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# Do Learning Approaches Set the Stage for Emotional Well-Being in College Students?

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**Abstract:** The research aim of this paper was two-fold: to generate evidence that personality factors are linear predictors of the variable approaches to learning (a relevant cognitive-motivational variable of Educational Psychology); and to show that each type of learning approach differentially predicts positive or negative achievement emotions, in three learning situations: class time, study time, and testing. A total of 658 university students voluntarily completed validated questionnaires referring to these three variables. Using an ex post facto design, we conducted correlational analyses, regression analyses, and multiple structural predictions. The results showed that Conscientiousness is associated with and predicts a Deep Approach to learning, while also predicting positive achievement emotions. By contrast, Neuroticism is associated with and significantly predicts a Surface Approach to learning, as well as negative achievement emotions. There are important psychoeducational implications in the university context, both for prevention and for self-improvement, and for programs that offer psychoeducational guidance.

**Keywords:** Big Five model; achievement emotions; learning approaches; emotional well-being; university undergraduates

## 1. Introduction

The experience of students in tertiary education is important because of its consequences in their physical and mental health and in their achievement, adaptation, and well-being [1–4]. For this reason precisely, it has drawn the interest of researchers in Educational Psychology [5]. Given the impact of stress on the academic and social functioning of university students, it is very important to identify factors that predict stress and well-being [6].

### 1.1. Students' Well-Being at University

Analysis of well-being at university has been undertaken in response to the Positive Psychology paradigm [7], and contrasts with the exclusive study of negative stress experiences at university [8]. Well-being at university has become an added value of the university learning experience [9]. Universities compete to produce a comprehensive experience of well-being in their students, beyond the offer of quality training during this academic period [10–12].

The well-being of university students has been conceptualized as a multidisciplinary phenomenon; analysis and intervention may occur at general, systemic, and cross-disciplinary levels [13]. Previous research has tried to identify factors that foster such well-being, including the student's personality [14,15], pleasurable experiences during this period [16], the quality of the teaching process [17], and the quality of the learning context and of professional advancement [18,19].

### 1.2. Learning Approaches and Students' Well-Being at University

Traditionally, Educational Psychology research has attempted to identify the personal and contextual variables that predict academic achievement at university. Among the many personal variables that have been analyzed, the construct of *learning approaches* [20–25] is one of the most highly recognized by educational psychologists in the international scientific community. Basically, it is a subjective construct, referring to the way in which students perceive their learning and study activities, as they complete the courses that constitute this academic period. The literature emphasizes two approaches to learning [26,27]: (a) a *deep approach*, where motivation is intrinsic; learners enjoy exploring the academic subject, which takes on personal meaning to them; (b) a *surface approach*, where motivation is extrinsic; the learners' strategy is oriented towards accumulating, storing, and reproducing knowledge, while minimizing the effort required to achieve this [28,29].

There is a large body of research that relates this construct to different motivational, affective, and cognitive variables, where learning approach is shown to predict other factors during the university period [30–34]. Furthermore, this construct has been translated and validated in numerous cultures and countries, showing factor invariance [35].

However, the type of emotional experience associated with each type of learning approach has not yet been clearly established. This question is relevant, because the students' most prevalent emotions predispose them to a satisfactory or stressful university experience [36]. Certain prior studies have tentatively established this relationship [37]. Others have highlighted the relationship between learning difficulties and well-being [38]. The relationship between learning approaches and self-regulation has also been established [31,39]. Some have even established the relationship between learning approaches and religious beliefs, as mediating variables in the well-being of university students [40]. Teaching preferences have also been established according to the learning approach [41]. In a complementary fashion, achievement emotions during university learning have also become a study variable, being considered a correlate of university students' well-being [42,43]; however, the precise relationship of achievement emotions to learning approaches is yet to be established.

### 1.3. Big Five and Learning Approaches

The relationship between personality factors and learning approaches has already been the object of previous analysis, and significant relationships were found [44,45]. Although Conscientiousness proved to be most predictive of achievement, some studies indicate that it combines with other learning-related variables to create this impact, particularly so in the case of learning approaches. The factors that most contribute to predicting individual differences are Conscientiousness and Openness to Experience. They are both good positive predictors of deep learning approaches [46–48]. By contrast, Neuroticism is a positive predictor of surface approaches [49,50]. Openness to Experience, Conscientiousness, and Deep Approach are each positively associated with academic achievement [51], revealing that both cognitive and non-cognitive variables must be included in any prediction of academic achievement.

