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Procrastination of University Students in the context of Personality and Academic Motivation

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Adrián Andraško | adrian.andrasko@smail.unipo.sk
Department of Pedagogy, Institute of Pedagogy, Andragogy and Psychology, Faculty of Humanities and Natural Sciences, University of Prešov, Slovak Republic
—
Nikoleta Baranová | nikoleta.baranova@smail.unipo.sk
Department of Pedagogy, Institute of Pedagogy, Andragogy and Psychology, Faculty of Humanities and Natural Sciences, University of Prešov, Slovak Republic
—
Patrícia Bičkošová | patricia.bickosova@smail.unipo.sk
Department of Pedagogy, Institute of Pedagogy, Andragogy and Psychology, Faculty of Humanities and Natural Sciences, University of Prešov, Slovak Republic
—
Kristína Husivargová | kristina.husivargova@smail.unipo.sk
Department of Pedagogy, Institute of Pedagogy, Andragogy and Psychology, Faculty of Humanities and Natural Sciences, University of Prešov, Slovak Republic
—
Klára Janigová | klara.janigova@smail.unipo.sk
Department of Pedagogy, Institute of Pedagogy, Andragogy and Psychology, Faculty of Humanities and Natural Sciences, University of Prešov, Slovak Republic
—
Marek Mihok | marek.mihok@smail.unipo.sk
Department of Pedagogy, Institute of Pedagogy, Andragogy and Psychology, Faculty of Humanities and Natural Sciences, University of Prešov, Slovak Republic

Abstract | Background: Procrastination can be understood as an excessive mismatch between the original intention and the resulting action, i.e., the gap between commitment and completion of a task greatly exceeds the amount of time required for successful completion of a given task (Bujnovská & Greifová, 2022). Objective: The aim of this paper is to analyse the relationship between procrastination, personality traits and motivation in university students. Method: Personality traits were measured using the BFI-2 S (Kohút et al., 2020). The Procrastination Scale (Gabrhelík, 2006; Lay, 1986) was used to measure procrastination and the Academic Motivation Scale – AMS-C 28 (Vallerand et al., 1989) was used to measure academic motivation. Result: In terms of personality traits, differences between types of procrastinators (mild, moderate, severe) were demonstrated in conscientiousness, openness, and agreeableness. In statistical analyses, we found that higher levels of procrastination were related to: a) lower levels of conscientiousness, openness and agreeableness; b) higher levels of amotivation. Conscientiousness was a significant predictor of procrastination. Discussion: The contribution of this research could be mainly focused on education, since this is where procrastination needs to be eliminated, which will improve not only students' performance but also their overall self-image.

Keywords | procrastination, motivation, students, personality traits

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Background

The phenomenon of procrastination is common in contemporary society. More and more often we postpone our duties to later, and although it is possible to find some advantages in doing so, this phenomenon needs to be eliminated as much as possible. However, in order to eliminate procrastination, we need to know what causes or suppresses it (Doktorová & Kochanová, 2021). In a study on procrastination, Bujnovská and Greifová (p. 875) state: *"Procrastination comes from the Latin verb prostrastinare, which was formed by combining the adverbs "pro" (which implies moving forward, towards someone) and "crastinus" (meaning "belonging to tomorrow")* (DeSimon, 1993, in Ferrari et al., 1995)*. Thus, the very meaning of the word suggests that it is a matter of postponing an activity until later."* Procrastination can be understood as an excessive mismatch between the original intention and the resulting action, i.e., the gap between commitment and completion of a task greatly exceeds the amount of time required for successful completion of a given task (Bujnovská & Greifová, 2022). Despite various approaches to defining the very concept of procrastination, we are inclined towards the definition of deliberate, unnecessary postponement of starting or completing important tasks, which is also associated with unpleasant feelings such as anxiety, depression or guilt (Abbasi & Alghamdi, 2015; Brownlow & Reasinger, 2012; Grunová, 2015, in Magdová et al., 2021). This phenomenon presents a barrier to goal achievement, with the individual being aware of the negative consequences this behaviour entails (Steel, 2007, in Magdová et al., 2021). We also include mood among such negative consequences. On the one hand, mood can be a consequence of procrastination; on the other hand, it can create procrastination. Initially, procrastination is associated with a good mood, but mood tends to get worse as the task completion deadline approaches (Bujnovská & Greifová, 2022). As well as mood, we also include performance here; procrastination can decrease and also increase it. Tice and Baumsteier (1997, in Uhláriková & Križmová, 2022) point out that procrastination leads to poorer performance on the one hand, but, on the other hand, it can mobilise all forces in an individual and motivate them to perform better. Thus, problems can be influenced by external factors as well as personal factors, such as cognitive, emotional and personality aspects of individuals (Steel, 2007; VanEerde, 2003). Milgram (1993 in Ferrari et al., 1995) states that procrastination is a modern disease to some extent, noting that its prevalence is only relevant in countries where technology is advanced and it is important to adhere to a schedule.

