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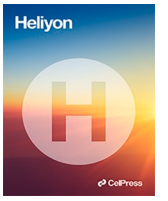

Research article

The role of big five traits and self-esteem on academic procrastination in Honduran and Spanish university students: A cross-cultural study

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ABSTRACT

Academic procrastination, a prevalent issue in higher education, has been associated with various adverse outcomes. This study aims to discern and compare the degrees of academic procrastination among university students in Honduras and Spain while also investigating the relationship between academic procrastination and the Big Five personality factors alongside self-esteem. The sample comprised 457 university students, encompassing 237 Hondurans and 220 Spaniards. The research employed descriptive, comparative, correlational, and regression analyses. Honduran university students exhibited a significantly lower level of academic procrastination. Correlational analyses revealed that self-esteem and all Big Five personality factors, except for neuroticism in the Spanish cohort, displayed noteworthy associations with academic procrastination. Further regression analyses demonstrated that conscientiousness emerged as a significant predictor of procrastination in both samples. This study's findings can be pivotal in identifying students at risk of procrastination at an early stage. Additionally, the results can inform the development of intervention programs designed to mitigate procrastination tendencies among university students.

1. Introduction

Procrastination has been defined as the voluntary and unnecessary delay in commencing or completing tasks originally slated within a specific timeframe despite the individual's recognition that such deferment may yield adverse repercussions [1]. This conduct has been linked to various detrimental outcomes, including unhealthy behaviors [2], elevated stress levels [3], loneliness [4], depression [5], problematic Internet usage [6], anxiety [7,8] and sleep disturbances [9]. Nevertheless, although procrastination has

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traditionally been viewed as maladaptive and undesirable, Chun Chu and Choi [10] proposed the concept of active procrastination, suggesting that not all instances of procrastination are associated with negative consequences. They posit that individuals engaging in active procrastination deliberately defer tasks to leverage time pressure, often achieving successful outcomes by completing them before deadlines. While some individuals procrastinate across various domains of their lives, others confine procrastination to specific areas, such as academics or work [11].

Academic procrastination, characterized by the postponement of planned academic tasks despite its detrimental consequences [12], is pervasive across educational levels, with heightened prevalence at the university level [13,14]. Studies indicate that up to 90 % of university students occasionally procrastinate [15]. Beyond its widespread occurrence, academic procrastination has been consistently linked in the literature to various adverse outcomes in the educational context, extending beyond low academic performance [16]. Such consequences include diminished academic engagement [17], dropout rates [18], and reduced motivation [19]. The prevalence of this maladaptive behavior, causing many negative consequences and hindering effective societal performance [20], underscores the need to investigate both risk and protective factors associated with academic procrastination.

While procrastination is commonly attributed to self-regulation issues [21], emerging research suggests it is a multifaceted process influenced by internal and external factors [22]. Internal factors, such as personality traits, are recognized as potential contributors to procrastination [1,22].

1.1. Academic procrastination and the Big Five personality model

Recent research underscores personality as a significant variable associated with academic procrastination [23–25]. Personality traits are stable emotional, cognition, and behavior patterns [26]. Specific traits within personality taxonomies may be linked to procrastination behaviors in an educational setting. Among the various models, the Big Five personality model [27] has emerged as the most influential in recent decades. This model identifies extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience as the primary personality factors. Numerous studies have established connections between academic procrastination and certain elements of the Big Five model, particularly highlighting conscientiousness [19,28] and neuroticism [24,29].

Conscientiousness is often characterized by organization, persistence, diligence, and adherence to rules [30]. These qualities play a crucial role in fostering students' motivation, as they drive individuals to fulfill their academic responsibilities and surmount possible obstacles [30].

On the contrary, neuroticism is the propensity to perceive routine situations as threatening or stressful [31]. Individuals high in neuroticism are more prone to experiencing negative emotions and struggle with impulse control [31]. Consequently, they may procrastinate, particularly when faced with academic tasks they find challenging or uninteresting, as such tasks induce heightened stress levels [31]. Moreover, those with high levels of neuroticism often resort to maladaptive coping mechanisms like avoidance, further exacerbating the tendency to procrastinate [32].

The remaining dimensions of the Big Five model—extraversion, openness to experience, and agreeableness—have inconsistent correlations with academic procrastination [33]. Concerning extraversion, research yields contradictory results. While some studies suggest that the impulsive aspect of this trait heightens procrastination tendencies [34], others indicate a negative correlation [35] or even no discernible link [36]. Similarly, the relationship between openness to experience, agreeableness, and academic procrastination remains equivocal [37].

1.2. Academic procrastination and self-esteem

Self-esteem, characterized as one's positive or negative attitude toward oneself [38], constitutes another variable frequently associated with various factors in the educational sphere. Elevated self-esteem has been related to enhanced academic performance [39,40], reduced dropout rates [41], and a diminished likelihood of engaging in academic dishonesty [42]. In the context of academic procrastination, a recent meta-analysis by Hidalgo-Fuentes et al. [43], encompassing a sample of 13,233 participants from 35 studies, revealed a moderately negative association between self-esteem and procrastination in students.