### 1.4. Big Five and Achievement Emotions

Personality factors of the Big Five (BF) model have been consistently and selectively associated with many types of emotional experiences in multiple contexts. Most of the personality factors have been shown to consistently predict positive emotions (especially Conscientiousness), while Neuroticism predicts negative emotions [52,53].

Achievement-related emotions emerge as a construct specific to the realm of learning and academic achievement, based on expectancy value theory [54]. The universal nature of achievement emotions has been reported recently, being consistent across cultures, although with certain modulating adjustments [55]. Given the specificity of the construct, there are few studies to date that relate the BF factors to types of achievement emotions [56,57].

Recent research has reported a consistent relationship between the Big Five model and achievement emotions. The conscientiousness factor predicts positive achievement emotions, while neuroticism predicts negative emotions [58,59].

### 1.5. Learning Approaches and Achievement Emotions

Different learning approaches reveal different ways of learning and understanding curriculum content and may also be related to different learning and achievement contexts. The learning environment is evidently important in how students engage with learning tasks [60], if we consider that they must make a personal assessment about the teaching context, grading methods, type of course, and the tasks involved in learning [23,61,62] in order to choose their strategies. Recent evidence has established that learning approaches depend on both the student's degree of self-regulation and how well the teaching process promotes regulation [63–65].

Certain recent research has demonstrated the specific relationship between learning strategies and achievement emotions when learning [66–68]. However, the degree to which this construct is related to the experience of emotional well-being at university is yet to be understood [69,70]. Other recent studies have shown that positive emotions predispose problem-focused coping strategies and engagement, while negative emotions predispose coping strategies geared to managing emotions, ultimately leading to an emotional state of burnout [71]. On this account, it is important to establish the relations between achievement emotions and learning approaches.

### 1.6. Objectives and Hypotheses

The aim of this research was to verify whether personality factors predict learning approaches and whether these two aspects jointly predict positive and negative achievement emotions. For this purpose, we tested the following hypotheses: (1) The positive factors of the Big Five model will significantly predict the Deep Approach, especially so in the case of Conscientiousness. The negative factor in the model, Neuroticism, will predict the Surface Approach. (2) The Deep Approach and its components will predict positive emotions, while the Surface Approach will predict negative emotions. (3) Conscientiousness and Deep Approach will appear as joint predictors of positive emotions, and Neuroticism and the Surface Approach will jointly predict negative emotions.

## 2. Method

### 2.1. Participants

The study sample contained a total of 642 undergraduate students who were enrolled at one of two universities in Spain. The students pursued degrees in Psychology, Primary Education, and Educational Psychology; 85.5% were female and 14.5% were male. Ages ranged from 19 to 25, with a mean of 21.33 years. The students were evenly split between the two universities, 324 attended one and 318 attended the other. An incidental, nonrandomized study design was used. Each university's Guidance Department invited participation from the teachers, and the teachers invited their students to participate, on an anonymous, voluntary basis. Each class subject was considered one specific teaching-learning process, questionnaires were completed online for each subject.

### 2.2. Instruments

We used the *Big Five Questionnaire* BFQ-N [71], based on the original version [72], in its adaptation for young university students [73]. Confirmatory Factor Analysis (CFA) reproduced a five-factor

structure corresponding to the Big Five Model. Adequate psychometric properties and acceptable fit indices were found. The second-order confirmatory model showed good fit (Chi-square = 38.273; Degrees of freedom (20–15) = 5;  $p < 0.001$ , Incremental Fix Index, NFI = 0.939; Relative Fix Index, RFI = 0.917; Incremental Fix Index, IFI = 0.947; Tucker-Lewis Index, TLI = 0.937, CFI = 0.946; Root Mean Square Error of Approximation, RMSEA = 0.065; HOELTER = 2453 ( $p < 0.05$ ) and, 617 ( $p < 0.01$ )). The total scale also showed good internal consistency (Alpha = 0.956; Part 1 = 0.932, Part 2 = 0.832; Spearman-Brown = 0.962; Guttman = 0.932).

*Learning Approaches.* This variable was measured using the revised two-factor study process questionnaire, R-SPQ-2F [74,75], in its Spanish validated version [76]. There are four subscales (Deep Motivation, Deep Strategy, Surface Motivation, Surface Strategy) that measure the two dimensions of Deep and Surface approaches to learning, respectively. Items are answered on a 5-point Likert scale, from 1 ('rarely true of me') to 5 ('always true of me'). A second factor structure with two factors was produced by using confirmatory factor analysis (Chi-Square = 2645.77; df = 169, CFI = 0.95, GFI = 0.91, AGFI = 0.92, RMSEA = 0.07). Reliability coefficients were also acceptable (Deep,  $\alpha = 0.81$ ; Surface,  $\alpha = 0.77$ ), similar to what the original authors found.

