



Development of the Academic Stressors Scale for Bulgarian University Students

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ARTICLE INFO

Article History:

Received: 13 Mar. 2019

Received in revised form: 5 Apr. 2019

Accepted: 16 May 2019

DOI: 10.14689/ejer.2019.81.7

Keywords

Academic stressors scale, Validity,
Reliability. University students

ABSTRACT

There are numerous studies regarding the damage of academic stress on student well-being and achievement. Unfortunately, there are not many methods to measure various academic stressors among students.

Purpose: The purpose of this study was to develop a valid and reliable scale to measure the stressors to which students are subjected in the academic environment.

Research Methods: After interviews with students about the stressors to which they are subjected at the university, a test form of a scale, which contains 19 items, was developed. The scale form was completed by 187 first-year students at the university.

Findings: The results showed that the Academic stressors scale was a reliable and valid data collection tool to be used in higher education. Four subscales emerged: stress related to parental expectations, stress related to lack of knowledge, stress related to learning material and the lecturers, and stress related to auditorium activities, which were confirmed by the confirmatory factor analysis. It was found that the biggest stressor in the academic environment was the stress associated with lack of knowledge.

Implications for Research and Practice: Researchers and educators can use and apply the "Academic stressors" scale among students; and thus, track which students are most vulnerable to poor success and dropout from the university, and take measures to prevent such negative consequences.

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Introduction

The current study of students' learning behavior was determined by various factors that influence it. One such factor like the stress occupies a central place among the predictors that determine students' behavior in the audience. It can be exacerbated by the large flow of information by the lack of systematisation of work during the semester, by disruptions in the learning and resting mode. The examination stress occupies one of the first places among the stressors in the students. In modern students experiencing high intellectual and emotional atrocities in the learning process, there is often negative dynamics of attitudes towards learning activity.

Academic stress among higher education students has been a subject of interest for many years and has recently attracted interest in a number of studies focusing on the relationship between stress, work and students (Heikkila, et al., 2012). The interest in stress among students is related to the recognition that excessive stress is harmful to academic achievement and may lead to dropping out (Kamtsios & Karagiannopoulou, 2015).

Much of the academic stress study was conducted primarily among first year students, as the university environment and the requirements faced by young people are new (Lin & Chen, 2009). During the first year at the university, undergraduate students have difficulty in learning a great deal of academic material for a short period of time, and they are required to develop effective techniques to deal with the volume of their assigned materials (Kumar & Bhukar, 2013). Some students confess that they have difficulties in interpersonal relationships with peers and professors, difficulties in adapting to university administration, etc. (Kumar & Bhukar, 2013). Below are some factors that can provoke stress among students:

Stress Related to Learning Material and Lecturers

Professors strive to focus on the acquisition of knowledge and often ignore students' emotions during the learning process, and this can cause stress and problems with learning and acknowledgment of the new material. Getting criticism from their mentors and assistants for academic work has also been associated with stress (Kumar et al., 2009). Students are yet to face a new and unfamiliar situation, rules and environment such as the university can show neuroticism, anxiety, disappointment, humiliation, depression, and so on. Similar emotions can be reinforced by the inability to obtain additional counseling from lecturers, the lack of support, or the very high demands of the lecturers, etc. This in turn can be a predictor of students' learning achievements, their academic self-esteem, and their ability to adapt to the new learning environment (Chen, et al., 2006).

Stress Related to the Lack of Knowledge

During the first year at the university, undergraduate students have difficulty in learning a great deal of academic material for a short period of time and are required to develop effective strategies to deal with the volume of their assigned materials (Kumar & Bhukar, 2013). Morse and Dravo (2007) investigated dental medicine students and found that the most serious sources of stress amongst students are: a heavy workload, the amount of assigned tasks by the lecturer, fear of failure at the end

of the year, exams and assessments (Morse and Dravo, 2007). In many studies, the largest stressor and source of anxiety has been found to be the exam session and the exams (Bedewy & Gabriel, 2015; Harikiran et al., 2012). The perception of heavy workload during the semester and the long examination session are major sources of stress and anxiety related to the university environment.