Individuals with low self-esteem often exhibit heightened levels of procrastination, partly attributable to their perceived inadequacy in managing academic tasks [44]. Additionally, they tend to harbor a greater fear of negative outcomes stemming from their work [45]. Consequently, students plagued by low self-esteem or feelings of incompetence are more inclined to defer their academic responsibilities in favor of unplanned and less demanding activities. This inclination stems from their perception of failure consequences as unpleasant and menacing, leading to negative emotions [46]. Thus, students wrestling with low self-esteem may resort to procrastination as a form of self-preservation [47]. This association may be reciprocal, as academic procrastination can also exacerbate feelings of low self-esteem. This is because the adverse academic consequences stemming from procrastination contribute to diminished self-appraisal [48]. However, a recent longitudinal investigation [49] revealed that while low self-esteem predicts procrastination, insufficient evidence supports the reverse relationship.

1.3. Academic procrastination and individualism/collectivism

Additionally, a less-explored variable compared to those previously discussed is the individualism-collectivism axis, one of the four cultural dimensions [50] to delineate the national culture of 40 countries and elucidate variations in their inhabitants' behavior. Individualism characterizes societies valuing individual independence, where everyone is expected to care for themselves and their immediate family. In contrast, collectivism pertains to societies where individuals form highly cohesive groups, fostering strong

interdependent relationships where harmony prevails over personal interests [51]. Those in collectivist societies often face pressure to adhere to social norms, and experience heightened anxiety if they deviate [52], potentially leading to lower rates of academic procrastination. Students from collectivist cultures often receive more parental supervision, perceive their parents as nurturing and close [53,54], and tend to cope with academic stress through social support-based strategies. In contrast, students in individualistic cultures may more frequently resort to avoidance strategies for stressful academic tasks, potentially resulting in varying levels of procrastination [55]. Lastly, individuals in collectivist cultures emphasize fulfilling acquired obligations, while hedonic motives are typically highly valued in individualistic cultures [56]. Spain, characterized by a much higher level of individualism (score of 51), stands in contrast to Honduras, which scored 20 in individualism [57]. Recent studies in Spain have extensively explored academic procrastination and its associated factors, including problematic Internet usage [6], excessive social media use [58], subjective well-being [59], and perceived competence and self-esteem [48]. However, there remains a noticeable dearth of research on this behavior in developing countries, particularly in Honduras.

Building on the aforementioned factors, the present research endeavors to compare the levels of academic procrastination among Honduran and Spanish university students. Additionally, the study explores the relationships between academic procrastination, the personality factors delineated by the Big Five model, and self-esteem within both samples. This study represents the first attempt to compare these two countries' procrastination levels in the educational context. Also, it is one of the pioneering efforts to incorporate the individualism-collectivism axis in examining this variable. The aim is for the study's outcomes to inform the development of educational programs geared toward mitigating student procrastination in academic endeavors while enhancing early identification of this behavior.

2. Method

2.1. Study design and participants

The present study is cross-sectional. The inclusion criteria encompassed being a university student, being 17 years of age or older, and providing informed consent to participate in the study. The sample was gathered through non-probability convenience sampling. The target population consisted of undergraduate students from Honduras and Spain. The accessible Honduran sample was recruited from the Universidad Pedagógica Nacional Francisco Morazán, whereas the Spanish sample was obtained from the Universidad de Extremadura. The sample size was determined to optimize the participation rate, considering the available resources and the researcher's ability to administer the survey effectively among the student population. According to the 5:1 rule (i.e. five participants for each item used in the study) proposed by Hair et al. [60], the minimum size required for this study is 225 subjects.

2.2. Instruments

2.2.1. Demographic information questionnaire

The first section of the survey comprised a series of questions regarding age, biological sex, the university of enrollment, and the date of survey completion.

2.2.2. Academic Procrastination Scale-Short Form (APS-SF; [61])

Brando-Garrido et al. [62] adapted the scale for use in Spanish. This instrument is designed to gauge academic procrastination through five items (e.g., "I get distracted by more interesting things when I should be focusing on my academic tasks"). Participants responded to these items using a five-point Likert-type scale, ranging from 1 (total disagreement) to 5 (total agreement). Scores range from 5 to 25, with higher values indicating increased levels of academic procrastination. Yockey [63] conducted a psychometric evaluation of the APS-SF with a sample of US college students, reporting an internal consistency of $\alpha = .87$ and adequate convergent validity with various procrastination measures.

