STUDIA DOCTORALIA
PSYCHOLOGY AND EDUCATIONAL SCIENCE
UNIVERSITY OF BUCHAREST
VIRTUTE ET SAPIENTIA

Personality and resilience in medical students

Raluca Motorga

University of Bucharest

ARTICLE INFO

Article history:
Received 15-August-2019
Accepted 24 October-2019
Available online 01-November-2019

This article should be cited as: Motorga, R. (2019). Personality and resilience in medical students. *Studia Doctoralia. Psychology and Educational Science, 10(2),* 78-89.

Corresponding author at: University of Bucharest, Department of Psychology, 90 Panduri Av, Bucharest, RO.
Tel.: +40 (0)769415430
E-mail address: raluca.motorga@yahoo.com

ABSTRACT

This study has three main objectives: to establish the relationships between personality traits and resilience in medical students, the relationships between vulnerability factors and the level of resilience in medical students, and the relationships between personality traits, resilience and symptoms of depression, anxiety, stress among medical students. In this study participated 134 students enrolled at the University of Medicine and Pharmacy in Craiova, both in the specialization of general medicine and general medicine nurses, aged between 18 and 25 years, M = 19.78, SD = 1.31. Of these, 34 are men and 100 are women. The instrument used were Inventory of vulnerability / protection factors (α = .79), Resilience Scale, short form, RS-14 (α = .87), five sets of 10 items each in five sub-domains of NEO PI-R: neuroticism, extraversion, openness to experiences, aggreableness, and conscientiousness (α > .70), and Depression, Anxiety, and Stress Scales, DASS 21-R ((α > .70). Resilience was negatively corelated with neuroticism, positively correlated with extraversion, and also positively correlated with conscientiousness. The protective factors were positively associated with resilience. Neuroticism has an increasing effect on depression, while extraversion has a decreasing effect on depression, neuroticism has an increasing effect on anxiety and stress, and aggreableness has a decreasing effect on stress. The results also showed that a high level of resilience leads to a low level of depression, anxiety, and stress.

Keywords: *medical students, resilience, personality, depressiona, anxiety, stress*

1. INTRODUCTION

The purpose of the present study is to identify the relationships between personality traits and resilience in medical students, the relationships between vulnerbility factors and resilience in medical students, as well as the

relationships among personality traits, resilience, and levels of depression, anxiety, and stress.

The resilience of medical students is a topic of great interest because they face stressful situations in the academic environment, the pace of learning is particularly alert, and the amount of knowledge they need to accumulate is higher compared to other students' or compared to the academic schedules.

By identifying the personality traits of the students and by associating them with resilience, we will try to discover which are the mechanisms that they activate in order to cope with the academic requirements and with the symptoms of depression, anxiety, stress they are very likely to face.

At the same time, we will try to identify the protective / vulnerability factors that can predict the level of resilience in medical students.

Medical students are among those young people whose academic life is difficult, complex and relatively hard to endure. The academic requirements are significantly more difficult than those of other students, the hours spent at courses, laboratories, and practice sessions are numerous and tiring. For this reason, high levels of depression, anxiety or stress are recorded both in medical students and in resident physicians (Ishak et al., 2013).

Stress factors in the medical field can have adverse consequences on both professional and personal life of the students. These include diminishing the level of empathy, decreasing the level of professionalism, fatigue, deteriorating health status, drug use, burnout (Firth-Cozens, 2001; Hojat et al., 2009). For this reason, it is necessary to observe and develop the level of resilience of the students.

Studies show that medical students have more psychological problems than other students, associated with stressors in the academic environment and 80% associated with the competitive environment in the academic environment (Guthrie et al., 1998). When students are exposed to academic stress for a longer period of time, they often begin to show symptoms of depression, anxiety, and stress, anger and aggression, or they experience frustration, exhaustion, fatigue, helplessness, cynicism (Jennet, Harris, & Mesibov, 2003).

The medical universities have as their primary objective the thorough training of the students so that they become quality professionals, who master their field of expertise and who become good practitioners. The academic curriculum in the medical field has been designed to cover these requirements. However, certain aspects of student training have negative effects on their mental and emotional health. At the individual level, studies show that stress and burnout can lead to overload of mental functions, substance use, the deterioration of interpersonal relationships, and disregard of the medical profession. At the professional level, students may show cynicism towards their patients, and their relationships with the faculty are deteriorating (Moffat, McConnachie, Ross, & Morrison, 2004).