Interpretation of the term itself can be based on attitude. What procrastination is to one person may not correspond with another's understanding of the concept. In their research, Steel et al. (2001) understand procrastination as an expression of an excessive mismatch between the original intention and the resulting action, where the gap between commitment and the start of work on a task (or completion of a task) far exceeds the appropriate amount of time required to successfully complete that task, and this occurs particularly in the early stages of a task's existence. In practice, this means that a procrastinator has certain determination to start working on a task but, for various reasons, starts working on it much later than they should or planned to. Most often this happens in the initial phase of work (Nábělková & Ledajová, 2012). But why do we put tasks off to another time? In terms of behavioural psychology research, researchers have discovered that a phenomenon called „time inconsistency" helps explain why procrastination seems to affect us despite our good intentions. This phenomenon is explained using the example of the present and future self. If we realize that our present actions will affect our future actions, but we will see the result later, perhaps years apart, there is an unsatisfactory present state in our brain, and thus we postpone tasks until later. The present self sees the value of immediate reward in procrastination (Clear, 2015).

Schouwenburg et al. (2004) understand procrastination as a personality trait, a feature that manifests itself in behaviour. Individuals exhibit dysfunctional cognitive or behavioural patterns, repeatedly and in different situations, towards postponement of a planned activity. From a cognitive perspective, procrastination is closely related to increased self-criticism, perfectionism, self-doubt and is understood as a consequence of irrational thoughts and beliefs that cause anxiety. Lay (1986), in turn, sees a close connection with the individual's organizational abilities. The procrastinator is disorganized, especially at the cognitive level and in daily activities, as he/she is unable to complete a simple task on time. According to Ferrari (1993), procrastinators' strengths are rationalization and excuse making. They often explain poor work as a result of lack of time, not lack of ability. In doing so, they also justify their behaviour and protect their own self-image (Sliviakova, 2007). Due to ignorance, this concept is often confused with laziness. Gabrhelík (2008) sees the difference in the fact that while a lazy person does not perform any activity, a procrastinator, on the contrary, is very active, but does not do what he or she should do at that very moment.

This phenomenon occurs to a large extent in pupils and students. As the transition from secondary school to university is often very stressful, the student may experience a deterioration in both motivation and desire to work. Thus, student achievement is hindered by academic procrastination, and therefore, a lot of research has been conducted trying not only to understand the factors causing procrastination, but also to eliminate them (Malkoç & Mutlu, 2018). Procrastination in academic settings will be discussed in the following section.

Procrastination in the academic environment

The school environment is the most prone to procrastination, with such behaviours affecting individuals in areas such as high stress levels, restless sleep, feelings of guilt and incompetence or panic over unfinished work. After experiencing these negatives, people promise themselves that they will never again put off their responsibilities and tasks until the last minute, but the situation reoccurs (Kagan et al., 2010). Academic procrastination is thus a fairly widespread phenomenon and a prevalent problem for many students who face a large number of exams, term papers and projects during their studies (Solomon & Rothblum, 1984). The individual engages in more pleasurable activities instead of studying, but gradually the negative effects caused by guilt for avoiding tasks begin to manifest (Lavoie, 2000, in Janssen, 2015).

In their study, Uhlárikova and Križmová (2019) state that the phenomenon of procrastination occurs especially in academic settings, where such behaviour represents irrational postponement of tasks replaced by many other activities that the individual finds more interesting and therefore fills with them the time that should be devoted to academic activities (Swaraswati et al., 2017). According to Schouwenburg (2004), procrastination can be understood both as a behaviour and as a generalised habit or trait, and therefore we will discuss the variables of personality and motivation in the following subsections.

