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## EDUCATIONAL PSYCHOLOGY & COUNSELLING | RESEARCH ARTICLE

# Pedagogical aspects of the development of academic stress

Jana Martincová<sup>1\*</sup> and Michaela Bílá<sup>1</sup>

**Abstract:** Stress and its effects bring a number of problems and complications for university students. Long-term and frequent exposure to negative factors can lead not only to students dropping out of studies but also to the development of health complications. The aim of the present study was to analyse the pedagogical aspects that contribute to the emergence and impact of academic stress, with more than half of the respondents reporting that they encountered stressful situations at least twice a week. One of the biggest burdens the students indicated was performance assessment, with the traditional grading system reported as insufficient to their needs. Other elements were reported as contributing to the development of stress, including the attitude of teachers, the lack of information about the university operations as well as the perceived lack of meaning in the presented curriculum. The questionnaire and other tools used for data collection and analysis were suitably adapted to the university context, with the research sample consisting of 984 students. The data were analysed using factor exploratory analysis, the Pearson correlation coefficient and the coefficient of determination. Six factors were extracted by exploratory factor analysis: organizational aspects, communication, meaning of study, perceived deprivation, interpersonal relationships, and university environment.

**Subjects:** Study of Higher Education; Educational Psychology

**Keywords:** educational situation; university; academic stress; stress management; pedagogical aspects

### 1. Introduction

The period of university studies is perceived by many students as challenging (Huang et al., 2020), with a number of pedagogical situations contributing to the emergence and impact of academic stress. High levels of experienced stress lead to the development of undesirable changes, including in the student's motivation to complete tasks, accomplish goals and even to continue studies. The finding that stress can significantly impair the physical or mental health of an individual and cause serious health complications has been confirmed by a great deal of contemporary research emphasizing the importance of alleviating stressful situations in the school environment (Ali et al., 2015; Babakova, 2019; Corrales Riveros et al., 2021; Gallego et al., 2014; Habibi Asgarabad et al., 2021; Trigueros et al., 2020).

University students are faced with a wide range of activities, experiences, and problems to which they must respond. The educator, whose actions can lead to a reduction of or increase in stressful situations for students, is the key actor in the university environment (Trigueros et al., 2020). Mutual cooperation between the student, the teacher and the university itself is vital in creating a positive school climate, fostering personal skills and establishing positive relationships, all of which can help prevent the effects of academic stress. A number of questions may be posed in this context. Which pedagogical aspects do students identify with at university? How do these pedagogical aspects relate to academic stress? The aim of this paper is to begin to address these questions to bring the discussion to a deeper exploration of the pedagogical aspects of academic stress.

## 2. Theoretical background

Studying at university is a crucial and stressful period of transition from late adolescence to emerging adulthood (Bruffaerts et al., 2018; Bulanda et al., 2018; Gresham & Karatekin, 2022). A number of expert authors have emphasized that universities should primarily be committed to developing new knowledge and deepening existing knowledge by offering suitable opportunities for further development (Raposo & Do Paço, 2011; Sánchez, 2011). The demands of the education system have been evaluated in existing research as quite high, often requiring a reorganization of time management and life domains for the individual (Manrique-Millones et al., 2019). These adjustments can be difficult for many students. In combination with other educational situations that can have a negative effect on the individual, the effects of academic stress become even more intense, putting university learners at risk of both health complications and other problems in their personal and professional lives (Martin, 2009; J. Reid & Poole, 2013).

Students come into contact with many types of educational situations during their studies. Each situation may affect each learner in a different way, leading to various types of reactions from each individual (Dobrova, 2021). Once an individual assesses a certain condition as challenging or even threatening and perceives no suitable options to cope with the circumstances (Glozah, 2013), the risk of academic stress increases (Quincho et al., 2021). Stress levels of students escalate to different extents in various ways (Bedewy & Gabriel, 2015). Stress develops based on stimuli such as not meeting expectations, poor academic performance, homework load, challenging exams (Dhull & Kumari, 2015), group projects, or the organization of the educational system itself (Karaman et al., 2019).