Medical students begin to experience stress starting with first years in academic context. Despite the fact that a certain level of stress is specific to medical education and can sometimes become a motivating factor, not all students consider it constructive. For most students, academic responsibilities generate fear, feelings of incompetence, anger, guilt and may be associated with mental or physical morbidity (Park & Adler, 2003).

By identifying the current state of medical students, we can base prevention programs that will support them to strengthen their protective mechanisms and reduce their vulnerability to the symptoms of physical and mental dysfunctions. At the same time, by establishing the level of depression, anxiety, and stress in students, we can use specific programs to reduce the symptoms and to improve the quality of life of the students.

Resilience and personality traits

Resilience is defined in this context as the ability to cope with or manage adverse experiences without incurring physical or mental consequences over the course of college years (Campbell-Sills, Cohan, & Stein, 2006).

Resilience involves the ability, process and outcome of successfully adapting to life contexts that can threaten physical or mental health (Masten, Best, & Garmezy, 1990). Psychological resilience is a complex construct that implies the existence of a set of traits and the adoption of a set of actions for the purpose of self-recovery and is defined differently depending on the context: individual, family, organizational, societal or cultural (Southwick, Bonanno, Masten, Panter-Brick, & Yehuda, 2014).

In the medical field, resilience is analyzed as a bio-psycho-social process that develops naturally and not necessarily in response to traumatic events. Although all people are hypothetically resilient, some groups have higher tendencies to develop resilience, depending on the particular circumstances in which they operate and as a result of a combination of factors that may interfere in their activity (Buikstra et al., 2010).

Physicians and medical students need to have a high level of resilience to help them cope with the challenges of their profession, such as work overload, emotional and physical demands and individual expectations (Drybye & Shanafelt, 2012). Physicians must constantly respond to the sometimes overwhelming demands of their work, and resilient individuals are better equipped to cope with these demands, learn from the complex situations they go through, and continue to successfully manage the stressful situations of medical practice.

Numerous studies have attempted to highlight the presence and intensity of personality traits that are related to resilience and which facilitate positive adaptation to

stressful contexts. Luthar et al. (2000) have shown that certain personality traits help to overcome adverse events, such as humor, social responsibility, tolerance, self-esteem, self-discipline, and self-control, as well as planning skills, problem-solving ability, or critical thinking (Garmezy, 1984). Jacobs and Dodd (2003) pointed out that temperament influences students' reactions to stress and resilience and for this reason the links between stress, depression, and anxiety symptoms on the one hand and personality traits and resilience on the other should be studied in more detail.

Grotberg (1995) defined personality traits as protective factors in developing resilience and grouped them into categories he called: i) personal "strengths" - I am, ii) personal abilities - I can, and iii) factors of social support - I have. I am includes the individual qualities and personal attributes that resilient people have and which can be predictive factors of resilience, being able to be associated with the classic personality traits (McCrae & Costa, 1986). The strongest empirical support was provided by Costa and McCrae (1992) reffering at personality traits as a group of fundamental behavioral tendencies that influence thoughts, emotions and actions and that are associated with the mechanisms through which people cope with adversity. According to their results, Big Five factors are associated with the way individuals cope with extreme situations, so neuroticism correlates positively with hostile reactions to adverse events, extraversion correlates with tendencies to plan rational actions, positive thoughts, and reframing through humor, openness correlates with fantasy and humor, conscientiousness correlates with learning skills.

Taking into account the above, we formulate the first hypothesis of the study:

H1. Personality traits are associated with resilience in medical students.

H1a. Extraversion is positively associated with resilience.

H1b. Neuroticism is negatively associated with resilience.

H1c. Openness to experiences is positively associated with resilience

H1d. Aggreableness is positively associated with resilience.

H1e. Conscientiousness is positively associated with resilience.

Resilience and protection / vulnerability factors

In the conceptualization of resilience theories, four basic elements are discussed: risk factors, protection factors, vulnerability areas, and compensatory strategies (Kitano & Lewis, 2005). Risk factors represent existing constructs that have the potential to create barriers or impediments to natural evolution. Protective factors have the ability to diminish or remove all or part of the aspects determined by the risk factors. Vulnerability areas are idiosyncratic manifestations of risk, and compensatory strategies are the specific responses to these vulnerabilities.