In addition to the different interpretations of the term motivation, in the context of education it can be understood as a phenomenon consisting of an individual's belief in their ability to solve a task, the reasons and goals of completing the task and the subsequent emotional experience of completing the task. For students, academic motivation is the driving force; it is the need to excel on campus (Malkoç & Mutlu, 2018). Motivation in higher education is closely linked to the satisfaction gained from various learning activities, whether it is new knowledge, achievement, praise or the correct completion of assignments (Magdová et al., 2021). It also includes the amount of effort students put into their study, the effectiveness of their study, and their persistence when

faced with challenges (Useher & Moris, 2012).

Authors Malkoç and Mutlu (2018) share the division of motivation into intrinsic and extrinsic. In the case of extrinsic motivation, students find initiative in the forms of praise or recognition from the outside world, while intrinsic motivation drives them in the direction of achieving their goals (Amrai et al., 2011, in Malkoç & Mutlu, 2018). A similar approach can be found when dividing purposes or obligations into "want to" and "have to". Goals bearing the label "want to" reflect personal interests, values of the individual that are both important and meaningful to them. The greater the interest and meaning, the greater the motivation to effectively fulfil them, and this state is assessed on the basis of self-control. Conversely, the perception of obligations labelled "have to" significantly reduces the motivation to achieve them, since the control of fulfilment comes largely from the external environment, the individual works to avoid various forms of sanctions (Milyavskaya et al., 2015).

In addition to extrinsic and intrinsic factors, other factors also influence the relationship between motivation and effectiveness of task performance. The characteristics of the task itself have different levels of attraction for students. Those obligations that students perceive as uninteresting or unpleasant are often subject to postponement of their completion (Schweigerová & Slavkovská, 2015). Motivation also decreases when completing assignments for which the due date is temporally distant from the present (Steel, 2007). Senécal et al. (1995) suggested that students who had intrinsic reasons for continuing their studies were less likely to procrastinate, while those who had extrinsic reasons were more likely to procrastinate. These findings lead to the question of whether the relationship of procrastination to motivation differs depending on whether motivation is determined by own intrinsic or nonautonomous extrinsic reasons.

The links between motivation, the studying process, and achievement were widely elaborated in the past. Research of Rowell and Hong (2013) showed that students who are motivated in their studying are more likely to perceive studying and education as valuable. In addition, they seem to enjoy the actual act of studying and study related activities much more than students who are not academically motivated. On the other hand, students without academic motivation may be more likely to dislike studying in general and also become poor learners who drop out of prospective studies.

Personality and procrastination

The study of personality correlates of procrastination seeks to answer the question why some people procrastinate more and others less, even in the same situations (Gabrhelik, 2008). The individual personality correlates can include neuroticism, conscientiousness, extroversion, openness to experience, irrational beliefs, anxiety, and depression. Neuroticism, as emotional instability, was one of the first personality traits associated with a tendency to procrastinate. Researchers hypothesized that if people procrastinate because of the unpleasantness of the task and its stressful nature, then those who are more prone to experiencing stress should procrastinate more (Steel, 2007). Neurotic individuals are generally characterized by a desire to learn as much as possible about themselves, but at the same time they seek to avoid any negative information about themselves (Ferrari et al., 1995). Thus, neuroticism is not directly related to procrastination, but it is related to fear of failure (Schouwenburg & Lay, 1986), and thus may alter its entire clinical picture. Anxious, neurotic, perfectionistic procrastinators may force themselves to perform much more conscientiously and to a higher quality than "carefree" procrastinators due to their negative persuasion, but they will still be worse off in terms of mental health (Steel, 2007; Schouwenburg, 2004). Another link between procrastination and neuroticism may emerge through direct

relationships to the variables that are now being extracted from the concept of neuroticism in research. Such variables, according to Steele (2007), are depression, irrational beliefs, self-efficacy, self-esteem, and self-handicapping.