Stress Related to Parental Expectations

A number of studies have found that parental pressure and expectations of professors during the session, as well as the choice of specific academic education or future careers, are sources of stress for first year students. Some authors found that students who enroll in university discipline at the request of their parents rather than on their own initiative, feel much more stressed to report their failure to their parents than students who have entered the university on their own initiative (Bedewy & Gabriel, 2015; Tangade et al., 2011). Other authors suggest that parental pressure predicts a higher degree of anxiety at the exams, as the threat of negative criticism increases. Conversely, it is theoretically argued that parental support will predict a lower level of stress and test anxiety as the threat of negative assessment is reduced (Putwain et al., 2010). Other authors conclude that the five main stresses presented in descending order are: exams and tests, student's personal aspirations, learning tasks, the aspirations of the professor and the aspirations of parents (Bedewy & Gabriel, 2015; Wang & Yeh, 2005).

Stress Related to the Auditorium Activities

Mehralizadeh et al. (2013) found that the factors that influence the new knowledge of the learning material are: concentration problems, lecturers' lack of teaching skills, lighting and ventilation in the audience, lack of time for preparation for the upcoming workshops.

Method

Research Design

The purpose of this study was to develop a scale for academic stressors among students. The study design for this study was considered at a descriptive level and at an acknowledgment level. Confirmatory studies test a priori hypotheses - such a priori hypotheses usually stem from theory or results from previous studies, which was also the purpose of this study. The study also had a quantitative character which allows an easier interpretation of results (Çelik-Örücü, 2013).

Research Sample

187 students from the first year of two universities in Plovdiv attended the study. The participants received detailed instructions to complete the test and were given sufficient time. The average age of the studied participants was 21.80 years, of which 42% were male and 55% female. 41% of students studied pedagogical disciplines and

55% studied arts disciplines. 46% of students were from big cities, and 44% have indicated that they are from small towns or villages.

Research Instruments and Procedures

In order to create a scale for assessing academic stress, first interviews were made with a part of the students. During the interviews, students reported and gave feedback on the main stress factors in the new university environment that frustrated them or prevented them from developing their academic potential during the sessions. Other students were asked to write short essays on what annoys them at the university or prevents them to develop their potential. After the content analysis, 19 items were structured and formulated, which were examined by two experts in the field of psychometry and two experts in pedagogical psychology. After agreeing to the overall scale structure, it was provided to the students to complete. Students first reported their age, gender and type of secondary school completed. Then they completed the "Academic stressors" scale. It consists of 19 items located in a 5-point Likert type scale. The students answered the question "What are the main obstacles and stressors at the university that you have experienced in the last two months?". Participants in the study completed the test at a psychology seminar. They were informed that the purpose of the tool is to identify the main obstacles or reasons that reduce their willingness to attend lectures and exercises. The questionnaire was filled in anonymously and the participants were convinced that the results would in no way affect their academic results at the university. After completing the Academic Stress Scale, students were provided with an Academic Engagement scale that was tested and validated for Bulgarian context. It contains 9 items divided into two subscales: "Dedication of Academic Work" ($\alpha = 0,868$) and Energy" ($\alpha = 0,831$). And they were given Resilience scale ($\alpha = 0,832$). It contains 7 items into one scale (Babakova, 2019). Surveys are offered to evaluate 7-point scale statements with which they determine their degree of agreement.

Hypotheses

In the present study the constructive validity of the "Academic stressors" scale was tested by a sample of Bulgarian students. The invariant of the scale measurement was verified by gender, university disciplines (field of study) and place of residence. We also wanted to know if the scale is sufficiently reliable and internally coherent.

The convergence validity of the "Academic stressors" scale was structured in this study by the internal correlations of the internal subscales of the scale. It was assumed that the internal correlations of the scale will correlate significantly and will be positive, while the correlations with the "Academic Engagement" scale will be negative. This study also identified the differences in the scales „Academic stressors“ by gender, field of study and place of residence. We took differences among students in their experience of stressors. Studies show that female students report higher degrees of stress at the university than male students.

Data Analysis

The collected data was processed and analyzed using SPSS 22 and AMOS. Statistical analyzes were performed to demonstrate the validity and reliability of the

scale. The following data analysis tools were used in the study: Internal reliability of the scales, Exploratory and Confirmatory Factor Analysis, Descriptive statistics with the average meanings of scales, ANOVA to identify differences in gender, specialty, and place of residence, Student's t-test to compare the results with another sample of students, Correlation analysis to internal and external relationships in the scale

Results

An analysis of the items and scales was first done. An exploratory factor analysis was used to check the construct validity. All items had high factor weights.