Understanding the links between these four elements is an essential requirement for the study of resilience. Kumpfer (1999) states that the operationalization of the concept of resilience must take into account a number of its predetermining factors. The author identified six aspects to consider, four of them being areas of influence, and the other two being bridges of transition between domains. The domains of influence are: stressor or challenge, external context, individual characteristics, and results. The transition points are: the confluence between the environment and the individual, the confluence between the individual and the choice of results.

1. Stressors or challenges - these stimuli activate the process of resilience and create an imbalance or interruption of homeostasis at the level of the individual or system (family, group, community); the degree of stress perceived by the individual depends on his level of perception, the cognitive assessments he makes, and the interpretation of the stressor as threatening or aversive.

2. The external context - includes the balance and the interaction between the risk and protection factors, as well as the processes that take place in the immediate environment of the individual (family, community, culture, school, group of friends); it changes with age and according to culture, geographical area and historical period.

3. Person-environment interactions - include the transition processes between the individual and his / her environment, including his / her attempts to perceive passively or actively and to interpret and overcome environmental threats, challenges or difficulties, in order to transform the environment into a protective one.

4. Internal individual characteristics - include the spiritual, cognitive, social, behavioral, physical, and emotional competences of the individual necessary to achieve success in different development tasks, in different cultures and in different environments.

5. Resilience process - includes long- or short-term resilience or coping processes learned by the individual by gradually exposing himself or herself to increasingly powerful challenges and stressors, which helps the person to "return" to the action and resiliently reintegrate.

6. The positive results - or the successful adaptation to the development tasks that will subsequently materialize in the resilience capacity.

All these six clusters must be considered when determining the vulnerability or protection factors and analyzing their predictive nature in relation to resilience as a final result.

In our research we intend to build a scale that will capture the vulnerability / protection factors, covering the issues mentioned above. Thus, the following aspects were taken into account: self-efficacy, hope, and confidence in

one's own abilities, mental and physical health, history of family illnesses, history of family abuse, history of substance abuse in the family, family relationships, family support, friends relationships, optimism, perseverance.

Given the fact that resilience is built as a result of a complex set of factors, we establish the second hypothesis of the study:

H2. Protective factors are predictors of resilience.

Personality traits and predisposition to depression, anxiety, stress

It is known that personality traits exert a marked influence on the tendency to manifest symptoms specific to depression, anxiety or stress (Bienvenu et al., 2004). Moreover, a comprehensive literature review highlighted that depressive and anxiety disorders are more prevalent among medical students than the general population of the same age (Dyrbye et al., 2006). This fact is explained not only by the high level of distress in the medical universities, but also by the predispositions related to personality traits (Matsuidara et al., 2006). Severe depression associated with neuroticism has been shown to be the leading cause of suicide among medical students (Tyssen et al., 2004). Untreated anxiety, as well as major depression, are also causes of suicide among physicians (Holmes & Rich, 1990).

Bunevicius, Katkute, and Bunevicius (2008) conducted a study on the prevalence of depression and anxiety among medical students as compared to human sciences students. The authors analyzed at the same time the personality traits and the vulnerability to stress of the students. The study involved 411 students. The results showed that 14% of medical students had symptoms of depression. The prevalence of anxiety symptoms was between 24% in the first year students and 12% in the final year students. Also, high levels of depression and anxiety were positively associated with high vulnerability to stress, and extraversion, conscientiousness, and emotional stability were associated with reduced vulnerability to stress.

Tyssen et al. (2007) conducted a study in which they investigated personality traits as predictors of academic stress among medical students. The study involved 421 Norwegian students. The results showed that neuroticism and conscientiousness are consistent predictors of stress. Controlling for gender and age, the results showed that the type with low extraversion, high neuroticism, and high conscientiousness is more vulnerable to stress whereas the type with high extraversion, low neuroticism, and low conscientiousness is less vulnerable to stress.