While stress is seen as a motivator for some students and encourages them to be active, it leads to problems for other students (Jogarathnam & Buchanan, 2004). Exposure to a reasonable amount and degree of stressors has been shown to instill an appropriate motivation to learn. However, in excess stress adversely affects student performance and induces anxiety and feelings of powerlessness (Ali et al., 2015; Khanekheshi & Basavarajappa, 2011; Rajasekar, 2013). A student's self-confidence plays an important role in coping with educational situations. With healthy self-esteem and perspective, students are able to successfully engage in learning activities, set goals and work hard to achieve them (Akbari & Sahibzada, 2020). On the other hand, low self-esteem can create barriers, fear, anxiety as well as feelings of futility and inadequacy, all of which may negatively affect a student's performance. The learning process and class participation are also often significantly affected. Students with low self-esteem do not actively engage in the classroom, which affects their vulnerability in the learning process (Rubio, 2007). Benabou and Tirole (2002) have highlighted self-esteem as having a major impact on a student's motivation and ability to solve university problems. This is a finding confirmed by Dong (2014), who found that exposure to academic stress has a negative impact on motivation, and students with higher levels of stress have lower levels of motivation to achieve their desired outcomes.

One of the factors behind the development of academic stress is the university environment itself (Monzón Martín María, 2007). New students are expected to adapt quickly (Dziegielewski et al., 2004). It is assumed that learners will perform the duties presented and will thus prepare

themselves to pursue future careers (Rajasekar, 2013). To alleviate the stress that university life places on students (and which they place on themselves), it is important that the university provides a safe and nurturing environment for students. In this context, Putwain (2007) mentions student evaluation by academic staff as particularly stressful, a finding also confirmed by Habibi Asgarabad et al. (2021). Other stressors that are specific to studying at university include testing and examinations as well as the large number of assignments and the limited time to complete them (Habibi Asgarabad et al., 2021), leading a lack of free personal time (Pluut et al., 2014). In our research investigation we have worked with all of these variables to confirm their significance.

Educational situations that cause students to experience states of stress lead to lower academic achievement and have a negative impact on student self-esteem and dropout rates (Habibi Asgarabad et al., 2021). Self-esteem is an important psychological construct that influences a student's academic performance (Kukulu et al., 2012). It is important to identify educational situations that put university students at risk for both poor academic performance (Andres & Grayson, 2003) and health problems (Bruffaerts et al., 2018). All schools at every level should strive for the holistic development of its students (Arnaiz-Sánchez et al., 2020), as the practices and actions that schools implement can greatly facilitate both the processes leading to students' educational development as well as their overall wellbeing (Flecha & Buslon, 2016; Muro et al., 2018).

### 3. Purpose of research and methods

A great deal of research has examined academic stress primarily from a psychological perspective (Carballo et al., 2020; Chacón-Cuberos et al., 2019; Nazari & Far, 2019; Ranasinghe et al., 2017), whereas an examination of what actually causes academic stress in the educational reality of the university environment remains neglected. Many research studies have investigated pedagogical variables that influence or correlate with academic stress levels. Examples include the relationship between academic stress, perceived student performance, and academic engagement (Ma & Bennett, 2021), as well as links between approaches to learning, perceived stress, and expected and actual outcomes (Ohrstedt & Lindfors, 2018). Other important pedagogical variables viewed in relation to academic stress are academic achievement (Kötter et al., 2017), learning styles (Magnavita & Chiorri, 2018), as well as student self-efficacy (Crego et al., 2016). Nevertheless, research that explores and extracts the pedagogical aspects of academic stress is rare. To attempt to fill this gap, the main objective of our research is to extract the pedagogical aspects of academic stress and place them in pedagogical categories and, furthermore, to analyse the relationships among these pedagogical aspects in terms of how they relate to the perceived intensity of academic stress by students. We thus pose this **research question**: *Which pedagogical aspects induce academic stress in students?*

In the context of this study we examine distress, a major negative connotation of academic stress, which is defined here as the type of stress that occurs in students, researchers and other actors in an academic environment as a negative reaction to demands placed on these individuals. The student respondents were introduced to this definition of academic stress, following which they filled out a questionnaire based on this definition. The potential positive consequences of academic stress are not explored in this research.

#### 3.1. Research tool

The research was conducted using a questionnaire containing 28 scaled items. Students expressed their level of agreement with a particular statement on a 5-point Likert scale ranging from *strongly agree* to *strongly disagree*. The statements were developed from the available theoretical resources in the field of pedagogical situations in higher education. A pre-survey was then conducted with more than 50 respondents, from which a working group was formed with task of evaluating whether the research tool was construct valid and corresponded to the educational reality of the university environment, with Cronbach's alpha found to be 0.833. We consider the

research tool to be reliable. The questionnaire was administered online in November 2021 during the period of digital education mandated as part of the Czech government's response to Covid-19.