*Achievement Emotions Questionnaire, AEQ* [77]. This instrument includes scales for nine different emotions (enjoyment, hope, pride, relief, anger, anxiety, hopelessness, shame, and boredom), classified along two axes. One axis is their *valence*, as positive or negative emotions; the other axis refers to *activation*, whether the emotions are activating or deactivating. Emotions are then categorized into the four quadrants: (1) *positive activating*: enjoyment, hope, pride; (2) *positive deactivating*: relief; (3) *negative activating*: anger, anxiety, shame; (4) *negative deactivating*: hopelessness, boredom.

They can also be classified according to the source of the emotion: the *activity* in progress (enjoyment, boredom, anger), a prospective outcome (hope, anxiety, hopelessness), or a *retrospective* outcome (pride, relief, shame). A factor structure that corresponds to the AEQ Model was confirmed in this sample through Confirmatory Factor Analysis [78]:

(1) *Achievement Emotions in Class* (80 items). Results showed adequate psychometric properties and acceptable fit indices. The confirmatory model showed good fit (Chi-square = 643,028; Degrees of freedom = 79;  $p < 0.001$ ; NFI = 0.954; RFI = 0.967; IFI = 0.953; TLI = 0.958, CFI = 0.971; RMSEA = 0.081; SMRM = 8.13; HOELTER = 156 ( $p < 0.05$ ) and 158 ( $p < 0.01$ ). Internal consistency for the total scale was good (Alpha = 0.904; Part 1 = 0.803, Part 2 = 0.853; Spearman-Brown = 0.903 and 853; Guttman = 0.862). Sample items include: *Item 1*: I get excited about going to class; *Item 36*: I get bored; *Item 75*: I feel so hopeless that all my energy is depleted.

(2) *Achievement Emotions during Study time* (80 items). Adequate psychometric properties and acceptable fit indices were found. The confirmatory model showed good fit (Chi-square = 629,890; Degrees of freedom = 79;  $p < 0.001$ ; NFI = 0.964; RFI = 0.957; IFI = 0.973; TLI = 0.978, CFI = 0.971; RMSEA = 0.080; SRMR = 7.91; HOELTER = 165 ( $p < 0.05$ ) and 178 ( $p < 0.01$ ). The total scale also showed good internal consistency (Alpha = 0.939; Part 1 = 0.880, Part 2 = 0.864; Spearman-Brown = 0.913 and 884; Guttman = 0.903). Sample items include: *Item 90*: I get angry when I have to study; *Item 113*: My sense of confidence motivates me; *Item 144*: I am proud of myself.

(3) *Achievement Emotions in Testing* (80 items). Adequate psychometric properties and acceptable fit indices were found. The confirmatory model showed good fit (Chi-square = 376,658; Degrees of freedom = 79;  $p < 0.001$ ; NFI = 0.978; RFI = 0.969; IFI = 0.983; TLI = 0.978, CFI = 0.963; RMSEA = 0.080; SRMR = 4.76; HOELTER = 169 ( $p < 0.05$ ) and 188 ( $p < 0.01$ )). Internal consistency for the total scale was good (Alpha = 0.913; Part 1 = 0.870, Part 2 = 0.864; Spearman-Brown = 0.824 and 0.869; Guttman = 0.868). Sample items include: *Item 170*: Before the exam I feel nervous and uneasy; *Item 181*: I enjoy taking the exam; *Item 224*: I am very satisfied with myself.

### 2.3. Procedure

Informed consent was obtained from all participants. Scales were completed on a voluntary basis, using an online platform [79]. Over a two-year period, students reported on five specific

teaching-learning processes, each one referring to a different university subject they were taking during this time. The September–October assessment, in 2018 and 2019, covered Presage variables. Process variables were assessed in the following February–March, and Product variables in May–June. The procedure was approved by the respective Ethics Committees of the two universities, in the larger context of an R&D Project (2018–2021).

#### 2.4. Data Analysis

**Hypothesis 1.** *The positive factors of the Big Five model will significantly predict the Deep Approach, especially so in the case of Conscientiousness. The negative factor in the model, Neuroticism, will predict the Surface Approach.*

**Hypothesis 2.** *The Deep Approach and its components will predict positive emotions, while the Surface Approach will predict negative emotions.*

**Hypothesis 3.** *Conscientiousness and Deep Approach will appear as joint predictors of positive emotions, and Neuroticism and the Surface Approach will jointly predict negative emotions.*

*Previous analyses.* In order to ensure that the university variable did not affect the analyses, we confirmed that there were no significant differences between the variables analyzed, using different one-way and multi-way ANOVAs.