Clark and Watson (1991) developed a model of association of personality traits with psychopathology according to Axis I, respectively anxiety and depression. According to their model, anxiety and depression are defined by high levels of negative effects and differ from each other by positive affect, which are low in depression and hyperactivated in anxiety. Negative and positive affect are strongly associated with extraversion and neuroticism, respectively (Watson, Wiese, Vaidya, & Tellegen, 1999). Thus, was postulated the idea that anxiety and depression are positively associated with neuroticism, but depression is negatively associated with extraversion. Subsequent studies have shown that a low level of extraversion is associated with both depression and social anxiety (Kotov et al., 2007).

Six models have been proposed that explain the nature of the associations between personality traits and psychopathology (Clark, 2005):

1. The vulnerability model - postulates the idea that the traits contribute etiologically to the development of the disorders; scores on personality tests can predict who will develop such disorders in the future.

2. Pathoplasty model - claims that personality traits influence the course and severity of symptoms in people who already have the disorder; the scores obtained in personality tests are supposed to be prognostic of the clinical evolution of the affected persons.

3. The scar model - claims that psychopathology permanently changes the personality

4. Complication model - claims that the changes are temporary and that they last as long as the disorder is active

5. Common cause model - argues that personality and psychopathology are associated because they have common causes, such as genetic vulnerability

6. Spectrum model - argues that personality disorders and traits should be viewed as different manifestations of the same process

Kotov, Gamez, Schmidt, and Watson (2010) conducted a meta-analysis on the links between personality traits and anxiety, depression, substance abuse. They considered 175 studies published between 1980 and 2007, comprising 851 effect sizes. The results showed that all the disorders were associated with neuroticism and to a lesser extent with conscientiousness and extraversion. Aggreableness and openness did not have significant associations with any of the disorders.

Taking into account the above, we formulate the third hypothesis of our study:

H3. Personality traits are predictors of depression, anxiety, and stress among medical students.

H3a. Increased neuroticism and low extraversion are predictors for depression.

H3b. Increased neuroticism and increased extraversion are predictors for anxiety.

H3c. Increased neuroticism and low agreeableness are predictors of stress.

Resilience effects on depression, anxiety, and stress

Developing resilience is seen as a potential response to the stressors associated with the contemporary way of

life, with daily responsibilities, with increasingly complex academic requirements (Neenan, 2009). Resilience has been defined in many ways, either as inborn or acquired, either as a process or as a result. Concern for the study of resilience occurred in three waves (Grafton et al., 2010). The first wave was related to resilience as a set of characteristics such as self-efficacy, optimism, coping, and adaptability. The second wave approached resilience as a dynamic process in which adverse events were confronted with a series of adaptive skills learned from previous experiences. The third and most recent wave refers to resilience in terms of innate energy or form of motivation found in the depth of the individual which facilitates the management of adverse experiences, engaging in marked cognitive transformations.

Regarding depression, anxiety, and stress among medical students, Dyrbye, Thomas, and Shanafelt conducted in 2006 a meta-analysis whose conclusions highlighted that the period of medical studies is extremely demanding for students. The authors noted that medical students have higher levels of depression, anxiety, and stress than the general population.

Beiter et al. (2014) conducted a study on the prevalence of depression, anxiety, and stress among students. The study was attended by 374 students between the ages of 18 and 24. The results showed that the three most important causes of distress are academic performance, pressure to succeed and career plans. At the same time, higher scores of depression, anxiety. and stress were recorded for students who transferred from other faculties and those living off campus.

Students with a higher level of resilience adopt adaptive coping strategies and often convert stressors into learning and development opportunities. Campbell-Sills et al. (2006) observed that in a group of students, resilience was positively associated with coping oriented towards solving tasks or with adopting active ways to solve problems to combat the effects of stress. Clifton et al. (2004) found that coping strategies focused on problem solving and perceived control over stressful situations have positive effects on academic outcomes. Therefore, the students' resilience level and the ways of manifesting their resilience are associated with the adaptive use of resources in combating stress symptoms.

These resources can be viewed as protective factors, which at the opposite side become vulnerability factors (Ortega, Beauchemin, & Kaniskan, 2008). Rutter (1990) defined internal and external resources as protective factors if they moderate risk and mitigate the negative impact of risk on resilience.

Considering the effects that resilience can have on the symptoms of depression, anxiety, and stress among students, we formulate the fourth hypothesis of our study:

H4. Resilience predicts the level of depression, anxiety and stress among students.

In order to reach the purpose of the present research, the following objectives were established:

O1. Establishing the relationships between personality traits and resilience in medical students.

