openness to experience	Internal control	0.21	3.06	0.01
Conscientiousness	Internal control	-0.39	-6.57	0.001
Agreeableness	Internal control	-0.34	-5.89	0.001
Neuroticism	Chance control	0.09	1.77	0.08
Extraversion	Chance control	0.15	2.51	0.03
Openness to experience	Chance control	0.19	2.91	0.01
Conscientiousness	Chance control	-0.25	-3.69	0.001
Agreeableness	Chance control	-0.24	-3.58	0.01

P≤0/05

The contents of Table 3 show that the direct effect of neuroticism and openness to experience on health anxiety is positive and significant at p≤0.05. The direct effect of extraversion, conscientiousness, and agreeableness on health anxiety is negative and significant. The direct effect of internal health control on health anxiety is negative and significant. The direct effect of external health control and chance health control on changes in health anxiety is positive and significant. The direct effect of neuroticism, extraversion, and openness to experience on changes in internal health control is negative and significant. The direct effect of conscientiousness and agreeableness on internal health control is positive and significant. The direct effect of neuroticism, extraversion, and openness to experience on changes in external health control is positive and significant. The direct effect of conscientiousness and agreeableness on external health control is negative and significant. The direct effect of neuroticism on changes in chance health control is not significant at p≤0.05. The direct effect of extraversion and openness to experience on changes in chance health control is positive and significant. The direct effect of conscientiousness and agreeableness on changes in chance health control is negative and significant.

Examining the mediating (indirect) effects of variables.

To examine the indirect effects of exogenous variables on endogenous variables through mediating variables, the bootstrap method was used as outlined in Table 4.

Table 4. Indirect effects of independent variables on dependent variables.

Independent Variable	Mediating Variable	Dependent Variable	Effect Size	t	Significance
Neuroticism	Internal control	Health Anxiety	0.13	2.38	0.01
Extraversion	Internal control	Health Anxiety	0.13	2.40	0.01
Openness to experience	Internal control	Health Anxiety	0.09	1.98	0.05
Conscientiousness	Internal control	Health Anxiety	-0.13	-2.40	0.01
Agreeableness	Internal control	Health Anxiety	-0.15	-2.70	0.01
Neuroticism	Internal control	Health Anxiety	0.11	2.25	0.03
Extraversion	Internal control	Health Anxiety	0.09	1.98	0.05

Openness to experience	Internal control	Health Anxiety	0.10	2.17	0.04
Conscientiousness	Internal control	Health Anxiety	-0.17	-2.98	0.01
Agreeableness	Internal control	Health Anxiety	-0.15	-2.71	0.01
Neuroticism	Chance control	Health Anxiety	0.04	1.34	0.12
Extraversion	Chance control	Health Anxiety	0.06	1.50	0.10
Openness to experience	Chance control	Health Anxiety	0.08	1.81	0.06
Conscientiousness	Chance control	Health Anxiety	-0.10	-2.18	0.04
Agreeableness	Chance control	Health Anxiety	0.10	-2.15	0.04

P≤0/05

The contents of Table 4 show that the five personality traits, through internal health control, external health control, and chance health control, can significantly explain changes in health anxiety.

Discussion

Personality traits influence a wide range of human activities, and based on the obtained results, they can also affect the way individuals cope with health crises and health anxiety. In this regard, Sharmi Elmadi and colleagues (2023) demonstrated in their research that there is a relationship between personality traits (neuroticism, extraversion [10], openness, agreeableness, and conscientiousness) and health anxiety.

Some of the results obtained indicate that neuroticism has a positive relationship with health anxiety. For instance, the studies by Bardbar and colleagues (2021), Davoodi and colleagues (2012), and Nikjooyek and colleagues (2021) also showed that neuroticism is positively related to health anxiety [6, 11, 12]. Another finding from this research revealed that there is a negative relationship between extraversion and health anxiety. In this regard, Norouzizadeh and colleagues (2022) demonstrated that extraversion has a negative relationship with COVID-19 anxiety.

To explain this finding, it can be said that individuals with high extroversion are often described as assertive, energetic, and social. It has been shown that extraversion is related to behaviors such as seeking pleasurable experiences, excitement, challenges, and stimulation [6]. These traits help increase the coping ability of extroverts when facing mental health crises related to illness. This personality trait may play a role in activating coping mechanisms, such as engaging with others, maintaining a positive attitude in society, and so on. Moreover, these individuals, with their verbal abilities and capacity to form close relationships, can garner more social support during illness, resulting in greater satisfaction, happiness, and reduced health anxiety.

Another finding from this study showed that agreeableness has a negative relationship with health anxiety. Bardbar and colleagues (2021) and Davoodi and colleagues (2012) also demonstrated in their research that agreeableness is negatively associated with health anxiety [11, 12.

To interpret this result, it can be inferred that when the trait of agreeableness increases in a person, their trust, kindness, and willingness to forgive also rise, enhancing their adaptability, which can reduce their stress. Individuals with an agreeable personality are essentially altruistic, compassionate, and empathic toward others. They are eager to help others and believe that others will reciprocate the same help. Therefore, they feel confident that if they fall ill, they will receive support from family, relatives, and friends, which leads to reduced anxiety about illness.