*Correlation analyses.* For Hypothesis 1, we also calculated reliability (Pearson bivariate correlation) using SPSS (version 25, IBM Corp., Armonk, NY, USA).

*Multiple regression.* For Hypothesis 2, we conducted a multiple regression analysis, also using SPSS (V. 25).

*Confirmatory Factor Analysis and Reliability.* For Hypothesis 3, a Structural Equation Model (SEM) was used to test in this sample. Data were aggregated by the determination of factors obtained in the previous exploratory and confirmatory factor analyses—not in a summational fashion, in order to avoid false positives. We assessed model fit by first examining the ratio of chi-square to degrees of freedom, SRMR, then the Comparative Fit Index (CFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), and Relative Fit Index (RFI). Ideally, these should all be greater than 0.90. Sample size adequacy was checked using the Hoelter Index [80]. The analyses were conducted using AMOS (version 22, IBM Corporation, Chicago, IL, USA).

### 3. Results

#### 3.1. Big Five and Learning Approaches

##### 3.1.1. Bivariate Association

Bivariate association results showed that the factors of Conscientiousness (C), Openness (O), Extraversion (E), and Agreeableness (A) had a significant, positive association with the Deep Approach (DA), and negative association with the Surface Approach (SA). A significant, negative relationship also appeared between Neuroticism (N) and the Deep Approach; its relationship with the Surface Approach was positive. Association strength was greatest between the personality factors and the factor Deep Motivation (DM). Direct values are presented in Table 1.

**Table 1.** Bivariate correlations between the Big Five Factors and Learning Approaches (n = 658).

Learning Approaches	E	C	N	A	O
DEEP MOTIV	0.232 **	0.413 **	−0.098 *	0.226 **	0.404 **
DEEP STRAT	0.194 **	0.413 **	−0.049	0.155 **	0.312 **
DEEP APPR	0.227 **	0.458 **	−0.083 *	0.208 **	0.394 **
SURFACE MOTI	−0.129 **	−0.365 **	0.129 **	−0.140 *	−0.222 **
SURFACE STRAG	−0.097 *	−0.343 **	0.197 **	−0.0143 *	−0.249 **
SURFACE APPR	−0.139 **	−0.387**	0.188 **	−0.148 **	−0.254 **

Note. E = Extraversion; C = Conscientiousness; N = Neuroticism; A = Agreeableness; O = Openness; \*  $p < 0.05$ ; \*\*  $p < 0.001$ .

### 3.1.2. Multiple Regression

Regression results were consistent with previous results, showing that the personality factors C and O positively predicted the Deep Approach and negatively predicted the Surface Approach. Factor N positively predicted the Surface Approach and negatively predicted the Deep Approach. Statistical effect size appeared in the prediction of the Deep Approach. See Table 2 for more details.

**Table 2.** Multiple Regression (Standardized Beta Index) for the Big Five Personality Factors and Learning Approaches (n = 658).

Learning Approaches	E	C	N	A	O	Effect	R Square
DEEP MOT	−0.017	0.294 **	−0.005	0.005	0.276 **	$F(5511) = 31.521 **$	0.234
DEEP STRAT	0.001	0.381 **	0.040	−0.045	0.155 **	$F(5511) = 25.664 **$	0.201
DEEP APPRO	−0.112	0.374 **	−0.019	−0.022	0.240 **	$F(5511) = 35.346 **$	0.246
SURF MOT	0.026	−0.333 **	0.076 *	0.050	−0.069	$F(5511) = 15.401 **$	0.131
SURF STRAT	0.072	−0.279 **	0.139 **	0.082	−0.183 **	$F(5511) = 17.967 **$	0.149
SURF APPRO	0.039	−0.320 **	0.129 **	0.068	−0.137 **	$F(5511) = 19.279 **$	0.160

Note. E = Extraversion; C = Conscientiousness; N = Neuroticism; A = Agreeableness; O = Openness; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

## 3.2. Learning Approaches and Achievement Emotions

### 3.2.1. Bivariate Association

Bivariate association results showed that the Deep Approach (DA) and its components had a consistent, significant, positive association with positive emotions, and were negatively associated with negative emotions. In the case of the Surface Approach (SA), the inverse effect appeared, correlating negatively with positive emotions, and correlating positively with negative emotions. The strongest associations were seen with the positive emotion of *enjoyment*, and the negative, deactivating emotions of *boredom* and *hopelessness*. As seen in Table 3, this behavioral pattern is stable across the three academic situations examined.



**Table 3.** Bivariate correlations between *Learning Approaches* and *Achievement Emotions*, in three situations (n = 658).