2.2.3. Big Five Inventory (BFI-2-S; [64])

The BFI-2-S represents a condensed iteration of the BFI-2, capturing the five factors of the Big Five personality model (extraversion, agreeableness, conscientiousness, neuroticism, and openness) through 30 items (6 in each dimension). Respondents utilize a five-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree) to express their responses. Recoding is necessary for certain items to derive scores within each dimension. As one of the abbreviated versions derived from the BFI by Soto and John [64], the BFI-2-S demonstrated internal consistency ranging from $\alpha = .73$ to $\alpha = .84$. It also exhibited satisfactory factorial validity in both a sample of university students and a broader, more heterogeneous group of North American adults. The Spanish adaptation by Gallardo-Pujol et al. [65] was employed in this study.

2.2.4. Rosenberg Self-Esteem Scale (RSE; [38])

This scale assesses overall self-esteem by capturing positive and negative feelings toward oneself. The questionnaire comprises ten items (e.g., "I think I have good qualities"), with responses recorded on a four-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). The cumulative score spans from 10 to 40, with higher scores indicative of heightened self-esteem. The Rosenberg self-esteem scale stands out as the predominant tool worldwide for evaluating self-esteem, accounting for 49 % of all citations to self-esteem measures in prominent journals [66]. The Spanish adaptation by Espada et al. [67] was employed.

2.3. Procedure

2.3.1. Data collection

The data utilized for this study were collected through a Google Forms questionnaire. The questionnaires were administered by the authors of the study during the students' academic timetable, after obtaining permission from their teachers to access their classes. The objectives of the study were explained to the students, and they were asked to complete a survey on Google Forms, ensuring its voluntary and anonymous nature. Upon completion of all questions, participants could submit the survey. Participants did not receive any compensation for their involvement in the study.

In Spain, 10 classes with approximately 380 students were accessed, resulting in 220 valid responses. In Honduras, 31 classes with an approximate total of 1470 students were accessed, yielding 791 valid responses. To balance the samples, a random selection of the Honduran questionnaires was made, resulting in a sample of 237 participants.

2.3.2. Data analysis

The analytical process unfolded in the following sequence. Initially, the psychometric properties and psychometric equivalence of the measurements across groups was ascertained. Subsequently, variations in demographic variables between groups were assessed. Lastly, the study's primary focus involved modeling the variables' predictive associations. The data exploration revealed no missing values, thereby obviating the need to implement a multiple imputation strategy.

Psychometric properties of the measurements. As there is no existing psychometric evidence for the measures within the Honduran population, an examination of the internal structure, specifically focusing on dimensionality and potential differential item functioning, was conducted. This analysis was thoroughly documented alongside the description of each instrument.

We employed the unweighted least squares mean and variance-adjusted (ULSMV) estimator on the Pearson inter-item correlations. The model tested for each instrument aligned with the theoretically expected number of dimensions. The overall fit of this modeling was assessed through the χ^2 test and approximate fit indices (CFI, RMSEA, SRMR). Additionally, we evaluated local fit by scrutinizing the size of the factor loadings; factor loadings less than .40 indicated potential candidates for item removal.

Psychometric equivalence between groups. Descriptive statistics were computed for both samples. Given that the comparison of groups in the constructs necessitates psychometric equivalence [68], a Differential Item Functioning analysis (DIF) was conducted (Table 2). This analysis incorporated the participant's country as a covariate (Honduras vs Spain), with the observed score of each measure (i.e., the sum of the items) serving as the matching variable. Ordinal Logistic Regression or OLR [69] was employed for this purpose, and it was recognized for its efficiency even in small sample sizes [70], with approximately 200 subjects in each matched group [71].

Three distinct models were formulated to elucidate the impact of three predictors on the response to each item: the absence of DIF (M1; predictor model: scale score), uniform DIF (M2; predictors: scale score + country), and non-uniform DIF (M3; predictors: scale score + country + interaction between score and country). The presence of DIF was scrutinized by examining the difference M3 − M1, with the null hypothesis positing the absence of DIF [72]. This value was estimated through the difference in the −2 Log Likelihood ($\Delta\chi^2$) and assessed at $p < .01$ with Bonferroni adjustment [73,74]. The effect size of the R^2 difference between the two models (ΔR^2) was gauged based on the following benchmarks: $\leq$.035: small, $>$.035: moderate, $>$.070: large, according to Ref. [75].

Differences between groups. A robust analytical approach was employed to assess group correlations and differences [76]. In computing mean differences, the Student *t*-test (t_r) with trimmed means was utilized [77]. Effect sizes were determined through trimmed means and bootstrap sampling through 1000 simulations [78]. The association of APS with other variables was examined using the percentage bend correlation or r_b [79], a robust alternative to Pearson's correlation designed to mitigate the impact of non-normality and outliers [80,81]. Adjustments for multiple testing were carried out using Holm's method [82] for the *p*-values associated with each r_b. The r_b correlations were separately calculated for Honduran and Spanish cohorts and subsequently compared using the *z*-test for two independent correlations [83], with the magnitude of the difference assessed using *q* [84]. Effect sizes were interpreted based on the criteria proposed by Sawilowsky [34,85], respectively.