In our case, four factors have been identified. The KMO value is 0.850, which means that the data can be subjected to a factor analysis. Barlett's Spherical Value Test is also statistically significant (1414,388; $p < 0,001$) and an explanation of variation of 58,364% (first factor with 20,358% dispersion, second factor - 17,164% dispersion, third factor - 10,844% factor (9,998%), the following factors were attributed to the stress related to the lack of sufficient knowledge ($\alpha = 0,805$), stress related to the learning material and the lecturers ($\alpha = 0,823$), stress related to auditorium activities ($\alpha = 0.786$), stress related to parental expectation ($\alpha = 0.836$). Below, Table 1 gives the factor extracts of the Academic Stressors Scale.

Table 1

Academic Stressors Scale Extraction method: Principal Components Analysis Method of rotation: Varimax with Kaiser normalization

Academic Stressors	Factor			
	F1	F2	F3	F4
Q4 Spend a lot of time searching for information about a topic		.536		
Q3 The attitude of my parents that I do not do well with my training				.751
Q2 Conflicts with parents because of my academic results				.816
Q 1 Disapproval of my learning results by my parents				.798
Q 5 Anxiety related to university exams		.689		
Q 14 The lack of consistency between professor lectures and curriculum content in textbooks	.653			
Q 19 Inability to concentrate at lectures			.628	
Q 13 The lack of interest in the study material by colleagues	.690			
Q 6 Lack of knowledge to prepare for exercises and seminars		.695		
Q12 The abusive attitude of some lecturers towards students	.736			
Q10 The tasks assigned by the lecturer can not be completed in time	.581			
Q11 Lack of communication between lecturers and students	.742		.835	
Q 18 Lack of discussion during classes				
Q 17 Lecturers quickly write on the board / change slides of the presentation			.630	
Q 7 A feeling of inferiority in the audience		.594		
Q 8 Incomplete and confusing learning materials		.655		
Q 16 Lack of knowledge in a given discipline			.579	
Q 15 Time Delays			.598	
Q 9 Lack of sufficient information about the conduction of exams		.682		
Cronbach Alpha	0,823	0,805	0,786	0,836

F1. Stress related to the learning material and the professors; F2. Stress related to the lack of sufficient knowledge; F3. Stress related to auditorium activities; F4. Stress related to parental expectation..

Table 1 shows the semantic content of each scale. The scale "Stress Related to Parental Expectations" focuses on parents as a leading and important factor in student education. Disappointment, criticism or conflicts between parents and their children can lead to stressful perceptions about the current state of the students at the school. Inside the Scale "Stress Related to auditorium activities", there are statements that focus on the difficulties faced by students during sessions - inability to concentrate, quickly changing presentation slides, lack of discussion, etc. The statement in the scale "Stress related to the lack of knowledge" are pooled around the sense of insufficient knowledge and skills on the part of students in order to be able to cope with the demands of their lecturers. The last scale "Stress related to the learning material and the lecturers" is mainly associated with the problems faced by students with their lecturers, such as difficulties with learning material, conflicts, poor communication, or lecturers negative attitudes towards students.

Confirmatory Factor Analysis

In order to confirm the structure of the exploratory factor analysis, a confirmation factor analysis was performed using the AMOS statistical software. The Confirmatory Factor Analysis (a) allows the researcher to see how well the data fit into a particular theoretical model (ie, adapting data to a priori-defined model), (b) assists researchers to be precise in defining constructions. In this case, the theoretical model consists of four correlated factors constituting an inclined pattern.

Multiple fitness indices were evaluated to support the model. The χ^2 / df ratio was included as an absolute fitness index with acceptable chi-square score corrected for degrees of freedom defined as less than five. We looked at two gradual adjustment indices, the TLI index and the IFI index, with values close to .95 indicating good fit. We also included a Comparative Fitness Index (CFI) with values greater than .90 considered to be good fit. Finally, we examined the approximate square error of approximation (RMSEA). Values below 0.05 show good fit, and values that are above .08 represent reasonable approximation errors. The model we tested initially showed an RMSEA of 0.06, but after we put two correlation relationships between two of the errors in two of the subscales, we obtained good degree indices as follows: $\chi^2 = 154,118$ ($df = 144$), $p = .02$, $\chi^2 / df = 1.070$, $TLI = .979$, $IFI = .983$, $CFI = .983$, $RMSEA = 0.039$. The four factors correlate very well and have good regression weights ranging between 0.522 and 0.860. The model is presented in Figure 1, below:

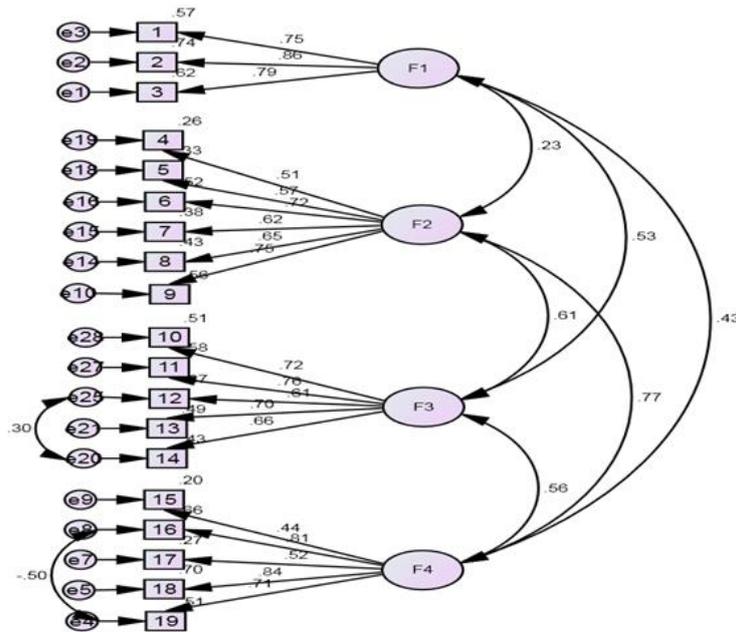


Figure 1. Confirmatory Factor Analysis of the Academic Stressors Scale. F1. Stress related to parental expectation F2. Stress related to lack of knowledge F3 Stress related to the learning material and lecturers F4 stress related to the auditorium activities.

Descriptive Statistics of Subscales

Table 2 shows the meanings for each subclass of the "Academic stressors" scale. It was found that the most pronounced stress in first year students is stress related to the lack of knowledge. It should be noted here that the test was given to students three weeks before their examination session. Significantly, less stressful subscales were the stress related to the auditory occupations that students are experiencing during the learning process and the stress related to the learning material and the lecturers. The least pronounced and insignificant stress is one that is related to parental expectations.

Table 2*Descriptive Statistics of Subscales*

Subscale	For a sample		Male students		Female students	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Stress related to parental expectation	5,11	2,95	5,47	3,01	5,11	3,08
Stress related to the auditorium activities	13,93	4,86	13,07	4,93	13,09	4,97
Stress related to lack of knowledge	19,31	5,69	17,43	5,64	20,17	5,45
Stress related to the learning material and lecturers	11,55	4,69	11,06	4,71	12,00	4,73

ANOVA showed statistically gender differences based on the scale "Stress related to lack of knowledge": $F(829,907) = 4,222$; $p = 0.043$. Female students were found to report more than the male students about stress related to lack of knowledge of the main subjects studied at the university. No statistically significant differences were noted on the scales: "stress related to parental expectation" $F(216,238) = 0,244$; $p = 0.623$; "Stress related to learning material and lecturers" $F(430,012) = 0,704$; $p = 0.404$ and "Stress related to auditorium activities" $F(560,825) = 0,040$; $p = 0.842$. The "place of residence" factor was found to have a statistically significant difference by factor "stress related to parental expectation" $F(222,180) = 4,682$; $p = 0.034$. Students from small towns and cities report more problems with their parents than those from big cities. Many of them shared during the study that for their parents, who raised many of them, it is very important that their children study well and take the exams. No statistically significant differences were found for the scales: "Stress related to auditorium activities" $F(554,481) = 0,869$; $p = 0.354$; "Stress related to lack of knowledge" $F(774, 162) = 0,234$; $p = 0.628$ and no significant differences were noted on the "Stress related to the learning material and lecturers" $F(427,585) = 0,332$; $p = 0.556$. There was a statistically significant difference between "Field of study" and "Stress related to lack of knowledge" $F(456,751) = 7,796$; $p = 0.001$. Highest values on this scale were reported by students studying in the music field. This is explained by the fact that in the first year a large number of students feel that they do not start with the same knowledge and skills, and this is a prerequisite for some of them to report greater difficulties in their study due to insufficient knowledge. There were no statistically significant differences in the "Field of study" factor with the "Stress-related to parental expectation" $F(115,937) = 0,260$; $p = 0.772$, "Stress related to auditorium activities" $F(302,297) = 2,013$; $p = 0.141$, "stress related to learning material and lecturers" $F(253,708) = 2,569$; $p = 0.083$.