CLASS	DM	DS	DA	SM	SS	SA
<i>Positive</i>	0.521 **	0.413 **	0.516 **	−0.327 ***	−0.328 **	−0.344 **
Enjoyment	0.515 **	0.387 **	0.542 **	−0.329 **	−0.336 **	−0.356 **
Hope	0.479 **	0.395 **	0.396 **	−0.326 **	−0.307 **	−0.346 **
Pride	0.413 **	0.350 **	0.374 **	−0.293 **	−0.232 **	−0.279 **
<i>Negative</i>	−0.224 **	−0.150 **	−0.212 **	0.327 **	0.344 **	0.371 **
Boredom	−0.334 **	−0.260 **	−0.361 **	0.394 **	0.429 **	0.448 **
Anger	−0.249 **	−0.175 **	−0.242 **	0.366 **	0.373 **	0.405 **
Anxiety	−0.161 **	−0.075 *	−0.146 **	0.213 **	0.272 **	0.270 **
Shame	−0.126 **	−0.046	−0.097 *	0.221 **	0.249 **	0.262 **
Hopelessness	−0.263 **	−0.187 *	−0.230 **	0.299 **	0.330 **	0.352 **
<b>STUDY</b>	<b>DM</b>	<b>DS</b>	<b>DA</b>	<b>SM</b>	<b>SS</b>	<b>SA</b>
<i>Positive</i>	0.472 **	0.395 **	0.478 **	−0.351 **	−0.343 **	−0.373 **
Enjoyment	0.538 **	0.444 **	0.542 **	−0.329 **	−0.366 **	−0.356 **
Hope	0.394 **	0.328 **	0.396 **	−0.326 **	−0.307 **	−0.346 **
Pride	0.369 **	0.313 **	0.374 **	−0.293 **	−0.232 **	−0.279 **
<i>Negative</i>	−0.296 **	−0.183 **	−0.266 **	0.363 **	0.391 **	0.413 **
Boredom	−0.388 **	−0.263 **	−0.361 **	0.394 **	0.429 **	0.488 **
Anger	−0.257 **	−0.175 **	−0.242 **	0.366 **	0.373 **	0.405 **
Anxiety	−0.168 *	−0.094	−0.146 *	0.213 **	0.272 **	0.270 **
Shame	−0.133 *	−0.046	−0.097 *	0.221 **	0.241 **	0.262 **
Hopelessness	−0.263 **	−0.154 *	−0.230 **	0.229 **	0.330 **	0.372 **
<b>TEST</b>	<b>DM</b>	<b>DS</b>	<b>DA</b>	<b>SM</b>	<b>SS</b>	<b>SA</b>
Positive	0.438 **	0.339 **	0.427 **	−0.280 **	−0.264 **	−0.298 **
Enjoyment	0.441 **	0.322 **	0.427 **	−0.267 **	−0.278 **	−0.298 **
Hope	0.396 **	0.336 **	0.405 **	−0.279 **	−0.257 **	−0.298 **
Pride	0.371 **	0.284 **	0.359 **	−0.238 **	−0.188 **	−0.238 **
Relief	0.080 *	0.070 *	0.84 *	−0.059	−0.012	−0.039
Negative	−0.208 **	−0.85	−0.161 **	0.237 **	0.307 **	0.307 **
Anger	−0.196 **	−0.087 *	−0.156 **	0.297 **	0.318 **	0.334 **
Anxiety	−0.131 **	−0.048	−0.099 **	0.100 **	0.195 **	0.175 **
Shame	−0.067	−0.006	−0.036	0.175 **	0.170 **	0.197 **
Hopelessness	−0.228 **	−0.115 **	−0.189 *	0.293 **	0.325 **	0.342 **

Note. DM = Deep Motivation; DS = Deep Strategy; DA = Deep Approach; SM = Surface Motivation; SS = Surface Strategy; SA = Surface Approach. \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

### 3.2.2. Multiple Regression

Results of the multiple regression analyses between *Achievement Emotions* (IVs) and *Learning Approaches* (DV) showed that: (1) the positive emotions *enjoyment* and *hope* positively predict the *Deep Approach* (DA), especially the DM component. However, the emotions of *boredom*, *anger*, and *hopelessness* negatively predict DA. The negative emotion of *shame* also predicts this approach in study and testing situations. (2) The emotions that positively predict *Surface Approach* (SA) are *boredom* and *hopelessness*, particularly so in the aspect of *Surface Strategies* (SS). There are some differences between the situations, however. In the study and testing situations, *enjoyment* negatively predicts the Surface Approach, while *boredom* and *anger* are positive predictors. The *hopelessness* emotion also positively predicts the Surface Approach, in the class situation as well as in testing. See Table 4.