Conscientiousness in the context of the Big Five determines the relationship to work, the active process of planning, organizing and implementing tasks. Individuals scoring high on this scale are described as goal-oriented, ambitious, diligent, persistent, systematic, strong-willed, disciplined, reliable, punctual, and orderly. Those with low scores are described as sloppy, indifferent, pursuing their goals with little interest (Hřebíčková & Urbánek, 2001). According to Lay (1986), conscientiousness is a proximal factor of procrastination, but we cannot equate procrastination with lack of conscientiousness, as the latter is defined much more broadly. Similarly, although Steel (2007) acknowledges significant overlap between the conscientiousness scale (NEO) and procrastination (distractibility, organization, level of motivation to perform, and the discrepancy between intention and action), he presumes that conscientiousness is nevertheless a construct defined much more broadly and defines procrastination rather as the most important aspect of lack of conscientiousness. Extroverts are described as sociable and energetic individuals with a tendency to be impulsive, so the assumption is that extroversion could be positively correlated with procrastination. Social activities are a frequent distractor and facilitator of procrastination; on the other hand, positive affect is associated with extroversion, and since lethargy is positively related to procrastination, extroversion should be inversely related (Steel, 2007).

The personality dimension of openness to experience within the Big Five model is characterized by vivid imagination, aesthetic focus, intellectual curiosity, behavioural flexibility, depth of emotional life, and unconventional attitudes (Durkáčová, 2014). The fantasy subscale is defined as receptivity to the inner world of imagination, and only this constitutes an exception. In his meta-analysis, Watson (2001) finds a weak relationship with procrastination. Yet this correlation was given by the relationship with tasks that require verbal reasoning such as studying for exams, essay writing and required reading.

Based on the above information, we consider it important to explore the personality traits of university students and their motivation in relation to their procrastinating behaviour. Magdová et al. (2021) investigated students' academic motivation in a sample of students at the University of Prešov in 2019. We are interested in what is the level of motivation related to procrastination in 2022, as the way of teaching (online teaching) changed in 2020-2021 due to pandemics. Previous research reports the importance of personality traits in procrastination.

Objectives

The aim of this paper is to analyse the relationship between procrastination, personality traits and motivation in university students. Another objective is to compare students with different levels of procrastination in terms of personality and motivation.

Methodology

BFI-2 S (Kohút et al., 2020) Personality traits were measured with the Slovak version of the BFI-2 S. The questionnaire contains 30 items and the respondents answer on a 5-point scale (1 = strongly disagree – 5 = strongly agree). The internal consistency of the scales was – extraversion (ω = .800), agreeableness (ω = .598), conscientiousness (ω = .666), negative emotionality (ω = .803), and openness (ω = .681).

Procrastination Scale (Gabrhelík, 2006; Lay, 1986) The General Procrastination Scale consists of 20 items. The respondent answers on a 5-point scale, where 1 represents "the behaviour is atypical" – 5 represents "the behaviour is very typical". After summing the responses for each item, a raw score is obtained, with higher scores indicating higher levels of procrastination. According to the raw scores, respondents can be classified into three categories. Individuals scoring up to 52 are classified as light procrastinators, moderate procrastinators score 53-63 and those scoring 64 and above are heavy procrastinators. The internal consistency of the questionnaire is ω = .798.

Academic Motivation Scale – AMS-C 28 (Vallerand et al., 1989) Academic motivation was measured using a scale that assesses 7 types of constructs, subscales – intrinsic motivation for knowledge (ω = .868), achievement (ω = .800), stimulation experience (ω = .809), also extrinsic motivation – internalized (ω = .793), identified (ω = .741), external regulation (ω = .565), and finally amotivation (ω = .494). It contains 28 items rated on a 7-point scale (1 = strongly disagree – 7 = strongly agree). The internal consistency of the entire questionnaire is ω = .874.

Research population

The research population consisted of 108 respondents (73.14% female) between the ages of 18 and 31 years (M = 21.51; SD = 2.02). The prerequisites for participation in the research were current enrolment at university and informed consent to participate in the research. Students of the University of Prešov constituted 88.89% of the research population, 5.56% were students of the Technical University of Košice, 2.78% were students of the University of Pavol Jozef Šafárik in Košice, and the remaining students were studying at other universities. The distribution of students in the research population by year was – 7.41% 1st year Bachelor's, 67.59% 2nd year Bachelor's, 6.48% 3rd year Bachelor's, 11.11% 1st year Master's and 7.40% 2nd year Master's.