The test resistantability is also confirmed by the internal correlations between the different subscales. In general, the correlations between the scales are in line with the theoretical concept of the structure and the relationships between the types of

academic stressors. The strongest is the correlation between subscale "Stress related to lack of sufficient knowledge" and "Stress related to auditorium activities" ($r = 0.77$; $p < 0.001$). It can be assumed that students who find deficiency in their knowledge of the university discipline they have chosen to study have problems with concentration and full learning of the learning material in the audience. There is a significant relationship between the "Stress related to the auditorium activities" and the stress related to the learning material and professors (" $r = 0.56$, $p < 0.001$). There is a tendency for students who start their studies at a university with insufficient knowledge and training in their university discipline to have learning problems because they do not have a solid enough knowledge based on which to build the new math studied in the higher education place. The high academic expression of professors can also create perceptions of difficult communication and distancing among students who begin to study their chosen university discipline with insufficient knowledge of it. There is also a lower but positive relationship between "Stress related to auditorium activities" and "Stress-related to parental expectation" ($r = 0.43$; $p = 0.057$). Students who have disputes with their parents about their study have problems with learning or taking part in the auditorium activities. On the scale "Stress related to lack of knowledge" and scale "Stress related learning material and lecturers", there is a moderate but statistically significant relationship ($r = 0.61$; $p < 0.001$). Learning material difficulties or what lecturers teach are related to the lack of knowledge of some undergraduates with insufficient knowledge. There is a significant correlation between the scale "Stress related to the learning material and lecturers" and the scale "Stress related to parental expectation" ($r = 0.53$; $p = 0.026$). Students who have problems with learning or communicating with lecturers feel threatened by the poor prospect of continuing their study. This can lead to significant problems with parents who have urged their children to complete their education rather than just entering a new university discipline. On the other hand, the problems with the parents which have some students entering the university have led to worse learning of the study material, perceptions of problematic relations with the lecturers, etc. The lowest correlation in the present study is between the scale "Stress related to the lack of knowledge" and the scale "Stress-related to parental expectations" ($r = 0.23$; $p = 0.046$). This shows that far from all students who lack sufficient knowledge at the university have problems with their parents. All these intercorrelations are an indication of a good consistency between the different scales.

Differences in Subscales of the "Academic Stressors" Scale in Students from Different Universities

In order to verify discriminative validity, the hypothesis testing method was used. In this study a comparison of the average values of the academic stress subscales was made with students from two universities. The results of the T-test are statistically significant in the four subscales among the students at one university where art disciplines are taught and students in another university where pedagogical disciplines are studied: the stress-related scale ($T = 2.031$, $sd = 4.18$; $p = 0.013$); scale "Stress related to lack of knowledge" ($t = 3.34$, $sd = 2.97$; $p < 0.001$); scale "Stress related to learning material and lecturers" ($t = 1.94$, $sd = 3.21$; $p = 0.056$); scale "stress related

to auditorium activities" ($t = 4.14$, $sd = 3.98$; $p = 0.039$). The comparison of the mean in the two instances with the help of the Student's t-criterion shows that the differences on the subscales of the "Academic stressors" scale are underestimated at $p < 0.001$ and $p < 0.05$. The brightest differences are observed on the "Stress related to lack of knowledge" subscale (students studying pedagogical disciplines have lower levels of stress than students studying the arts.) Differences on the scale are also quite indicative of "stress related to learning materials and lecturers" (again higher levels of this scale are seen in students studying arts compared to those studying pedagogical discipline.

The constructive validity of the test is confirmed by the measurement of the correlations between the sub-scales of the Academic Stressors scale and the subscales of "Academic engagement" that are Resilience, Energy, and Dedication to learning. For example, correlation analysis showed that students who have problems with their parents have negative values on the Resilience ($r = -0.023$; $p = 0.844$) and Dedication (and $r = -0.004$; $p = 0.989$); and an insignificant relationship with the "Energy" scale ($r = 0.125$, $p = 0.284$) is established. Students who reported having stress related to auditorium activities were found to have negative relationships with the Dedication scale ($r = -0.156$; $p = 0.180$) and negative and statistically significant relationships with the scales "Resilience" ($r = -0.234$, $p = 0.043$), and "Energy" ($r = -0.225$, $p = 0.052$). For students who reported high levels on the "Stress related to the lack of knowledge" subscale, they tend to indicate low values on the "Dedication" subscale ($r = -0.040$; $p = 0.736$) and distinguish negative and statistically significant differences in ($r = -0.383$; $p = 0.001$) and "Energy" ($r = -0.229$; $p = 0.048$). On the "Stress related to learning material and lecturers" subscale it was found that the strongest negative and statistically significant correlation was with a "Resilience" subscale ($r = -0.325$; $p = 0.004$). On the "Dedication" subscale, a negative correlation ($r = -0.183$; $p = 0.115$) and the "Energy" subscale ($r = -0.207$; $p = 0.073$) were also found. Negative relationships give reason to assume that the scale is valid.