**Table 4.** Regression (Standardized Beta Index) of Achievement Emotions to Learning Approaches (n = 658).

CLASS	DM	DS	DA	SM	SS	SA
Enjoyment	0.333 ***	0.109	0.251 **	−0.129	−0.069	−0.086
Hope	0.166 *	0.242 **	0.221 **	−0.035	−0.125	−0.114
Pride	0.004	0.071	0.036	−0.011	0.000	0.015
Boredom	−0.171 **	−0.174 *	−0.183 **	−0.107	0.245 ***	0.208 **
Anger	−0.226 **	−0.194 *	−0.227 **	−0.065	−0.173 *	0.137
Anxiety	−0.055	0.097	0.027	−0.075	−0.006	−0.048
Shame	0.084	−0.003	0.048	−0.021	0.011	0.008
Hopelessness	−0.151 *	−0.149 *	−0.169 *	0.360 ***	0.267 ***	0.335 **
<i>F</i> (8431)	24.260	14.996	23.940 ***	12.779	14.798	15.559 **
<i>R square</i>	0.310	0.210	0.310	0.191	0.215	0.231
STUDY	DM	DS	DA	SM	SS	SA
Enjoyment	0.588 ***	0.470 ***	0.585 ***	−0.076	−0.204 ***	−0.160 *
Hope	−0.013	0.035	0.007	−0.060	−0.068	−0.091
Pride	−0.139 *	−0.081	−0.119	−0.157 *	0.055	−0.023
Boredom	−0.245 ***	−0.107	−0.185 **	0.212 **	0.273 ***	0.243 **
Anger	0.107	0.029	0.069	0.234 **	0.157 *	0.221 **
Anxiety	−0.047	−0.061	−0.064	−0.084	−0.032	−0.060
Shame	0.099	0.198 *	0.178 **	0.014	−0.076	−0.048
Hopelessness	−0.087	−0.085	−0.106	−0.093	0.036	−0.007
<i>F</i> (8420)	29.714 ***	17.149 **	29.583 ***	17.357 **	19.783 **	21.003 ***
<i>R square</i>	0.364	0.248	0.365	0.251	0.269	0.298
TEST	DM	DS	DA	SM	SS	SA
Enjoyment	0.334 ***	0.211 **	0.334 ***	−0.142	−0.242 **	−0.196 *
Hope	0.194 **	0.294 ***	0.194 **	−0.068	−0.016	−0.054
Pride	−0.20	−0.009	−0.020	−0.051	0.016	−0.018
Relief	−0.037	−0.075	−0.037	0.038	0.006	0.022
Anger	−0.153 *	−0.115	−0.153 *	0.243 **	0.257 **	0.268 **
Anxiety	−0.019	0.121	0.019	−0.204 **	−0.054	−0.132 *
Shame	0.160 *	0.134 *	0.160 *	−0.054	−0.167 *	−0.117
Hopelessness	−0.031	−0.024	−0.031	0.164 *	0.194 *	0.201 *
<i>F</i> (8420)	18.034	11.054	18.304 **	9.460	11.780	12.323 **
<i>R square</i>	0.259	0.179	0.259	0.152	0.182	0.192

Note. DM = Deep Motivation; DS = Deep Strategy; DA = Deep Approach; SM = Surface Motivation; SS = Surface Strategy; SA = Surface Approach; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

### 3.3. Big Five and Achievement Emotions

#### 3.3.1. Bivariate Association

Bivariate association results showed that Big Five (BF) and its components (E,C,A, and O) had a consistent, significant, positive association with positive emotions, as well as a negative association with negative emotions. In the case of Neuroticism (N), the inverse effect appeared, correlating negatively with positive emotions, and correlating positively with negative emotions. The strongest associations were seen with the negative emotions of *anxiety*, *anger*, and *hopelessness*. As seen in Table 5, this behavioral pattern is stable across the three academic situations examined. The strongest positive association between N and negative emotions was produced in study and testing situations.