The development of the research instrument took place through several phases. In the first phase, the research tool was conceived on the basis of a theoretical grounding in pedagogical situations (constructs, processes and pedagogical environment) based on the analysis of current professional knowledge on this topic. In the second phase, a peer audit and an assessment was implemented by experts composed of pedagogues and psychologists who focus on university pedagogy as well as themselves practice within the academic environment. In the third phase, the construction of the questionnaire was verified by preliminary research in the form of focus groups of university students ( $n = 60$  students). The learners assessed the relevance of the questions asked, the appropriateness of pedagogical situations as well as the overall construction of the questionnaire. After the pre-research was completed, the main research project itself was carried out, in which the construct validity was calculated by exploratory factor analysis, the calculation of which is provided below.

#### **4. The research was approved by the ethics committee of the university**

##### **4.1. Research cohort**

The primary research cohort of randomly selected university students consisted of 984 respondents, 252 males and 732 females, i.e. women comprised 74% of the research population. To verify the distortion of the results by this fact, we used the Independent Sample T-test to determine the variable intensity of academic stress ( $\bar{X}_{\text{females}} = 2.59$ ;  $\bar{X}_{\text{males}} = 2.95$ ). No statistically significant differences are present between the average number of points in the perceived intensity of academic stress between men and women ( $t = 3.537$ ;  $p = .182$ ). The results correlate with the results of other major studies that do not confirm a link between the level of academic stress and gender (Al-Dabal et al., 2010; Elani et al., 2014; Stetz & Stetz, 2016). As we were interested in the distribution of the research cohort by year of study and field of study, the study focus was divided into seven separate studies (see Table 1). The majority of the students in the research cohort were in their first year of undergraduate studies ( $n = 524$ ). These students may be expected to perceive higher levels of stress due to their ongoing adaptation to the university environment. 250 students were in their second year of undergraduate studies, with 173 respondents in their third year of undergraduate studies.

Only 37 of the 984 respondents were studying for an advanced master's degree. In terms of the form of education, 793 respondents were studying full-time, 190 respondents part-time. The representation of the research cohort in terms of study focus was evenly distributed across all study programs.

##### **4.2. Statistical methods**

The data were analyzed through exploratory factor analysis with a varimax factor rotation for which the conditions were checked prior to use, with all conditions fulfilled. Subsequently, descriptive statistics of the data were employed on the individual extracted factors. We then proceeded with a correlation analysis of the data and the calculation of the coefficient of determination. For data analysis, the statistical software IBM SPSS Statistics 28.0 was used.

#### **5. Results**

The exploratory factor analysis (hereafter FA) was calculated from the 28 items of the questionnaire. In these items, students responded to the level of perceived stress that a given educational situation at the university causes them. Using FA, all aspects of the applicability of this analysis were verified. This is evidenced by the table showing the results of the KMO test and Bartlett's test (Table 2). The KMO value is 0.837, i.e. at a very good level. The number of factors, which was not predefined, was determined by using a scree plot and statistical calculations.

**Table 1. Distribution of the research cohort by field of study**

Focus of study	Study program:	Percent	Frequency
Pedagogical	Kindergarten teaching, first grade teaching at primary school	14.7	145
Humanities	Social pedagogy, andragogy	15.1	149
Economic	Economics and Management, Process Engineering, Production Engineering, Finance and Taxation, Business Economics, Public Administration,	12.1	119
Art	Space Creation, Industrial Design, Clothing Studio, Product Design, Shoe Design, Audiovisual Design, Marketing Communication	21.2	209
Technical	Software Engineering, Safety Technology, Intelligent Systems with Robots, Food Technology and Evaluation, Biomaterials and Cosmetics	12.4	122
Nursing	General Nursing, Midwife	1.9	107
Linguistics	English for Management Experience, German for Management Experience	13.5	133
Total		100 %	984

**Table 2. Kaiser-Meyer-Olkin Test and Bartlett's Test for Factor Analysis**

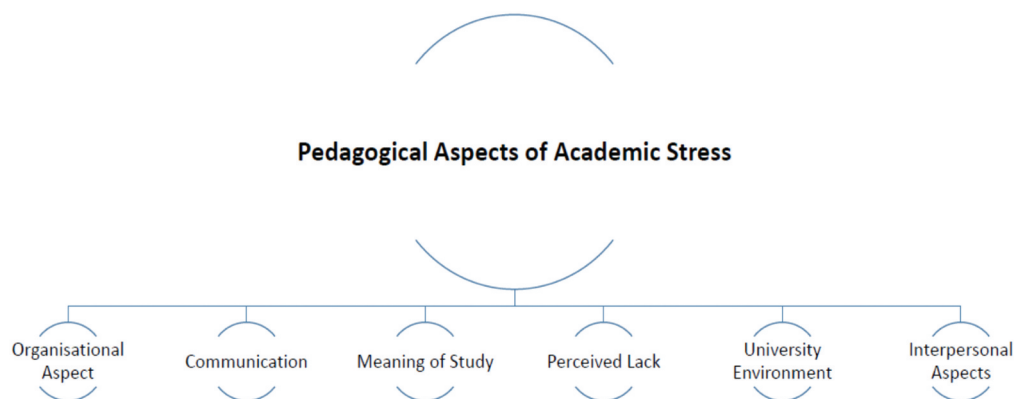
KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.837
Bartlett's Test of Sphericity	Approx. Chi-Square	6184.335
	df	378
	Sig.	.000