Finally, the results from the analysis of personality traits showed that conscientiousness has a negative relationship with health anxiety. As Norouzian and colleagues (2022) concluded in their research, conscientiousness is negatively associated with anxiety caused by the COVID-19 pandemic [13].

To explain this result, it can be said that as conscientiousness increases, self-control, rationality, diligence, and trust in the individual also increase, which aids in their adaptability. Therefore, the individual can better adjust to the conditions of illness, and if they contract a disease, their hospital stay is shortened. It can be concluded that with higher conscientiousness, an individual's adaptability increases, leading to a reduction in health anxiety. In other words, individuals with this personality trait, due to their sense of responsibility, strive to fully adhere to health and hygiene guidelines, and with these precautionary actions, they cope with stress and anxiety.

The data analysis revealed that the personality traits of neuroticism, extraversion, and openness are negatively related to internal health control. On the other hand, conscientiousness and agreeableness are positively related to internal health control. These findings are consistent with the studies of Bardbar and colleagues (2021), Safariniya and Dehkordi (2020), and Taghini and colleagues (2021) [11, 14, 15].

To interpret the results, it can be said that individuals with flexible, extraverted, and conscientious personality traits are imaginative, rational, and curious. They are open to accepting new and unconventional beliefs and values and are capable of experiencing both positive and negative emotions and discussing them. They are always ready to accept ethical and social ideas and respond to all events responsibly.

The results from the data analysis also showed that there is a relationship between the source of health control and health anxiety. Specifically, internal health control has a negative

relationship with health anxiety, while external health control and chance health control have a positive relationship with health anxiety. These findings are in line with the research of Honarasa and colleagues (2021), Karbasian Varnamkhasti and colleagues (2021), Khoshare and Mirtajeddini (2021), Abd al-Sattar and colleagues (2021), and Hawnkamp-Hermelik and colleagues (2019) [8, 16-18].

To explain the negative relationship between internal health control and health anxiety, it can be stated that one of the key cognitive constructs is the controllability of illness, which determines the anxiety related to a disease. Uncertain and ambiguous situations severely limit an individual's ability to predict and control outcomes. A sense of security results from understanding the situation, predicting its outcomes, and having control over them. Individuals with internal health control believe that they have control over the outcomes and consequences of an event. When a person feels responsible for the events in their life, they tend to display more constructive behavior when facing challenges and use more effective coping strategies. The use of effective coping strategies reduces individuals' levels of anxiety and depression.

Other results indicated that openness to experience, through chance health control, significantly explains health anxiety. Conscientiousness, through chance health control, can significantly and negatively explain health anxiety. Agreeableness, through chance health control, is also able to significantly and negatively explain health anxiety.

A Conscientious person has strong, predefined goals and considers themselves responsible for achieving these goals and plans, not attributing their success or failure to luck or others. As a result, when illness arises, they tend to seek solutions and preventive measures, thus experiencing less anxiety. Similarly, an individual with agreeable traits feels empathy for others and is eager to help, believing that others share the same relationship with them. This trait is more aligned with positive social and mental health aspects. With passive chance health control, the individual has a negative relationship with health anxiety, and through this mechanism, they mediate health anxiety.

Conclusion

The study highlights the significant influence of personality traits on health anxiety and coping mechanisms during health crises. The findings demonstrate that neuroticism is positively associated with health anxiety, while traits such as extraversion, agreeableness, and conscientiousness have a negative relationship with health anxiety. The research emphasizes how personality traits contribute to adaptability, social support, and effective coping strategies, which play crucial roles in reducing anxiety related to illness. Additionally, the study sheds light on the relationship between health control sources and health anxiety, underscoring that internal health control is linked to lower anxiety, whereas external and chance health controls are associated with higher anxiety. The mediating role of chance health control in the relationship between openness, conscientiousness, agreeableness, and health anxiety further expands our understanding of how personality traits influence mental health outcomes. These insights can inform interventions aimed at enhancing coping strategies and promoting mental well-being, particularly during health crises.

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References

1. Denovan A, Dagnall N, Lofthouse G. Neuroticism and somatic complaints: Concomitant effects of rumination and worry. Behavioural and cognitive psychotherapy. 2018 Jul;47(4):431-45.
2. Salkovskis PM, Rimes KA, Warwick HM, Clark D. The Health Anxiety Inventory: development and validation of scales for the measurement of health anxiety and hypochondriasis. Psychological medicine. 2002 Jul;32(5):843-53.
3. Cooper K, Gregory J D, Walker I, Lambe S, Salkovskis PM. Cognitive Behaviour Therapy for Health Anxiety: A Systematic Review and Meta-Analysis. Behav Cogn Psychother. 2017;45(2):110-123.
4. Olagoke AA, Olagoke OO, Hughes AM. Intention to Vaccinate Against the Novel 2019 Coronavirus Disease: The Role of Health Locus of Control and Religiosity. Journal of Relig Health. 2020;30:1-16.
5. Kobylińska D, Zajenkowski M, Lewczuk K, Jankowski KS, Marchlewska M. The mediational role of emotion regulation in the relationship between personality and subjective well-being. Current Psychology. 2022;41:4098-111.
6. Nikčević AV, Marino C, Kolubinski DC, Leach D, Spada MM. Modelling the contribution of the Big Five personality traits, health anxiety, and COVID-19 psychological distress to generalised anxiety and depressive symptoms during the COVID-19 pandemic. Journal of affective disorders. 2021 Jan 15;279:578-84.