O2. Establishing relationships between vulnerability factors and the level of resilience in medical students.

O3. Establishing relationships between personality traits, resilience and symptoms of depression, anxiety, stress among medical students.

2. METHODOLOGY

Participants and procedure

In this study participated 134 students enrolled at the University of Medicine and Pharmacy in Craiova, in the specialization of general medicine and general medicine nurses, aged between 18 and 25 years, M = 19.78, SD = 1.31. Of these, 34 are men and 100 are women.

The study design is nonexperimental, exploratory, correlational. Initially, the Inventory of Vulnerability/Protection Factors was developed, then the Resilience Scale was translated. This was sent back to an authorized translator and the required changes were made. Subsequently, the psychometric instruments were drafted, printed and distributed to the participants in a special session that lasted 50 minutes. Participants signed the informed consent form, then completed questionnaires in pencil-paper version. 150 students were contacted, out of which only 134 participate in the study. Demographic data are presented in Table 1.

Table 1. *Demographic data of participants (N = 134)*

		Specialization		Marital status			Economic status			
		General medicine	General medicine nurse	Unmarried	In a relationship	Married	Unsufficient	Sufficient	Satisafctory	High
Gender	Males	33	1	24	10	0	0	12	16	6
	Females	70	30	77	22	1	1	45	48	6
Total		103	31	101	32	1	1	57	64	12

Instruments

Inventory of vulnerability / protection factors. The instrument was designed by us to capture the factors that can underpin the development of resilience. It includes 20 items that refer to internal factors (self-efficacy, self-confidence, optimism) and external factors (family and friends support, critical family history). Examples of items: "I think I will become a good specialist in my field", "In my family there were no people dependent on substances". The answers are given on a 5-step Likert scale, where 0 - to a very small extent and 4 - to a very large extent. A Cronbach Alpha coefficient α = .79 was obtained.

Resilience Scale, short form, RS-14 (Wagnild & Young, 2009). Initially, the instrument comprised 25 items, later it was reduced to 14 items to reduce the time required for completion. When reducing the number of items, those with high inter-item correlations were maintained. Example of item: "I find things to cheer me on". The answers are given on a 7-step Likert scale where 0 - never and 6 - always. The RS-14 scale has been translated and used in the Japanese and Spanish versions, as well as the Chinese and Taiwanese versions (Damasio, Borsa, & da Silva, 2011; Nishi, Uehara, Kondo, & Matsouka, 2010; Yang, Li, & Xia, 2012). In our study, the Cronbach Alpha coefficient α = .87 was obtained.

Personality was measured with the five sets of 10 items each in five sub-domains of NEO PI-R: neuroticism, extraversion, openness to experiences, aggreableness, and conscientiousness, a total of 50 items. Examples of items: "I do not like to draw attention to myself", "I respect others". Responses to items are dichotomous, 1 - yes, 0 - no, scoring is done after reversing some of the items. The Cronbach Alpha coefficients were: α = .76 for neuroticism, α = .79 for extraversion, α = .61 for openness to experiences, α = .56 for aggreableness, and α = .70 for conscientiousness. The questionnaire is used extensively, either in the reduced form (10 items for each personality trait) or in the extended form (20 items for each personality trait). In Romania it was translated by Iliescu, Popa, & Dimache (2015).

Depression, Anxiety, and Stress Scales, DASS 21-R (Lovibond & Lovibond, 1995). The scale consists of a set of three subscales, three for each of the dimensions: depression, anxiety, stress, comprises 21 items, seven for each subscale. The instrument is used both as a method of psychodiagnosis and in research. The scores are offered on a 4-step Likert scale, where 0 – not at all like me and 3 - very much like me. Example of item: "I was scared for no serious reason". The Cronbach Alpha coefficients were: α = .75 for depression, α = .80 for anxiety, and α = .85 for stress. The scale was translated in Romanian by Perțe (2015).

3. RESULTS

The means, standard deviations, and correlations among variables are presented below.