After evaluating the P-P Plots and all aspects of exploratory factor analysis, we proceeded to the actual extraction. Six factors were extracted from the analysis. Based on the varimax factor rotation, the following factors were created: communication, interpersonal aspects, meaning of study, scarcity, organizational aspects, and university environment. These factors (Figure 1) explain **49% of the variance** in the questionnaire items.

In Table 3, we can see the definitions of each extracted factor along with their assignment to a pedagogical category. The definition of the rotated factors is based on the individual questionnaire items that saturate the factor. A more detailed description of each factor is given below.

In the Table 4, the **communication factor** (mode = 12.54,  $\emptyset = 10$ ; interval  $5 \leq x \leq 30$ ) focuses on the educational aspects that require the student's own expression. These situations are often associated with a student's self-presentation, project defence as well as oral examination. Included here are certain specifics such as expertise, scientific language, terminology, and culture of presentation, all of which are factors that cause students to experience academic stress. This

Figure 1. Extracted factor variables from FA.



experience has been confirmed by a number of studies by prominent authors (Habibi Asgarabad et al., 2021; Jesús de la Fuente et al., 2021). Most often, students reported that they were very stressed by oral exams ( $\bar{X} = 1.84$ ), having to present a theme, term paper or assignment in front of others ( $\bar{X} = 2.33$ ), defending their own project ( $\bar{X} = 2.22$ ) as well as having to publicly evaluate their opinion ( $\bar{X} = 2.91$ ). On average, the lower the students scored, the more stressful this pedagogical aspect was for them. On the contrary, the students indicated that it is easy for them to express their opinion in class and that this situation does not cause them an increased level of stress.

The second factor is **organizational aspects** (mode = 16,  $\bar{X} = 16,75$ ; interval  $6 \leq x \leq 36$ ). More than 60% of students reported that it is the organizational aspects that cause them a lot of stress. This mainly takes the form of the assessment of the student's performance by an A-F grade or a written examination. A significant problem for students from an organizational point of view is meeting deadlines at university ( $n = 774$ ; 79%), a perception which may be due to the poor time management of students. The second most stressful organizational aspect is the rapidly changing university environment and the related adaptation problems of students, with 59% of students indicating the need to adapt as causing them academic stress. Conversely, the least stressful item ( $n = 391$ , 40%) was student evaluation in the form of grades (A-F). The obligation to be evaluated with a grade follows from the study and examination regulations along with the accreditation parameters of the study programs.

Students also experience **deficiencies (Perceived Lack)** during their studies that cause them academic stress (mode = 10,  $\bar{X} = 11,36$ ; interval  $5 \leq x \leq 30$ ). The limitations that make studies difficult include: lack of study materials, lack of information about the course of study or unclear and insufficient information from the teacher. Students also find it very stressful if they have less time than they need for a test. Question 1 refers to the statement "I have less time to complete a test than I need": 51% of students agree that they have a lack of time to complete tests and this causes them excessive stress. Only 6% of students have not encountered this situation, and 4% of students ( $n = 43$ ) have not indicated a problem with this situation. The finding of more than half of the students perceiving that they do not have enough time to complete tests is an alarming percentage. Students also feel a lack of study materials (Q6), with 38% of students feeling stressed because of this lack. 12% of students report that they have enough materials at their current stage of study and this aspect does not cause them academic stress. A number of students feel a lack of sufficient information about their studies (Q7), with only 5% of students reporting that they have never encountered this situation in an academic setting. Nevertheless, 46% indicate that lack of information is one of the factors that contribute to academic stress. The last question measuring this factor explored the lack of clarity of information that students receive about assignments from teachers (Q25). 64% of students report that lack of clarity causes them academic stress ( $n = 604$ ), with the most strongly felt lack being the vagueness of the tasks and the lack of time to complete the tests.