Modeling. The study assessed percentage of variance in academic procrastination explained by personal attributes, namely self-esteem and the five personality factors, incorporating demographic variables such as gender and age. The analysis was conducted using Factor Score Path Analysis, i.e., factor score regression or FSR [86], to a) mitigate issues of local misspecification diffusion, especially in measurement models, across the entire modeling process, b) enhance modeling stability by minimizing the number of estimated parameters, and c) prevent convergence issues due to the relatively small sample size [87–89]. Notably, the accuracy of this method is not dependent on the normality of the variables [90]. This process unfolded in two steps: initially, the measurement models for the measures (excluding sex and age) were constructed, and factor scores were subsequently obtained, incorporating Croon's correction [91]. In the second step, these factor scores were introduced into the modeling as predictors of academic procrastination.

After modeling relationships between predictor variables and academic procrastination [92], a comparison strategy was employed. Parameters obtained, including beta coefficients and R^2 values for both Honduran and Spanish groups, were compared using Wald's test [93] for the difference of each parameter. Maximum Likelihood (ML) estimation was employed, and standard errors and confidence intervals were derived through bootstrap simulation (10,000 simulated samples). Statistical analyses were performed with SPSS v. 28.0.1.1, and the R packages *lavaan* [94], *MeasInv* [95], and WRS2 [96].

Table 1
Adjustment of instrument measurement patterns (across the entire sample).

Scale model	ULSMV χ^2 (df)	CFI	SRMR	RMSEA (90 % CI)
Academic Procrastination Scale-Short Form (APS-SF)	13.258[a] (10)	.998	.027	.060 (.021, .101)
Rosenberg Self-Esteem Scale (RSE)				
Ten-item model	269.272[a] (35)	.967	.104	.121 (.108, .135)
Eight-item model	72.056[a] (20)	.991	.066	.076 (.057, .095)
Big Five Inventory (BFI-2-S)				
30-item model	2828.450[a] (406)	.775	.119	.121 (.117, .125)
22-item model	1381.449[a] (199)	.873	.109	.114 (.109, .120)

Note. ULSMV: Unweighted Least Square Mean Variance. df: degrees of freedom. CFI: Comparative Fit Index. SRMR: Standardized Root Mean Square Residual. RMSEA: Root Mean Square Error of Approximation. CI: confidence interval.
[a] $p < .01$.

Table 2
Differential performance of items of the study measures.

	$\Delta\chi^2$	p	ΔR^2	DIF Classif		$\Delta\chi^2$	p	ΔR^2	DIF Classif
APS					BFI-2-S				
APS1	30.10	.000	.026	Neg	EXTRA				
APS2	16.52	.000	.014	Neg	BFI7	29.414	.000	.038	Mod
APS3	8.61	.013	.007	Neg	BFI 10	8.307	.016	.009	Neg
APS4	2.87	.237	.002	Neg	BFI 16	9.600	.008	.011	Neg
APS5	13.40	.001	.012	Neg	BFI 24	.364	.834	.000	Neg
RSE					AGREE				
RSE1	2.888	.236	.003	Neg	BFI 1	.481	.786	.001	Neg
RSE2	1.550	.461	.002	Neg	BFI 3	3.799	.150	.006	Neg
RSE3	16.067	.000	.018	Neg	BFI 14	5.227	.073	.009	Neg
RSE4	14.219	.001	.014	Neg	BFI 22	9.204	.010	.012	Neg
RSE5	4.998	.082	.006	Neg	BFI 29	17.983	.000	.024	Neg
RSE7	9.130	.010	.009	Neg	CONS				
RSE9	22.089	.000	.029	Neg	BFI 4	13.818	.001	.020	Neg
RSE10	19.467	.000	.017	Neg	BFI 9	1.192	.551	.001	Neg
					BFI 11	2.631	.268	.004	Neg
					BFI 17	2.611	.271	.003	Neg
					BFI 23	3.053	.217	.003	Neg
					BFI 25	5.793	.055	.006	Neg
					NEURO				
					BFI 2	10.153	.006	.011	Neg
					BFI 8	4.730	.094	.005	Neg
					BFI 12	17.857	.000	.024	Neg
					BFI 19	35.287	.000	.042	Mod
					OPEN				
					BFI 15	8.499	.014	.009	Neg
					BFI 20	3.101	.212	.004	Neg
					BFI 26	5.120	.077	.005	Neg

Note. APS: Academic Procrastination Scale-Short Form. RSE: Rosenberg Self-Esteem Scale. BFI-2-S: Big Five Inventory. EXTRA: extraversion. AGREE: agreeableness. CONS: conscientiousness. NEURO: neuroticism. OPEN: openness to experience. $\Delta\chi^2$: DIF model difference test. p: statistical significance of $\Delta\chi^2$. ΔR^2: difference between effect size. DIF Classif: DIF size classification. Neg: negligible. Mod: moderated.