Table 2. *Means, standard deviations, and correlations among variables (N = 134)*

	M	SD	P/V F	Res	Ne	Ex	Op	Ag	Co	D	A	S
P/V F	59.02	9.25	1									
Res	62.57	11.28	.67**	1								
Ne	3.85	2.66	-.42**	-.50**	1							
Ex	6.42	2.67	.26**	.50**	-.26**	1						
Op	7.75	1.91	.01	.05	.08	.16	1					
Ag	8.31	1.59	.21*	-.01	-.11	-.03	.09	1				
Co	6.61	2.33	.46**	.53**	-.35**	.39**	-.03	.07	1			
D	4.17	4.12	-.47**	-.59**	.56**	-.35**	-.05	-.17*	-.27**	1		
A	5.43	4.52	-.33**	-.33**	.50**	-.21*	-.11	-.07	-.25**	.59**	1	
S	6.72	5.01	-.39**	-.37**	.51**	-.13	-.07	-.22*	-.24**	.59**	.65**	1

**. p < .01, . *. p < .05

1. P/V F – Protection / Vulnerability factors, 2. Re – Resilience, 3. Neuroticism, 4. Ex – Extraversion, 5. Op – Oppeness, 6. Ag – Aggreableness, 7. Co – Conscientiousness, 8. D- Depression, 9. A – Anxiety, 10. S – Stress.

To test the hypotheses, a series of statistical analyzes were performed using the IBM SPSS.22 program (IBM Corp, 2013).

H1. Personality traits are associated with resilience in medical students.

H1a. Extraversion is positively associated with resilience.

H1b. Neuroticism is negatively associated with resilience.

H1c. Openness to experiences is positively associated with resilience

H1d. Aggreableness is positively associated with resilience.

H1e. Conscientiousness is positively associated with resilience.

To test these hypothesis, we ran a multiple regression analyse for personality factors as predictors and resilience as dependent variable.

Table 3. *The regression equation for the associations among personality factors and resilience*

		B	ES	β	t	p
1	(Constant)	51.80	5.52		9.39	.00
	Neuroticism	-1.39	.29	-.33	-4.67	.00
	Extraversion	1.21	.31	.29	3.96	.00
	Oppeness	.26	.39	.04	.65	.52
	Aggreableness	-.41	.46	-.06	-.88	.38
	Conscientiousness	1.48	.35	.31	4.20	.00

a. Dependent Variable: Resilience

b. $R^2 = .47$

The five personality factors account for 47% of the variance of resilience, the regression equation being statistically significant, $F(5,128) = 22.82$, $p < .01$. Of these, only three are associated with resilience, respectively: neuroticism in the negative sense, $\beta = -.33$, $p < .01$, extraversion in the positive sense, $\beta = .29$, $p < .01$, and conscientiousness in the positive sense, $\beta = .31$, $p < .01$.

Thus, the hypothesis H1 is partially supported by the analyzed data, in the sense that three of the personality factors are associated with resilience.

H2. Protective factors are predictors of resilience.

In order to test this hypothesis, a simple regression analysis was performed.

Table 4. *The regression equation for the association between protective factors and resilience*

Model	R	R^2	B	SE	β	t	p
1	.67	.45	.81	.08	.67	10.25	.001

It is observed that the protection factors are consistent predictors of resilience. The results of the regression analysis show that the protective factors explain 67% of the resilience variation, $R^2 = .45$, $F(1, 133) = 104.96$, $p < .01$. The result shows that protection factors significantly predict resilience, $\beta = .67$, $p < .01$. Thus it can be said that the H2 hypothesis is supported by the analyzed data, in the sense that the protective factors are predictors of resilience.

H3. Personality traits are predictors of depression, anxiety, and stress among medical students.

H3a. Increased neuroticism and low extraversion are predictors for depression.

H3b. Increased neuroticism and increased extraversion are predictors for anxiety.

H3c. Increased neuroticism and low agreeableness are predictors of stress.

Table 5. *Regression equation for neuroticism and extraversion as predictors of depression*

		Unstandardized Coefficients				
Model		B	SE	β	t	p
1	(Constant)	3.35	.98		3.44	.001
	Neuroticism	.77	.11	.50	6.87	.000
	Extraversion	-.34	.11	-.22	-3.00	.003

a. Dependent Variable: Depression

b. $R^2 = .36$

It is observed that the two predictors, extraversion and neuroticism predict depression, explaining 35.5% of its variation, $F(2, 132) = 35.99$, $p < .01$. Neuroticism has an increasing effect on depression, $\beta = .50$, $p < .01$, while extraversion has a reducing effect on depression, $\beta = -.22$, $p < .01$.