Method of data collection and data processing

Data collection was conducted online using the available selection in November 2022, with the requirement for participation in the research being a current ongoing study at the university. Respondents were informed of the research objectives and in order to participate in the research, they had to confirm that they were familiar with the research and voluntarily agree to participate. Data were processed in JASP 0.16.4.0 in accordance with the terms of use of statistical methods. Descriptive statistics, one-way analysis of variance, Pearson's correlation coefficient and linear regression (enter) were used to process the results.

Results (and interpretation)

Table 1 shows the individual descriptive statistics (mean, standard deviation, skewness, steepness, minimum and maximum) of each construct measured. We were interested in the extent to which procrastination is present in our research population and therefore, based on the evaluation of Lay's Procrastination Questionnaire, we found that 25% of the students were categorized as light procrastinators, 48.15% as moderate procrastinators, 25.93% as heavy procrastinators, and .92% as non-procrastinators.

Table 1

Descriptive statistics

		N	Missing	Mean	SD	Skewness	Kurtosis	Min	Max
BFI2 S	extraversion	108	0	18.148	5.168	-.052	-.654	7	29
	agreeableness	108	0	22.370	3.569	-.163	-.636	15	30
	conscientiousness	108	0	20.704	4.143	.155	-.510	11	30
	negative emotionality	108	0	18.750	5.351	-.235	-.367	6	30
	openness	108	0	21.065	4.481	-.216	-.307	9	30
	Procrastination (Lay)	108	0	57.546	11.136	-.319	.429	28	84
AMS-C 28	intrinsic motivation - knowing	108	0	18.787	5.866	-.472	-.514	5	28
	intrinsic motivation - achievement	108	0	16.352	5.486	.117	-.364	4	28
	intrinsic motivation - stimulation	108	0	13.648	5.798	.358	-.482	4	28
	extrinsic motivation- identified	108	0	21.315	5.389	-.956	.377	5	28
	extrinsic motivation - internalised	108	0	17.083	5.555	-.272	-.660	5	28
	extrinsic motivation - externally regulated	108	0	21.074	4.646	-.569	.327	5	28
	amotivation	108	0	10.000	5.307	.807	.188	4	27

We were interested in whether there were differences between respondents based on the level of procrastination (light, moderate, heavy) in personality traits (Table 2) and types of motivation (Table 3). We used a one-way analysis of variance to investigate whether group differences were present.

Table 2

Comparison of types of procrastinators across personality traits

Personality traits	Procrastinator	Mean	SD	F	p	Eta Squared
extraversion	light	18.74	6.01	.714	.492	.014
	moderate	17.48	4.81			
	heavy	18.61	5.16			
agreeableness	light	23.81	3.17	3.389	.038	.061
	moderate	22.19	3.31			
	heavy	21.43	4.07			
conscientiousness	light	25.22	2.81	46.612	< .001	.473
	moderate	19.98	3.30			
	heavy	17.54	2.71			
negative emotionality	light	16.74	5.39	2.523	.085	.046
	moderate	19.48	5.41			
	heavy	19.11	4.86			
openness	light	22.93	3.55	3.670	.029	.066
	moderate	20.65	4.70			
	heavy	19.89	4.47			

df = 2, ** p< .001, * p < .05

In terms of personality traits, differences across procrastinator types were demonstrated in conscientiousness (F(2) = 46.612, p < .001), openness (F(2) = 3.670, p = .029), and agreeableness (F(2) = 3.389, p = .038). Specifically (post hoc tests - Bonferroni) light procrastinators (M = 23.81, SD = 3.17) had higher levels of agreeableness than heavy procrastinators (M = 21.43, SD = 4.07), light procrastinators (M = 25.22, SD = 2.81), and moderate procrastinators (M = 19.98, SD = 3. 30) have higher levels of conscientiousness than heavy procrastinators (M = 16.74, SD = 5.39) (with a strong effect) and finally light procrastinators (M = 22.93, SD = 3.55) have higher levels of openness than heavy procrastinators (M = 19.89, SD = 4.47).