3. Results

3.1. Participants

The selected sample comprised 457 university students aged between 17 and 50 ($M = 22.01$; $SD = 6$). Among the participants, 320 were female (70 %), and 137 were male (30 %). The Honduran subset included 237 students from the Universidad Pedagógica Nacional Francisco Morazán, with 186 women and 51 men and an average age of 24.97 years. In contrast, the Spanish subgroup consisted of 220 students from the Universidad de Extremadura, including 134 women and 86 men, with an average age of 18.79 years.

3.2. Psychometric properties of the measurements

The measurement model of the APS-SF demonstrated satisfactory fit (Table 1), and the reliability within the entire sample was ω = .853. Initially, the fit of the measurement model of the BFI-2-S was suboptimal. Subsequent refinement involved the removal of items with low factor loadings, specifically those below .35 (extraversion: items 5 and 28; agreeableness: item 30; conscientiousness: items 21 and 27; openness: items 6, 13, and 18). Following this adjustment, the model demonstrated a moderate fit (Table 1) and exhibited acceptable reliabilities for the study's objectives: extraversion ω = .643, agreeableness ω = .646, conscientiousness ω = .756,

Table 3
Descriptive statistics and differences between the Honduran and Spanish samples.

Variables	Honduran sample (n = 237), $M \pm SD$	Spanish sample (n = 220), $M \pm SD$	t_r (df)	p	d_r (95 % CI)
Procrastination	11.00 ± 5.25	12.85 ± 4.92	4.590 (270.01)	<.001	−.298 (.178, .435)
Self-esteem	32.35 ± 6.29	29.59 ± 6.14	6.047 (271.42)	<.001	.388 (.269, .497)
BFI-2-S					
Extraversion	20.53 ± 4.30	20.08 ± 3.79	1.936 (271.78	.053	.135 (.000, .265)
Agreeableness	23.99 ± 3.83	24.02 ± 3.27	.938 (271.8)	.348	.072 (.000, .207)
Conscientiousness,	23.92 ± 4.33	21.71 ± 4.70	4.432 (272.99)	<.001	.310 (.175, .424)
Neuroticism	16.96 ± 4.25	17.70 ± 4.01	2.875 (261.4)	.004	.213 (.080, .352)
Openness to experience	22.15 ± 3.78	21.61 ± 3.40	2.948 (265.16)	.003	.191 (.058, .310)

Note. SD: standard deviation. t_r: Robust Student's *t*-test. df: degrees of freedom. *p*: statistical significance. d_r: Cohen 's *d*.CI: confidence interval.

Table 4
Pearson's bivariate correlations between academic procrastination, Big Five personality factors, and self-esteem (Honduran and Spanish sample).

Procrastination with:	Honduran sample (n = 237)				Spanish sample (n = 220)				*Z*	*q*
	r_b	t_r (df = 235)	95 % CI		r_b	t_r (df = 218)	95 % CI			
			LL	UL			LL	UL		
Extraversion	−.30	−4.86[a]	−.41	−.18	−.25	−3.80[b]	−.37	−.12	−.574	−.054
Agreeableness	−.34	−5.47[a]	−.44	−.22	−.24	−3.71[b]	−.36	−.12	1.254	.118
Conscientiousness	−.58	−10.78[a]	−.65	−.48	−.63	−11.89[b]	−.70	−.54	.838	.079
Neuroticism	.32	5.12[a]	.20	.43	−.02	−.33	−.15	.11	3.731[b]	.352
Openness to experience	−.24	−3.80[a]	−.36	−.12	−.17	−2.60	−.30	−.04	−.776	−.073
Self-esteem	−.38	−6.37[b]	−.49	−.27	−.11	−1.63	−.24	.02	−3.073	−.290

Note. r_b: percentage bend correlation. t_r: significance test for r_b. df: degrees of freedom. CI: confidence interval. LL: lower limit. UL: upper limit. *Z*: Fisher's *z* test. *q*: Cohen effect size.
[a] $p < .001$.
[b] $p < .01$.

neuroticism ω = .639, and openness ω = .563.

Regarding the RSE, after removing two items (6 and 8) with low factor loadings, the measurement model demonstrated a satisfactory fit (Table 1), with high internal consistency at ω = .892.

3.3. Equivalence of groups

The findings revealed instances where the statistical significance for certain items fell below the nominal value ($p < .01$ with Bonferroni adjustment). However, it is crucial to note that the impact of DIF on the ΔR^2 metric was deemed trivial. Notably, only two BFI-2-S items (items 7 and 19) exhibited a moderate level of DIF. Most items demonstrated negligible ΔR^2 ratings: APS ($Md = .012$), RSE ($Md = .01$), and BFI-2-S ($Md = .006$). To preserve the comprehensive coverage of their respective subscales, a deliberate decision was made to retain these items, avoiding any further reduction in content coverage. In summary, the overall results indicated nonsignificant differential functioning, underscoring the equivalence of the groups under examination.