Studies on the development and adaptation of a particular scale are topics of major importance for educational research as they provide an opportunity to collect reliable and valid data subsequently. Understanding the current academic stressors faced by students is one of the main prerequisites for the implementation of preventive educational measures to minimize these stressors and thus students to achieve higher satisfaction with university activities. When there is a quality instrument to measure stressors in students, then it becomes possible to track trends in the experience of stress and to take measures to limit its impact on students. The present study found the results of the constructive and convergent validity of a scale for measuring the academic stressors. The internal consistency of the scales turned out to be high Cronbach's alpha ranged between 0.836 and 0.786 for a sample of students, which is an indicator that items are understandable for Bulgarian students.

Discussion, Conclusion and Recommendations

From the above results and conclusions, it can be summarized that first year at the university, students experience academic stress mainly in four areas: stress that is due

to the excessive demands and expectations of parents for high learning achievements; stress in the audience, which is due to difficulties or problems with the learning of the lesson during the sessions, stress that is due to the lack of sufficient knowledge or general culture in the area in which the students are trained and the stress related to the study material and lecturers. Female students reported higher levels of stress related to lack of knowledge, that is, in some university discipline, male students succeeded in passing the female students by learning more quickly. For their part, students living in small settlements experience significantly higher levels of stress related to their parents. Students studying music disciplines experience the highest levels of stress related to lack of knowledge. " It can be summed up that the most significant stress that students have reported is one that is related to the lack of sufficient knowledge. Students who study at art discipline have higher levels of stress related to the lack of knowledge and stress associated with the learning material and the lecturers. One of the reasons for these results is that at present Bulgarian higher education institutions accept students with a maturna assessment rather than a specialized examination for a given field of study. This means that students who complete musical or artistic schools will have much more knowledge than students who have completed general education schools but have entered an arts degree. This has resulted in a serious dissonance that drives students, graduates of general education schools to compare with those who have completed specialized schools and experience the significant difference in knowledge and skills. Therefore, it would be good if the Bulgarian higher education institutions introduce a specialized exam for each discipline in order to accept students with relatively close knowledge of the respective specialty or to increase the hours of preparation of the students who are just entering a discipline and thus by the end of the first year the knowledge of all students should be reduced to approximately equal levels.

The main objectives of this study were to develop and verify the factorial structure of a scale measuring academic stressors, gender differences, domicile and university discipline among the different subsidies, and to assess the interrelationships with the variables related to the criterion.

Four Factor Structure with good fitness indicators is established, indicating that this model is suitable for explaining the data received from Bulgarian students. All four subscales show good internal consistency.

Correlations between subscales show that they all interact statistically significantly between themselves, indicating good internal interrelationships between the individual stressors.

Correlations between Academic Stressors subscales and Academic Engagement subscales such as Resilience, Dedication and Energy indicate results that show good internal validity and correspond to the theoretical model.

The value of the Academic Stress Scale is that with a short scale, a wide range of academic stressors that everyday students can experience can be explored. The results of the present study indicate the factor structure and invariance among the Bulgarian sample, the reliability and the predictable validity. This option for measuring

academic stressors for the future can also be used for other purposes, such as, for example, styles and resources to deal with students' stressors, as well as to create a stressor-strategy model for coping - satisfaction with the learning process.

Although this study is carefully conducted, it has its limitations and shortcomings. For example, no study was conducted among other groups of students in engineering or humanities. In addition, the study was conducted only among first year students in university as it is assumed that during the first year of study, students will experience the highest levels of stress due to the new academic environment and expectations. But it is not clear whether the stress levels are higher in the first year or in the last year of study. It would be good for the same group of students to periodically fill in the "Academic stressors" scale, thus retesting the results. In addition, university students and high student comparisons can be made to test differences in the experience of different stressors.

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