**Table 3. Operationalization of rotated factors from exploratory factor analysis**

Rotated factor	Variable definition	Questionnaire items	Factor Load.	Pedagogical category
Organizational aspects	Organizational aspects include pedagogical situations that are related to the organization and assessment of studies, such as deadlines at the college, A-F grading, self-study and giving feedback.	Q0: I have to meet all my university deadlines.	.533	Educational environment external
		Q16: I have to study by myself (self-study).	.590	
		Q18: When the teacher evaluates my own performance with a grade (A-F).	.640	
		Q20: Written examination.	.673	
		Q21: I have to adjust (adapt) to the rapidly changing conditions at university.	.601	
		Q27: If I receive feedback on my work only in the form of grades.	.534	
Perceived Lack	Students perceive deficiencies mainly in the areas of time, the amount of study materials, information about studying and unclear instructions in the course they are studying.	Q1: I have less time to complete the test than I need.	.588	Educational construct
		Q6: A lack of study materials.	.512	
		Q7: Lack of information about the progress of study.	.518	
		Q25: Unclear or insufficient instructions given in advance for processing the task.	.601	
		Q24: Lack of time to study due to employment obligations.	.624	
Communication	The pedagogical aspect of communication includes expression of students' opinions in class and presentation of seminar papers to others. In addition, the communication factor includes the defence of one's own project, self-reflection and oral examination.	Q4: I have to express my opinion in class.	.703	Educational process
		Q5: I have to present a topic, a term paper, or an assignment in front of others.	.739	
		Q17: When I have to publicly evaluate my own performance in class.	.640	
		Q22: Oral exam.	.504	
		Q23: Defense of my own project.	.641	

(Continued)



**Table 3. (Continued)**

Rotated factor	Variable definition	Questionnaire items	Factor Load.	Pedagogical category
Meaning of Study	Another pedagogical aspect is the meaning of the curriculum, namely the unclear objective of the lesson, requiring too many activities to complete one subject, repetition of the same information over and over again, non-linkage of the knowledge from each subject or impossibility to express one's opinion.	Q2: I do not understand the point of the curriculum.	.673	Educational process
		Q3: The goal of the lesson is not clearly defined.	.684	
		Q9: Repetition of the same information over and over again.	.433	
		When the teacher requires too many activities to complete one subject.	.559	
		Q11: Teachers do not know what we do in other subjects, and they do not connect information from individual subjects to each other.	.525	
University Environment	The pedagogical aspect of the university environment includes the social climate at the university and the overall behavior of the university towards students (internal university policy).	Q13: Social climate at the university (communication between the university and students, relationships at the university between teachers, administration and students).	.836	Educational environment external
		Q14: The behavior of the university towards us as students (internal policy of the university towards students).	.810	

(Continued)

Rotated factor	Variable definition	Questionnaire items	Factor Load.	Pedagogical category
Interpersonal aspects	The interpersonal factor is fulfilled by the inappropriate evaluation of the student's activity by the teacher as well as the students' ignorance regarding each other.	Q12: At the seminar, I am in a group with classmates I do not know.	.308	Psychosocial educational environment
		Q8: I cannot express my opinion during the lessons.	.668	
		Q15: The teacher grades my work in an inappropriate way.	.481	
		During the lesson, the teacher finds out what I (we) know about the topic with the help of a short test.	.422	
		Q:26: Other students evaluate my performance in class.	.357	

The perceived deficiencies are followed by the **meaning and connection of information during the study** (mode = 20,29,  $\emptyset$  = 18; interval  $5 \leq x \leq 30$ ). The overall meaning of the curriculum is one of the least stressful pedagogical situations based on the extracted factors. 368 students report that if they are unaware of the meaning of the subject matter, this situation causes them academic stress. Of the five analyzed questions, the least stressful for students refers to teachers repeating the same information, a pedagogical situation which 122 students have not yet encountered. This may be due to the fact that a significant part of our research population consisted of first-year students. On the contrary, it is most stressful if the teacher requires too many activities to complete one subject, with 718 students (73%) reporting that being overwhelmed with assignments has caused them academic stress. Based on the analysis of the open-ended supplementary question in the questionnaire, the students indicated that to a great extent that they do not see the point in completing an excess of tasks and consider it one of the biggest burdens during their studies.