3.4. Group differences

Table 3 provides a comprehensive overview of descriptive statistics and intergroup differences between the Honduran and Spanish samples. Notably, the Honduran sample exhibits a statistically significant, albeit small, reduction in academic procrastination compared to the Spanish sample, based on Sawilowsky's (2009) criteria [85].

Honduran university students demonstrated statistically significantly higher scores than their Spanish counterparts in conscientiousness, openness to experience, and self-esteem, with effect sizes falling within the very small to small magnitudes range. Additionally, there was a statistically significant lower score in neuroticism among Honduran university students, albeit of a small magnitude.

3.5. Correlation between variables

The relationships among the various variables under investigation were assessed through Pearson's percentage bend correlation analysis for both samples, as presented in Table 4. In the Honduran sample, academic procrastination exhibited statistically significant positive correlations with neuroticism and significant negative correlations with extraversion, agreeableness, conscientiousness, openness to experience, and self-esteem. These correlations varied in magnitude from small to moderate, except for the relationship with conscientiousness, which exhibited a large effect size.

Table 5
Multiple regression analysis of predictors of academic procrastination.

Variables[a]	Honduran sample				Spanish sample				Difference (Δ)			
	β	s.e.	95 % CI boot		*β*	s.e.	95 % CI boot		Δ	s.e.	95 % CI boot	
			LL	UL			LL	UL			LL	UL
Sex	.004	.058	−.119	.117	−.052	.063	−.178	.059	.057	.083	−.117	.216
Age	−.064	.054	−.164	.044	.059	.058	−.042	.140	−.123	.071	−.252	.025
Self-esteem	−.137	.076	−.297	.009	.114	.072	−.034	.250	−.252[c]	.106	**−.457**	**−.041**
BFI-2-S												
Extraversion	−.145	.176	−.491	.182	−.281[c]	.139	**−.549**	**−.004**	.136	.228	−.317	.587
Agreeableness	.110	.102	−.089	.300	.019	.084	−.150	.185	.091	.134	−.188	.342
Conscientiousness	−.646[c]	.093	**−.824**	**−.455**	−.641[b]	.072	**−.777**	**−.484**	−.005	.118	−.224	.236
Neuroticism	.013	.081	−.149	.175	−.086	.074	−.235	.057	.099	.112	−.113	.319
Openness to experience	.356	.166	**.034**	**.689**	.252	.151	−.049	.547	.104	.231	−.352	.576
R^2	.284[b]	.052	.207	.415	.372[b]	.058	.282	.511	−.088	.078	−.244	.064

Note. *β*: standardized effect. s.e.: standard error of *β*. 95 % CI boot: confidence intervals based on bootstrap simulation. LL: lower limit. UL: upper limit. *Δ:* between-groups *β* difference. R^2: effect size for model fit.

[a] Predictors based on factor score.

[b] $p < .01$.

[c] $p < .05$.

In the Spanish university student sample, procrastination correlated negatively with extraversion, agreeableness, conscientiousness, and openness to experience. Similar to the Honduran sample, only the correlation between procrastination and conscientiousness reached a high magnitude. The only significant difference between the two samples was the correlation between academic procrastination and neuroticism ($Z = 3.731$; $p < .01$).

3.6. Structural modeling

The models derived from the multiple regression analyses for both samples yielded statistical significance (Table 5), elucidating 28.4 % of the variance in academic procrastination for the Honduran sample and 37.2 % for the Spanish student sample. Importantly, the two samples had no statistically significant difference in the percentage of explained variance.

In the Honduran sample, conscientiousness emerged as the sole statistically significant predictor of academic procrastination, exhibiting a negative association. Conversely, in the Spanish sample, conscientiousness and extraversion were statistically significant negative predictors of academic procrastination in the university context.

4. Discussion

Academic procrastination is a very frequent behavior, especially in higher education [14,97,98], which has been related to numerous negative effects and can lead in the long term to the development of depression, stress, or anxiety [99]. The present study aimed to examine the differences between the level of procrastination in a sample of Honduran university students and another of Spanish university students, as well as to assess the variables associated with academic procrastination in both groups.

Regarding the first objective, noteworthy differences in academic procrastination were identified between students from Honduras and Spain. The latter exhibited a significantly higher level, albeit of a small magnitude. This finding aligns with expectations when considering the individualism-collectivism axis.

In more collectivist societies, like Honduras, individuals often display a heightened inclination to adhere to established social norms, feeling perceived and judged as integral members of a collective [100]. This collective orientation may contribute to the lower levels of procrastination observed. Furthermore, collectivist societies foster greater peer support, knowledge-sharing, and resource collaboration, potentially acting as protective factors against procrastination or academic dishonesty [101].

Conversely, members of more individualistic societies, such as Spain, generally prioritize hedonistic and recreational motives [56]. This emphasis on personal enjoyment may lead to a neglect of obligations, including academic tasks and study, thereby contributing to higher levels of procrastination.

To address the second objective, which involves examining the relationship between the factors of the Big Five personality model, self-esteem, and academic procrastination, correlation and regression analyses were conducted for both samples.