Table 3

Comparison of types of procrastinators in terms of motivation

Motivation	Procrastinator	Mean	SD	F	p	Eta Squared
Intrinsic motivation - knowing	light	21.07	6.13	2.898	.060	.053
	moderate	18.15	5.56			
	heavy	17.71	5.88			
intrinsic motivation - achievement	light	17.70	6.71	1.285	.281	.024
	moderate	15.62	4.61			
	heavy	16.32	5.72			
intrinsic motivation - stimulation	light	15.74	6.29	2.528	.085	.046
	moderate	13.10	5.38			
	heavy	12.57	5.83			
extrinsic motivation- identified	light	21.89	5.96	.248	.781	.005
	moderate	21.31	5.63			
	heavy	20.86	4.51			
extrinsic motivation - internalised	light	17.07	5.83	.133	.876	.003
	moderate	16.79	5.31			
	heavy	17.46	5.92			
extrinsic motivation - externally regulated	light	22.00	3.92	.762	.469	.014
	moderate	20.63	4.61			
	heavy	21.00	5.41			
amotivation	light	8.48	5.85	1.625	.202	.03
	moderate	10.52	5.23			
	heavy	10.71	4.73			

In terms of motivation, there were no differences ($p > .05$) between procrastinator types. Next, we were interested in whether there was a relationship between the level of procrastination and individual personality traits and motivation. The results are presented in Table 4. We used Pearson's correlation coefficient to detect relationships between variables.

Table 4

Correlation matrix (procrastination, personality traits and motivation)

	1	2	3	4	5	6	7	8	9	10	11	12
1.procrastination	1											
2.extraversion	.009	1										
3.agreeableness	-.224*	.122	1									
4.conscientiousness	-.646**	.194*	.301**	1								
5. negative emotionality	.124	-.401**	-.247*	-.289**	1							
6. openness	-.225*	.135	.070	.195*	-.069	1						
7. intrinsic motivation - knowing	-.212*	.219*	.168	.230*	-.272**	.352**	1					
8. intrinsic motivation - achievement	-.072	.308**	.135	.143	-.253**	.157	.770**	1				
9. intrinsic motivation - stimulation	-.167	.227*	.078	.177	-.185	.176	.710**	.743**	1			
10. extrinsic motivation- identified	-.026	-.011	.093	.072	.065	.267**	.625**	.482**	.371**	1		
11. extrinsic motivation- internalised	.065	.048	-.164	-.117	-.004	.020	.367**	.631**	.456**	.373**	1	
12. extrinsic motivation - externally regulated	-.037	.029	.175	.048	-.135	.083	.284**	.306**	.165	.574**	.396**	1
13.amotivation	.205*	-.043	-.143	-.098	.034	-.191*	-.539**	-.312**	-.181	-.567**	-.058	-.195*

Negatively significant relationships with procrastination were demonstrated across personality traits between conscientiousness ($r = -.646$, $p < .01$), openness ($r = -.225$, $p < .05$), and agreeableness ($r = -.224$, $p < .05$). The higher the level of conscientiousness, openness and agreeableness of the respondent, the lower the level of procrastination.

A negative significant relationship was demonstrated in terms of motivation and procrastination between intrinsic motivation – knowing ($r = -.212$, $p < .05$). The higher the level of intrinsic motivation – knowing, the lower the level of procrastination. Finally, a positive significant relationship was found between amotivation and procrastination ($r = .205$, $p < .05$). The higher the level of amotivation (absence of motivation), the higher the level of procrastination.

Finally, we entered the correlates of procrastination (agreeableness, conscientiousness, openness, intrinsic motivation – knowing, and amotivation into the regression model. The regression model (enter method) was significant ($F(5) = 16.877$, $p < .001$) and explained 45.3% of procrastination. Only conscientiousness was a significant predictor ($B = -.625$, $p < .001$).

Discussion

The research focused on procrastination of university students in the context of personality and academic motivation, which aimed to analyse the relationship of procrastination, personality traits and motivation in university students. In analysing the results, the highest level of attention was

paid to the link between academic procrastination and motivation and its relationship with personality traits based on the Big Five model. When examining academic motivation, we worked with five levels of internalizing motivation in accordance with R. Ryan and E. Deci (Korbelová & Groma, 2013).