**Table 5.** Bivariate correlations between *Big Five* and *Achievement Emotions*, in three situations (n = 658).

CLASS	E	C	N	A	O
<i>Positive</i>	0.380 **	0.586 **	−0.146 **	0.325 **	0.523 **
Enjoyment	0.285 **	0.482 **	−0.152 **	0.275 **	0.517 **
Hope	0.382 **	0.628 **	−0.204 **	0.341 **	0.417 **
Pride	0.369 **	0.505 **	−0.066	0.277 **	0.413 **
<i>Negative</i>	−0.246 **	−0.426 **	0.369 **	−0.237 **	−0.373 **
Boredom	−0.081 *	−0.437 **	0.335 **	−0.193 **	−0.202 **
Anger	−0.177 **	−0.384 **	0.338 **	−0.304 **	−0.206 **
Anxiety	−0.233 **	−0.272 **	0.418 **	−0.160 **	−0.332 **
Shame	−0.312 **	−0.199 **	0.338 **	−0.142 **	−0.292 **
Hopelessness	−0.172 **	−0.400 **	0.374 **	−0.222 **	−0.354 **
STUDY	E	C	N	A	O
<i>Positive</i>	0.366 **	0.566 **	−0.168 **	0.313 **	0.505 **
Enjoyment	0.292 **	0.526 **	−0.112 **	0.291 **	0.459 **
Hope	0.357 **	0.528 **	−0.225 **	0.306 **	0.476 **
Pride	0.303 **	0.505 **	−0.079 *	0.277 **	0.397 **
<i>Negative</i>	−0.208 **	−0.400 **	0.459 **	−0.204 **	−0.356 **
Boredom	−0.153 **	−0.515 **	0.339 **	−0.251 **	−0.296 **
Anger	−0.068 **	−0.340 **	0.443 **	−0.213 **	−0.233 **
Anxiety	−0.162 **	−0.255 **	0.438 **	−0.110 **	−0.274 **
Shame	−0.251 **	−0.254 **	0.412 **	−0.170 **	−0.190 **
Hopelessness	−0.231 **	−0.248 **	0.441 **	−0.215 **	−0.274 **
TEST	E	C	N	A	O
<i>Positive</i>	0.352 **	0.534 **	−0.176 **	0.245 **	0.480 **
Enjoyment	0.292 **	0.485 **	−0.110 **	0.200 **	0.435 **
Hope	0.327 **	0.535 **	−0.269 **	0.268 **	0.469 **
Pride	0.341 **	0.498 **	−0.137 **	0.265 **	0.411 **
Relief	0.099 *	0.215 **	0.086 *	0.168 **	0.120 *
<i>Negative</i>	−0.104 **	−0.234 **	0.486 **	−0.124 **	−0.275 **
Anger	−0.061	−0.258 **	0.415 **	−0.205 **	−0.257 **
Anxiety	−0.070	−0.108 *	0.438 **	−0.025	−0.220 **
Shame	−0.142 **	−0.217 **	0.394 **	−0.133 **	−0.197 **
Hopelessness	−0.104 *	−0.234 **	0.405 **	−0.212 **	−0.348 **

Note. E = Extraversion; C = Conscientiousness; N = Neuroticism; A = Agreeableness; O = Openness; \*  $p < 0.05$ ; \*\*  $p < 0.001$ .

### 3.3.2. Multiple Regression

Results of the multiple regression analyses between *Achievement Emotions* (IVs) and the *Big Five* (DVs) showed that: (1) the positive emotions *enjoyment* and *hope* positively predicted E, C, and A, and negatively predicted N, in class and testing, but not in the study situation. Predictions that differ according to the situation are worth noting. In the class situation, the factors mostly strongly predicted by emotions are C and E; in the study and testing situations, C and N are most strongly predicted. In no situation was C predicted by enjoyment. Negative emotions (anger or anxiety) were usually predictors of the N factor; however, in the study and testing situations, for example, they are predictive of both C and E. See Table 6.