Extraversion, a trait embodying sociable, assertive, talkative, and self-confident qualities associated with a high degree of positive emotions [102], exhibited statistically significant, negatively signed correlations of moderate intensity with academic procrastination in both samples. Furthermore, this personality trait emerged as a significant negative predictor of academic procrastination among Spanish university students. The rationale behind this finding suggests that individuals with high extraversion tend to be more active and assertive, displaying no difficulties in engaging in various activities at an accelerated pace, potentially resulting in lower levels of academic procrastination [34].

Agreeableness, characterized by altruism, honesty, modesty, and cooperation [103], demonstrated a statistically significant negative correlation of moderate intensity with procrastination in Honduran and Spanish students. This negative association implies

that students with higher levels of agreeableness may refrain from procrastinating to avoid harming peers who rely on them for group tasks [104,105]. Furthermore, agreeableness might indirectly influence diminishing academic procrastination by virtue of specific motivational regulation strategies associated with the environment. Students characterized by high agreeableness tend to select and arrange conducive learning environments, potentially curbing their propensity for academic procrastination [19].

Conscientiousness, defined as the inclination towards greater self-control, organization, diligence, and adherence to rules [106], emerged as a variable displaying a stronger, negatively signed association in both samples and as a predictor in the regression models for both groups. This result aligns with numerous recent studies reporting a consistent negative relationship between conscientiousness and procrastination [19,24,25,107]. Individuals with high levels of conscientiousness typically exhibit low impulsivity and seldom encounter issues with self-control or self-regulation [106], both factors linked to procrastination [108,109]. Moreover, individuals exhibiting elevated levels of conscientiousness display a predisposition towards diligence, meticulous task planning, and effective time management. These characteristics explain the negative correlation between this personality trait and academic procrastination [110]. Notably, some models even integrate procrastination as a facet of conscientiousness [111].

Neuroticism, characterized by a tendency to perceive ordinary situations as stressful, frequent experiences of negative emotions, and a limited ability to control impulses [31], exhibited a statistically significant positive correlation in the Honduran sample but not in the sample of Spanish students. Several studies have reported a positive relationship between neuroticism and procrastination in educational settings [24,112–114], consistent with the findings in the Honduran sample. However, other research [34] has found no connection between neuroticism and active procrastination—defined as the intentional postponement of tasks for better results [115].

Openness to experience, a personality trait associated with intellectual curiosity [116], exhibited a statistically significant negative correlation in the Honduran sample, aligning with findings from several studies [24,117,118]. This congruence suggests that students with a high level of openness to experience, characterized by intellectual curiosity and intrinsic motivation for learning [119], are more inclined to enjoy studying. Consequently, they are less likely to procrastinate when completing their academic tasks and homework [99]. However, contrasting findings exist, with some studies reporting positive correlations [120] or indicating no discernible relationship between the two variables [121].

Lastly, self-esteem demonstrated a statistically significant negative relationship with academic procrastination in Honduran students, consistent with a recent meta-analysis involving 13,233 participants [43]. Procrastination has been conceptualized by Steel [1] as a protective mechanism against low or vulnerable self-esteem, corroborating the findings in both samples. A recent longitudinal study revealed a unidirectional relationship between the two variables: low self-esteem predicts academic procrastination, but no significant relationship was observed in the opposite direction [49]. This finding supports the hypothesis that procrastination might function as a protective mechanism against low self-esteem for some students. Additionally, academic procrastination has been related to a fear of failure and low academic satisfaction—factors commonly associated with students experiencing low self-esteem [44,122].

4.1. Limitations

The present study's findings should be interpreted cautiously, considering several limitations that should be addressed in future research. First, applying a non-probability sampling method could condition the generalizability of our results. The existence of a selection bias could pose a challenge to achieving representativeness. However, it is essential to underline that this approach does not diminish the relevance of the results in terms of their methodological and theoretical soundness, coinciding with similar studies [123,124].

Second, reliance on self-assessment tests, while common and possessing good reliability and validity properties, introduces the potential for response bias idiosyncratic to the sample. As psychometric evidence specific to the Honduran population is lacking, we took precautions to avoid making incorrect validity inductions of the validity of our instruments [125]. We empirically justified the adjustments, ensuring the psychometric properties remained robust. Conceptually, because the items in each dimension are a sample of an infinite population of items from its constructs [126,127], reasonable content validity exists for items not removed. However, additional validity evidence is necessary to fully establish the instruments' validity status, necessitating further diligent efforts. It's important to note that these modifications warrant consideration when interpreting results and maintaining consistency with prior literature.

Third, the cross-sectional design hinders establishing causal relationships and exploring how the studied variables interact over time. Future research employing experimental or longitudinal approaches could provide valuable insights into these dynamics.

Fourth, since the study was conducted exclusively among students from two specific universities, the generalizability of the findings may be limited. Consequently, future research endeavors should gather data from a more diverse range of universities spanning Spain and Honduras. Additionally, exploring potential variations based on academic disciplines or specific career paths and considering the stage of the student's educational journey could offer valuable insights.