In terms of personality traits, differences between students with different types of procrastination were demonstrated in agreeableness, conscientiousness and openness – those who procrastinate less have higher levels in these personality traits. Consistent with research by Bujnovská and Greifová (2022), the relationship between procrastination and neuroticism was not confirmed. On the other hand, the relationship between agreeableness and openness to experience was confirmed. The more open and agreeable a person is, the lower the tendency to procrastinate. This statement is also contradicted by the research conducted by Uhlárikova and Križmová (2019). As reported by Steel (2007), extroverts are described as sociable and energetic individuals with a tendency to be impulsive. Social activities are a frequent distractor and facilitate procrastination; on the other hand, positive affect is associated with extroversion, and since lethargy is positively related to procrastination, extroversion should have an opposite relationship (Steel, 2007). Consistent with these assumptions, no differences between different types of procrastinators were found in our research population.

When examining the relationship with motivation, a positive relationship between procrastination and amotivation was demonstrated, where the individual sees no reason to act. This contradicts the research conducted by Magdová et al. (2021). Their results confirm a positive relationship with introjected motivation, which we understand as motivation conditioned by external influences, such as different expectations or attempts to avoid feelings of guilt and shame (Korbeľová & Groma, 2013), which was not confirmed in our research. We found that if a student has higher intrinsic motivation, they procrastinate less. According to Milyavskaya et al. (2015), intrinsic motivation is related to finding the right means that can help in achieving the goal. Pupils with intrinsic motivation put more effort in finding the means to achieve the set objectives and encountered fewer obstacles than pupils with extrinsic motivation. Motie et al. (2012) confirmed our hypothesis that intrinsically motivated students procrastinate less. He suggests that students with intrinsic motivation are more conscientious in organizing their work and use more appropriate means to achieve their study goals. Senécal et al. (1995) confirmed to us that intrinsic motivation is more effective against procrastination than extrinsic motivation. Meanwhile, the research results show that students have a high level of extrinsic motivation, which is not as effective in reducing procrastination. Final exams, parents' expectations or future employment may play a big role. Testing this hypothesis would be beneficial in future research.

In particular, we see some limitations of the research in the uneven distribution of respondents in terms of gender and in terms year at university, due to which we were not able to examine differences in procrastination rates across years of study. The self-reporting nature of the questionnaire used also presented some limitations, which could have been a precondition for biasing the results, as each person perceives their level of procrastination with slightly differently. Another limitation is the internal reliability of the two scales in the measurement of academic motivation, amotivation and external regulation, which was lower than $\omega < .700$ and may have affected the reliability of the results. The constructs mentioned above would be well suited to be measured in the future with a more reliable instrument and on a research population that is more representative.

The contribution of the research presented could be directed on education, since this is where the occurrence of procrastination needs to be eliminated, which will improve not only students'

performance but also their overall self-image. As the amount of procrastination decreases with high intrinsic motivation, it is necessary to include such elements, methods or strategies that will stimulate this kind of motivation in students in the educational process. Conscientiousness as a single personality trait has had the greatest impact on the phenomenon of procrastination, so it is recommended that teachers know their students well enough to be able to develop this trait in them through their actions. Since studying at university precedes the choice of a future profession, it would be a good idea to take this information into account – the degree of agreeableness, conscientiousness and openness and the intrinsic motivation of students already when choosing a profession, e.g., in career counselling at schools.

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The research was conducted in compliance with the ethical standards set by the Declaration of Helsinki (1964) and informed consent was provided to all participants.

Anonymized data and materials have been made publicly available at the osf.io and can be accessed at https://osf.io/zaqek/

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Author 1: Conceptualization, Methodology, Data curation, Writing – Original Draft, Writing – Review & Editing.

Author 2: Conceptualization, Methodology, Writing – Original Draft, Writing – Review & Editing.

Author 3: Conceptualization, Methodology, Writing – Original Draft, Writing – Review & Editing.

Author 4: Conceptualization, Writing – Original Draft, Writing – Review & Editing.

Author 5: Conceptualization, Writing – Original Draft, Writing – Review & Editing.

Author 6: Conceptualization, Writing – Original Draft, Writing – Review & Editing.

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