It can be said, therefore, that hypothesis H3a is supported by the analyzed data, in the sense that a high level of neuroticism and a low level of extraversion predict depression.

Table 6. *Regression equation for neuroticism and extraversion as predictors of anxiety*

		Unstandardized Coefficients				
Model		B	SE	β	t	p
1	(Constant)	3.21	1.15		2.79	.006
	Neuroticism	.81	.13	.48	6.10	.000
	Extraversion	-.14	.13	-.08	-1.06	.290

a. Dependent Variable: Anxiety
b. $R^2 = .26$

It is observed that the regression equation is statistically significant, the two predictors, extraversion and neuroticism predicting anxiety, explaining 25.5% of its variation, $F(2, 132) = 22.44$, $p < .01$. Of the two predictors, neuroticism has an increasing effect on anxiety, $\beta = .48$, $p < .01$, and extraversion does not have a significant effect., $p > .05$.

It can be said, therefore, that hypothesis H3b is partially supported by the analyzed data, in the sense that neuroticism negatively predicts anxiety, but extraversion does not.

Table 7. *Regression equation for neuroticism and aggreableness as predictors of stress*

		Unstandardized Coefficients				
Model		B	ES	β	t	p
1	(Constant)	7.44	2.11		3.53	.001
	Nuroticism	.93	.14	.49	6.63	.000
	Aggreableness	-.52	.23	-.16	-2.20	.029

a. Dependent Variable: Stress
b. $R^2 = .29$

It is observed that the two predictors, aggreableness and neuroticism predict stress, explaining 28.7% of its variation, $F(2, 132) = 26.34$, $p < .01$. Neuroticism has an increasing effect on stress, $\beta = .49$, $p < .01$, and aggreableness has a decreasing effect on stress, $\beta = -.16$, $p < .05$.

It can be said, therefore, that the H3c hypothesis is supported by the analyzed data, in the sense that a high level of neuroticism and a low level of aggreableness predict stress.

H4. Resilience predicts the level of depression, anxiety and stress among students.

In order to test this hypothesis, a series of three simple regression analyzes were performed.

Table 9. *Regression equation for resilience predicting depression*

Model	R	R^2	B	SE	β	t	p
1	.59	.35	-.21	.03	-.59	-8.34	.001

It is observed that resilience is a consistent predictor of depression. The results of the regression analysis show that resilience explains 34.5% of the variance of depression, $R^2 = .35$, $F(1, 133) = 69.51$, $p < .01$. The result shows that resilience negatively predicts depression, $\beta = -.59$, $p < .01$, meaning that a high level of resilience leads to a low level of depression.

Table 10. *Regression equation for resilience predicting anxiety*

Model	R	R^2	B	SE	β	t	p
1	.37	.13	-.16	.04	-.37	-4.53	.001

It is observed that resilience is a consistent predictor of anxiety. The results of the regression analysis show that resilience explains 13.4% of the anxiety variance, $R^2 = .13$, $F(1, 133) = 16.28$, $p < .01$. The result shows that resilience negatively predicts anxiety, $\beta = -.37$, $p < .01$, meaning that a high level of resilience leads to a low level of anxiety.

Table 11. *Regression equation for resilience predicting stress*

Model	R	R^2	B	SE	β	t	p
1	.33	.11	-.13	.03	-.33	-4.03	.001

It is observed that resilience is a consistent predictor of stress. The results of the regression analysis show that resilience explains 11% of the variance of stress, $R^2 = .11$, $F(1, 133) = 20.50$, $p < .01$. The result shows that resilience negatively predicts stress, $\beta = -.33$, $p < .01$, meaning that a high level of resilience leads to a low level of stress.

It can therefore be said that hypothesis H4 is supported by the analyzed data.

4. DISCUSSION

The results of the present study are aligned with the results obtained by other researchers, as observed from the studies analyzed for the derivation of hypotheses.