Fifth, another limitation of the present study is the sample size, comprising 220 participants in Spain and 237 in Honduras. These sample sizes may impose restrictions on the statistical power of the study. Specifically, a relatively small sample size may limit the ability to detect small but potentially significant effects. According to the 5:1 rule proposed by Hair et al. [60], our sample sizes are close to the recommended lower limit for robust results. Therefore, the minimum detectable effect size with our samples may be larger than in studies with larger sample sizes, which may influence the generalizability of the results. Future studies with larger sample sizes would be beneficial to corroborate and extend these findings, allowing for greater precision in detecting smaller effects.

Lastly, assessing academic procrastination as a unidimensional construct is a limitation. Future investigations could benefit from exploring potential differences in predictors based on the type of procrastination—whether passive, involving the postponement of tasks due to indecision and inability to act promptly, or active, characterized by intentionally delaying task completion to leverage the

pressure of impending deadlines and enhance motivation, resulting in successful outcomes.

4.2. Practical implications/Recommendations

The findings of this study mark a significant stride in advancing strategies for preventing, detecting, and mitigating academic procrastination levels among university students, particularly in their initial years. The emphasis lies on addressing the predictor variables. Conducting a personality assessment early in a student's university journey holds promise for identifying those prone to higher levels of procrastination in higher education. This proactive approach allows for the design of targeted programs aimed at curbing this maladaptive behavior, with potential positive repercussions on mental health, by alleviating the anxiety associated with procrastination [24].

University institutions can play a pivotal role in reducing procrastination through various initiatives. These may include providing training in self-regulation strategies, time management, and cognitive-behavioral therapies. As demonstrated by van Eerde and Klingsieck [128] in their meta-analysis of intervention studies on procrastination, such programs effectively reduce procrastination levels and sustain these improvements over time. Implementing these measures can contribute to fostering a more focused and mentally healthier academic environment for students.

This study contributes novel findings to the Big Five personality theory by investigating its correlation with variables pertinent to university life. These insights are situated within an unpublished context, specifically the Honduran university population, and adopt a comparative approach between two distinct populations: Spain and Honduras.

Of particular significance is the contribution of the Conscientiousness factor. Given its recognized role as a protective factor against procrastination at the university level, enhancing this trait among students is highly beneficial. While personality traits tend to exhibit stability over time, they also display a degree of malleability during adolescence and young adulthood [129,130], allowing for interventions to foster specific modifications [131], such as increasing conscientiousness [132].

Furthermore, this study represents the first exploration of the psychometric properties of the instruments within the study population. This endeavor not only offers valuable preliminary insights but also underscores the importance of validating measures of interpersonal variability.

5. Conclusion

In conclusion, this study has successfully achieved its predetermined objectives. Firstly, it has effectively identified and established differences in the levels of academic procrastination among samples of Honduran and Spanish students. Additionally, the investigation has delved into the intricate relationship between the Big Five personality factors and self-esteem with procrastination among university students from two countries marked by substantial cultural distinctions.

The results reveal noteworthy patterns in the Honduran sample, where four of the five dimensions of the personality test (extraversion, agreeableness, conscientiousness, and openness to experience), along with self-esteem, exhibit a statistically significant negative correlation with academic procrastination. In contrast, the Spanish sample displays this correlation only in the dimensions of extraversion, agreeableness, and conscientiousness.

These findings underscore the importance of considering cultural nuances in understanding and addressing academic procrastination. As future research endeavors unfold, the insights gained from this study could inform the development of targeted interventions to reduce procrastination levels, thereby enhancing academic success and overall well-being for students across diverse cultural contexts.

Ethical approval statement

The research underwent scrutiny and received approval from the Research Ethics Committee of Universidad Pedagógica Nacional Francisco Morazán on May 29, 2023, under registration number 2023-003.

Considering the study's emphasis on minimizing potential risks to participants and its voluntary, anonymous nature, parental consent for the involvement of 17-year-old university students was deemed unnecessary. Instead, consent was directly sought from the students themselves.

Data availability statement

The raw data supporting this article's conclusions are available from the authors without undue reservation. Correspondence and requests for materials should be addressed to Guillermo Chans.

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CRediT authorship contribution statement

Sergio Hidalgo-Fuentes: Writing – original draft, Supervision, Methodology, Formal analysis, Data curation, Conceptualization.

Isabel Martínez-Álvarez: Writing – review & editing, Project administration, Methodology, Conceptualization. **Fátima Llamas-Salguero:** Writing – review & editing, Project administration, Methodology, Conceptualization. **Iris Suyapa Pineda-Zelaya:** Conceptualization, Resources. **César Merino-Soto:** Writing – review & editing, Visualization, Supervision, Formal analysis. **Guillermo M. Chans:** Writing – review & editing, Visualization, Supervision, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

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