The last two factors are **interpersonal factors** (mode = 14,  $\emptyset$  = 13.94; interval  $5 \leq x \leq 30$ ), which saturate five items in the questionnaire. The least stressful pedagogical situation from this extracted variable referred to students being unable to express their opinion in the seminar (mode = 4,  $\emptyset$  = 4.46), with only 8% of students indicating stress from this situation. On the contrary, it is most stressful if the teacher seeks to determine what the students know during the lesson with the help of a short test. Up to 48% of students perceive this pedagogical situation as very stressful. Nevertheless, this is not a surprising result. Overall, the analysis of the data shows that exams and testing are one of the most stressful pedagogical situations at the university. The analysis also shows that only 42% of students do not feel stress if the teacher evaluates their work inappropriately. This may be due to the fact that students do not have enough information about the assessment method and do not know what the teacher expects from them.

The last variable monitored is the university environment (mode = 6,  $\emptyset$  = 6.9; interval  $2 \leq x \leq 12$ ). This extracted factor saturates two items of the questionnaire investigating the social climate and behavior of the university towards students. Social climate is an environmental factor that causes

**Table 4. Descriptive statistics of variables of explanatory factor analysis**

Variables	N	Mean	Mode	Std.dev.	Number of questionnaire items	Scoring Interval	
						Min	Max
Organizational Aspects	984	16.75	16	5.17	6	36	
Perceived Lack	984	11.33	10	3.93	5	30	
Communication	984	12.54	10	4.91	5	30	
Meaning of study	984	20.29	18	4.76	5	30	
University Environment	984	6.90	6	2.55	2	12	
Interpersonal Aspects	984	13.94	14	3.84	5	30	
Intensity of Stress	984	2.68	2	1.40	1	6	

**Table 5. Pearson coefficient of correlation between research variables**

Variables	Interpersonal aspects	Communication	Meaning of Study	Perceived Lack	Organizational Aspects	University Environment	Stress intensity
Interpersonal aspects	1	.413**	.350**	.352**	.363**	.232**	.177**
Communication	.413**	1	.131**	.257**	.355**	.100**	.241**
Meaning of Study	.350**	.131**	1	.506**	.263**	.314	.217**
Perceived Lack	.352**	.257**	.506**	1	.279**	.303**	.323**
Organizational Aspects	.363**	.355**	.263**	.279**	1	.268**	.340**
University Environment	.232**	.100**	.314	.303**	.268**	1	.191*
Stress intensity	.177**	.241**	.217**	.323**	.340**	.191*	1

\*\*Pearson correlation coefficient is statistically significant at the 0.01 level of significance

**Table 6. Determination coefficient for substantive interpretation**

Variables	Determination coefficient	Interpretation
Perceived lack x meaning of study	$r^2 = 0.26$	26% of the differences in the level of perceived lack during study can be explained by the perceived purpose of study
Communication and interpersonal relationships	$r^2 = 0.17$	17% of the differences in the level of communication increasing academic stress can be explained by interpersonal aspects

stress in 37% of college students, with fewer students ( $n = 277$ ; 28%) stressed by the university's behavior towards students, i.e. communication between the university and the student along with relations at the university between teachers, administration and students. The questionnaire measured the **perceived intensity of academic stress** during university studies. A total of 542 students reported experiencing academic stress more than twice a week during the academic semester. This is a very high and alarming figure, representing almost 55% of the respondents in the research cohort. Data analysis confirms the results of many expert studies that highlight that academic stress is a common occurrence in higher education (Acharya Pandey & Chalise, 2017; Bedewy & Gabriel, 2015; García-Martínez et al., 2021; Manrique-Millones et al., 2019).

To detail the results, after assessing the normality of the data we calculated the Pearson correlation coefficient for the individual factors as well as their correlation, with the data shown in the Table 5. It is clear that for all the factors calculated there is a statistically significant relationship between the perceived intensity of academic stress and the extracted factors from FA, although this relationship is very low. The highest strength of relationship (a moderately close relationship) is observed between perceived deficiencies during studies and the meaning of study ( $r = 0.506$ ). There is also a moderately close relationship between situations that require communication and interpersonal aspects. In the other measured correlations, according to Guilford's interpretation the tendency is towards a not very close relationship.

For a more accurate description, we add the determination coefficient to the calculated value (Table 6). This clarifies the substantive argument of the research. We have calculated this coefficient of determination only for variables that have been shown to be moderately closely related.

We also examined the frequency of perceived stress to determine if there was a statistically significant difference between the mean level of perceived academic stress for each factor in relation to the intensity of academic stress, i.e. whether students who experience academic stress more often achieve higher levels of academic stress in each factor. In our case this assumption was not verified, as the significance level for the extracted factors was greater than 0.05.