7. Naviaux AF, Janne P, Gourdin M. Medico-psychological aspects relating to the coronavirus epidemic (Covid-19): The contribution of the theory of signal detection and the concept of place of control. InAnnales Medico-psychologiques 2020 Mar 31 (Vol. 178, No. 3, pp. 223-225).
8. Hovenkamp-Hermelink JH, Jeronimus BF, Spinhoven P, Penninx BW, Schoevers RA, Riese H. Differential associations of locus of control with anxiety, depression and life-events: A five-wave, nine-year study to test stability and change. Journal of affective disorders. 2019 Jun 15;253:26-34.
9. Nargesi F, Izadi F, Karimi Nejad K, Rezaei Sharif A. Investigating the reliability and validity of the Persian version of the Health Anxiety Questionnaire in medical students. Educational Measurement Quarterly. 2017;7(27):147-60.
10. Sharmi Elmadi F, Mirzapour Elmadi M, Khane Kashi A, Hassan Zadeh M, Yazdani F. The relationship between personality traits and emotion regulation strategies with health anxiety during the COVID-19 pandemic. Cognitive Psychology and Psychiatry. 2023;10(2):95-106.
11. Bardbar F, Khani I, Shahrzad C, Esmaeili M. The role of personality traits and health control source in predicting COVID-19 anxiety in women. Journal of Clinical Psychology. 2021;13(3):59-68.
12. Davoodi I, Nargesi F, Mehrabizadeh Honarmand M. Dysfunctional beliefs and personality traits in teachers with and without health anxiety. Jundishapur Journal of Cellular and Molecular Biology. 2012;3(4):34-21.
13. Norouzian K, Piadeh Kohsar A. Predicting death anxiety based on personality traits and God's image in COVID-19 patients. Behavioral Sciences Research Journal. 2022;20(2): 204-19.
14. Safariniya M, Dehkordi S. An exploratory model to explain relationships between personality factors, attachment styles, control source, coping strategies, and perceived stress with illness perception in hemophilia patients: Emphasizing the mediating role of social exchange styles. Psychological Health Research. 2020;14(2):66-80.
15. Tagini S, Brugnera A, Ferrucci R, Mazzocco K, Pievani L, Priori A, Ticozzi N, Compare A, Silani V, Pravettoni G, Poletti B. Attachment, personality and locus of control: Psychological determinants of risk perception and preventive behaviors for COVID-19. Frontiers in Psychology. 2021 Jul 9;12:634012.
16. Karbasian Varnamkhasti E, Nikbakht A, Zarei I. A model of COVID-19 anxiety based on health control source, emotion regulation strategies, perceived social support, and illness anxiety with the mediating role of cognitive-behavioral avoidance. Behavioral Science Research. 2021;19(4):647-61.
17. Khoshare H, Mirtajeddini FS. Predicting COVID-19 anxiety based on health control source and perceived social support. Psychology Growth Journal. 2021;10(12):97-108.
18. Abdelsattar M, Derar E, Salem AA, Al-Mujaim F. Cyberchondria Severity, Health Anxiety, and Health Locus of Control: The Mediation Role of COVID-19 Anxiety. Asean Journal of Psychiatry. 2021 Mar 2;22.
19. Honarasa P, Javadi H, Rezaei A, Barzegar M. Predicting death anxiety based on health control source in middle-aged and elderly people. Iranian Journal of Developmental and Educational Psychology. 2022;3(3):215-24.
20. Lekfuangfu WN, Powdthavee N, Warrinnier N, Cornaglia F. Locus of control and its intergenerational implications for early childhood skill formation. The Economic Journal. 2015 Feb 1;128(608):298-329.
21. Norouzizadeh Z, Bakhshesh A, Salehzadeh Abragouei M. The role of personality traits and lifestyle in predicting anxiety and depression during the COVID-19 pandemic: A web-based cross-sectional study. Journal of Gilan University of Medical Sciences. 2022;31(122):84-101.
22. Wallston KA, Stein MJ, Smith CA. Form C of the MHLC scales: a condition-specific measure of locus of control. Journal of personality assessment. 1994 Dec 1;63(3):534-53.
23. Costa, P. T., & McCrae, R. R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. Psychological assessment, 4(1), 5.
24. Anisi J, Majdiyan M, Joshanloo M, Ghoharikamel Z. (2012). Validity and reliability of NEO Five-Factor Inventory (NEO-FFI) on university students, International Journal of Behavioral Sciences, 5(4), 351.