By hypothesis H1 we intent to establish the links between personality traits and resilience. It has been observed that extraversion is positively associated with resilience, which can be explained by the fact that extravert people who are open to others and who manifest a more intense sociability have stronger capacities to cope with critical experiences. Also, the optimism and the openness to the world, as well as the free expression of their needs, and also the capacity to ask for help are more emphasized to the extraverted people, which again is the basis of increasing the level of resilience. In contrast to extraversion, neuroticism is associated with low resilience. Neurotic people generally exhibit states of tension and anxiety that in critical situations can dramatically diminish problem solving capabilities. Conscientiousness has been positively associated with resilience, which can be explained by the fact that people who are goal-oriented and who strive to fulfill their responsibilities will have a more pragmatic orientation on solving and facing critical situations, addressing more constructive and more adaptive problem solving strategies, so they become more resilient by directly addressing the wrong situation.

Hypothesis H2 identified the links between the protective factors and resilience. Protective factors, as opposed to vulnerability factors, are those elements in the lives of individuals that lead to diminishing the effects of adverse events. These factors can be internal or external to the person and are constituted in resources that are activated when confronted with difficult life situations. The more these factors are oriented towards the protection zone, the higher the resilience, and the more they are oriented towards the vulnerability zone, the lower the resilience. Persons previously exposed to adverse situations will face the difficulties of the current difficult situations, and in the same way, optimistic people, with high self-confidence and a higher level of self-efficacy and optimism will also show higher resilience. On the other hand, those who have suffered traumas in childhood and adolescence, those who take care of their own health, those who have a history of abuse or neglect in the family, will have a lower level of resilience.

Hypothesis H3 established the level of prediction of personality traits in the manifestation of symptoms of depression, anxiety, and stress. It was observed that the high level of neuroticism plays a predictive role in all three disorders. This result can be explained by the fact that neuroticism carries negative affects, which are found in the three types of mental dysfunctions. People with a higher level of neuroticism are generally more closed to relationships with others, more suspicious and fearful. Blocking free communication with others specific to neuroticism, as well as the weight of maintaining quality relationships can be the basis of the symptoms of depression, anxiety or stress. Internal distress and personal anxiety also contribute to the installation of the aforementioned dysfunctional states. At the same time, it has been observed that a high level of extraversion fails to predict a decrease in anxiety, which reflects the idea that opening up to the world and socializing are not enough and

sometimes even hinder the correct addressing of stressors. The aggreableness proved to be a consistent predictor for a low level of stress, which underscores the importance of exhibiting self-help, supportive behaviors, which leads to the establishment of well-being and the general opinion that problems can be solved with patience and tenacity.

Hypothesis H4 showed that the level of resilience predicts the manifestations of depression, anxiety, and stress. Of the three regression models, resilience has stronger effects on depression and less on anxiety and stress. Resilience is most likely to be activated by unlocking resources when individuals are in critical situations, with anxiety and stress less intense than depression.

Limitations

The present study represents only a first part of an extensive research project. The participants in this study were all students in the first year, so comparative analyzes could not be performed to observe the differences that may occur with the passage of time. On the other hand, first-year students still do not experience high levels of depression, anxiety, and stress, all these installing as students go through years of study and face more difficult academic tasks. Another limitation of the study can be considered the use of theinstrument developed by us to measure the factors of protection / vulnerability. There were no analyzes to verify its psychometric properties, although the coefficient of internal consistency was high. However, the limits of the present study are constituted in future research directions.

Future research directions

As immediate future goals we intend to grow the group of participants, including students from senior years of study and students from other specialties of the medical school. At the same time, we will carry out a series of analyzes to identify the mediating factors of the relationships analyzed here, taking into account perseverance and motivation. We intend at the same time to establish the psychometric properties of the instrument designed by us and to continue to use it in other groups of students. After evaluating the level of depression, anxiety, and stress, we will select an experimental group of students with high depression scores and we will intervene with a specific program to reduce the symptoms. In this study we will also use a control group that will not benefit from the conditions of the therapeutic program. We will carry out pre-test and post-test measurements to evaluate the differences resulting from the intervention.

Practical implications

The present study, together with the ones outlined above, will bring to light aspects of the life of medical students. The psychological load and its long-term effects will be identified, the factors of protection and vulnerability will be analyzed, being able to work on them through different prevention and intervention programs. Special policies for the protection and support of students along their academic journey may be proposed to universities with medical profile, and eventually solutions for modifying the currently highly loaded academic curriculum may be proposed. By identifying the personality factors responsible for increasing resilience or manifesting symptoms of depression, anxiety or stress, one can generalize the results of our studies to the larger numbers of students who are facing critical situations that they cannot cope with.

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