## 6. Discussion

The higher education system is characterized by significant changes that students face throughout their studies (Dada et al., 2019; García-Martínez et al., 2021). The analysis of our data has shown that it is the rapid adaptation to new environments and conditions that is burdensome for students. Unlike the previous types of education the students have been through, at university it is necessary to adopt effective study habits and appropriate planning and time management strategies (Ulu, 2019). The most difficult period of study at university has been found to be the first year for students (Babakova, 2019), a finding we can confirm based on the results, as we can assume that the lack of information about the study process prevails primarily in the first months when the individual is adapting to the new environment. In subsequent years of study, students seem to adjust to the university environment and system, encountering fewer surprises. The overall structure remains the same, with only the subjects and teachers changing along with

their requirements. Students generally already have a clear idea of how things work at a particular university along with personal experience in negotiating the system. The respondents' statements in the open-ended question confirm that the initial months before they obtain knowledge of the system and how the university functions are stressful for them. Statements such as the following were obtained from the student respondents: "The thing that stresses me out the most is that I haven't had the experience of exams and how they go." "Since I'm in my first year, I'm worried about plagiarism problems." "In my case, the first two weeks of university were the most stressful, with countless term papers and assignments due, and generally I had to get to know everything and integrate into a completely new environment." Most of the students' testimonies indicated that they found university studies challenging in terms of a lack of free time. The findings show that students lack experience in time management, which often puts them under the pressure of meeting deadlines. A necessary skill during university studies is that of self-study, which may be a source of stress for students (García-Ros et al., 2018) and is related to a perceived lack of time. The findings of the research yielded an interesting finding regarding the lack of study materials and the greater obligation to study outside of teaching hours. It can be assumed that inadequate materials are one reason students may find it challenging or frustrating to work outside of the classroom.

One of the most influential factors is the evaluation of students with regard to examinations. Results by Carver and Scheier (1994) report that students perceive exam stress as quite threatening and even harmful. Despite the fact that this study is nearly 30 years old, our own results show that students regard the assessment of their work, progress and knowledge continues as one of the major stressors. Student dissatisfaction with the traditional concept of grade-based assessment may be related to this aspect. Respondents reported: "Only grades and no feedback." "I am the last one in the alphabet during the assessment of the term paper, so the teachers are already tired, so they only give me a bad grade for the paper without an explanation or critique, so I don't know what I am doing wrong or how to improve." "Letter grading (A-F) isn't exactly the best solution either; since students are comparing themselves to each other and someone with a lower grade than their friend may feel inferior. They may feel that they could have spent more time on the preparation, or they might just have been having a bad day." University students are constantly exposed to impersonal assessments that encourage competition among them (Dyrbye et al., 2006). Simple letter grading with no further feedback from teachers does not take into account the specific abilities and skills of individuals.

An integral pedagogical aspect of the emergence of academic stress is interpersonal relationships. The most common source of academic stress is an inappropriate teacher-student relationship. In the open-ended question, respondents reported: (issues with) "Lessons with one particular teacher." "This unnamed teacher told us that there were too many of us in the field; she said a lot of us should leave. She expected some of us to give up or not make it during our studies." "I am stressed by the teachers' obsession with rules which were not explained to us properly. An obsession with forms to follow that we have not been given enough information about. And her exaggerated behavior during classes (banging the table, raising her voice). And the use of institutions (commissions, etc.) as an argumentation lever." These findings are very disturbing. The teacher should be the key person that students can turn to and find the support they need, whether in the case of personal or academic difficulties (Trigueros et al., 2020). Based on these results, teachers have work to do to not only reduce academic stress, but also decrease the effects and impact of it. Concerning power dynamics in the classroom, along with the authority teachers assume in the learning environment, educators should take into consideration the potentially vulnerable position their students have been put into. In addition to decreasing stress, creating a pleasant, nurturing atmosphere in the class also leads to more effective learning outcomes. Academic stress leads to poor performance, difficulty adapting (Robotham, 2008) and a predisposition to health complications in students (Manrique-Millones et al., 2019). As teachers are crucial in the development of academic stress within their subjects, they can also be key actors in the alleviation of this stress, leading to a productive experience and harmonious environment for all.

It is important to emphasize that each individual may perceive a certain situation in a completely different way. Experiencing specific events affects an individual's personality, self-concept and frustration tolerance (García-Martínez et al., 2021). Differences in past experiences, temperament and personality may explain why the statements of the respondents vary, to a lesser or greater extent. Still, even keeping in mind such diversity, the results of the analysis show that 55% of students experience stressful situations more than twice a week.

The impact of academic stress on a large scale is alarming. While low stress levels can encourage students to perform better, even this outcome cannot be assumed in the presence of ineffective management and inappropriate educational strategies (Jayasankara Reddy et al., 2018). It is therefore important that educational institutions provide sufficient opportunities to deepen the relationships between students, teachers and the university itself. Such a concept involves strengthening constrained areas, optimizing weaknesses throughout the educational system, and providing appropriate tools to reduce academic stress (M. Reid et al., 2019). To accomplish all of this, it is essential to identify the sources of academic stress and to set up appropriate collaboration between teachers, students and the university.

## 7. Conclusion

In this study, we have presented a research investigation focused primarily on the pedagogical aspects behind the emergence and development of academic stress. We found that 55% of students experience stress at least twice a week. Given the fact that each individual perceives the source of stress as stemming from different situations as well as the degree of stress (Ekpenyong et al., 2013), the results obtained are very concerning, thus there is a clear need to look into this area in more depth.

We have delineated and examined in detail 6 pedagogical aspects that cause excessive exposure to academic stress. Students encounter stress primarily through interpersonal relationships in which they do not perceive a high level of support from teachers (Fariborz et al., 2019). Another aspect that negatively affects the abilities of students to cope is examinations along with other performance assessments. Dissatisfaction with letter grading as a performance assessment shows a need for the use of modern methods of pedagogy that are currently being proposed and discussed. In this context, many of the student respondents reported that education has remained the same for several decades, with the students themselves perceiving that changes are needed based on their experiences in educational systems.

Clearly, research into the pedagogical aspects of academic stress is a pragmatic theme that requires deeper investigation. For this reason, our ongoing research work focuses on qualitative studies through which a deeper understanding can be obtained of the pedagogical aspects that cause student academic stress and negatively affect the study progress of learners.

Reducing student academic stress should be a key priority for university management and university teachers. A number of practical recommendations can be made in this area: (1) providing resources and support to students, especially in terms of academic counseling, psychological counseling as well as scholarships. The purpose of this support is to optimize the study and personal life of students. (2) Monitor the effectiveness of communication between teachers and students. Set the parameters and intensity of communication and monitor the level of communication between academic staff and students as well as draw conclusions from the assessment of teaching quality in order to strengthen pedagogical competences in relation to conducting effective communication and dialogue in teaching. (3) Strengthening flexible forms of education that allow for the adaptation of education to the student. This model is evident in developed countries such as Norway, with efficacy increasing with the development of digital education technologies. (4) Supporting the critical thinking of students along with their individual learning styles to strengthen student resilience. (5) Strengthening pedagogical competences in the areas of error management, feedback, subject structure and curriculum work, activation methods in teaching,

project teaching, collaborative forms of teaching and the use of digital technologies. (6) Support of group work and the development of student associations.

These recommendations must be applied in accordance with the teaching quality system at the university. In addition, strengthening the relationship between academic staff, the university and students is an integral part of effectively reducing academic stress. It is necessary to realize that academic stress does not only affect individuals. Reducing academic stress and the negative burden of an individual has a positive connotation in the field of sustainable development. This has been evidenced in many studies (Bai et al., 2021; Liu et al., 2018; Nair et al., 2020). Low levels of mental health can lead to an overall lower sense of well-being and quality of life. Bai et al. (2021) have shown that students who are exposed to increased academic stress have a higher tendency towards excessive consumer behavior, which has a negative impact on sustainability by significantly increasing the volume of waste, creating a further burden on the environment. Academic stress has thus become an important theme in which the necessity to eliminate pedagogical situations that can increase the negative academic load becomes even more vital.

### 7.1. Limits of research

This research was carried out at one selected university, as the researchers were familiar with the environment and an in-depth interpretation of the data was possible. Another potential limitation we recognize is the configuration of the questionnaire. As part of the research, students were able to answer an open-ended research question about what stresses them out the most at university, with teachers emerging as the most frequent answer. A future questionnaire could thus focus more on the relationships between the university, the student and the teacher. The data were obtained in November 2021 during the period when the COVID-19 lockdown was in effect in the Czech Republic. Online classes at the university began on 9 November 2021, so before this date students had been participating in face-to-face classes for the previous two months. By collecting data at the beginning of the online teaching period, the negative impacts on study results due to the necessary organizational changes in teaching were minimized. The students were invited by the accompanying letter to the questionnaire to evaluate the pedagogical situations in relation to the two months of face-to-face teaching at the university which had previously taken place.

### 7.2. Research ethics

The data collection was approved by the ethics committee of the university. The research file did not contain vulnerable population groups and was implemented in accordance with the GDPR. The students gave their informed consent to the processing of the answers in the questionnaire. The questionnaire was anonymous.

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