**Table 6.** Regression (Standardized Beta Index) of Achievement Emotions to Big Five in each situation (n = 658).

CLASS	E	C	N	A	O
Enjoyment	−0.085	−0.158 *	0.022	0.079	0.233 **
Hope	0.256 **	0.535 **	−0.161 *	0.230 **	0.323 **
Pride	0.248 **	0.105	−0.181 **	0.042	−0.019
Boredom	0.201 *	−0.211 **	0.158 *	0.286 **	0.171 *
Anger	−0.179 *	−0.079	0.041	−0.482 **	0.129 *
Anxiety	−0.044	0.029	0.271 **	−0.046	−0.097
Shame	−0.271 **	0.105	0.034	−0.079	−0.029
Hopelessness	0.225 **	−0.105	−0.060	0.061	−0.245 **
<i>F</i> (8416)	17.357 **	40.505 **	10.489 **	10.447 **	26.849 **
<i>R square</i>	0.250	0.436	0.166	0.168	0.339
STUDY	E	C	N	A	O
Enjoyment	0.165 *	0.063	0.005	0.126	0.435 ***
Hope	0.239 **	0.202 **	−0.100	0.228 **	0.102
Pride	0.054	0.185 **	0.134	−0.060	−0.087
Boredom	−0.051	−0.494 **	−0.001	−0.053	−0.011
Anger	0.304 **	0.197 *	0.171 *	−0.131	0.205 **
Anxiety	−0.157 **	−0.068	0.078	−0.195 *	−0.121
Shame	−0.261 **	0.025	0.199 *	−0.097	−0.050
Hopelessness	0.154	0.109	0.077	0.069	−0.229 **
<i>F</i> (8402)	12.930 ***	32.081 **	14.915 ***	6.208 **	22.808 **
<i>R square</i>	0.205	0.248	0.230	0.112	0.317
TEST	E	C	N	A	O
Enjoyment	−0.069	−0.027	0.124	−0.118	0.118
Hope	0.200 *	0.384 ***	−0.144 *	0.199 *	0.238 **
Pride	0.271 **	0.179 *	−0.009	0.130	0.090
Relief	−0.095	0.022	−0.016	0.078	0.013
Anger	0.191 **	−0.168 **	0.239 **	−0.243 **	−0.075
Anxiety	0.107	0.219 **	0.269 **	0.141 *	−0.010
Shame	−0.102	0.017	0.109	0.000	0.137 *
Hopelessness	−0.142	−0.122	−0.073	0.036	−0.198 *
<i>F</i> (8420)	9.146 **	26.486 **	17.207 **	6.045 **	19.359 **
<i>R square</i>	0.157	0.343	0.253	0.106	0.279

Note. E = Extraversion; C = Conscientiousness; N = Neuroticism; A = Agreeableness; O = Openness; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

### 3.4. Structural Predictions: Personality, Learning Approaches and Achievement Emotions

Multiple prediction analysis, using SEM, showed three consistent prediction models; their statistics are presented in Table 7. *Model 0 (three situations)* tested the relationship with the complete construct (5 BF factors), and the statistical values obtained were less adequate. *Models 1 to 3* selected only C and N as predictors; these models showed adequate significance.

**Table 7.** Models of structural linear results of the variables.

Model	Chi Square	DF	Chi/df	NFI	RFI	TLI	CFI	RMSEA	Hoelter 05–01
0.CL(BF)	863,666 ***	110	7.85	0.865	0.812	0.880	0.832	0.066	246–267
0.STU(BF)	1,088,044 ***	111	9.80	0.849	0.792	0.849	0.862	0.075	197–214
0.TES(BF)	931,255 ***	111	8.31	0.854	0.799	0.869	0.868	0.069	230–250
1.Class (C&N)	502,808 ***	69	7.28	0.917	0.907	0.920	0.900	0.080	175–194
2. Study (C&N)	504,705 ***	69	7.31	0.948	0.928	0.924	0.939	0.078	193–204
3. Test (C&N)	508,201 ***	69	7.36	0.929	0.914	0.907	0.903	0.069	246–268

Note. Model for each situational context (1 to 3). 0 Models = Situations and BF (Big Five factors); 1,2,3 Models: Situations with C (Conscientiousness) and N (Neuroticism) factors; \*\*\*  $p < 0.001$ .

### 3.5. Model 1. Class

#### 3.5.1. Direct Effects

There were several significant, direct predictive effects. Conscientiousness (C) was a significant positive predictor of the Deep Approach (while negatively predicting the Surface Approach); the Deep approach in turn predicted *Positive Emotions (PE)*. However, Neuroticism (N) was a significant positive predictor of the Surface Approach (SA) and of *Negative Emotions (NE)*. There was also a positive direct effect of DA on *Positive Emotions*, and of SA on *Negative Emotions*. See Table 8 for more details.

**Table 8.** Standardized Direct Effects (Default model): Class situation.

Variables	CONS	NEUR	DA	SA	POSEM	NEGEM
NEUR	−0.194					
DA	0.489				0.484	
SA	−0.234		−0.321			
DM			0.875			
DS			0.733			
SM				0.783		
SS				0.846		
POSEM	0.436		0.391			
NEGEM		0.328		0.296	−0.298	
ENJOYMENT					0.920	
HOPE					0.843	
PRIDE					0.836	
BOREDOM						0.748
ANGER						0.861
ANXIETY						0.811
SHAME						0.654
HOPELE						0.918

Note. CONS = Conscientiousness; NEUR = Neuroticism; POSEM = Positive Emotions; NEGEM = Negative Emotions; DA = Deep Approaches; SA = Surface Approaches; DM = Deep Motivation; DS = Deep Strategies; SM = Surface Motivation; SS = Surface Strategies. HOPELE = Hopelessness.

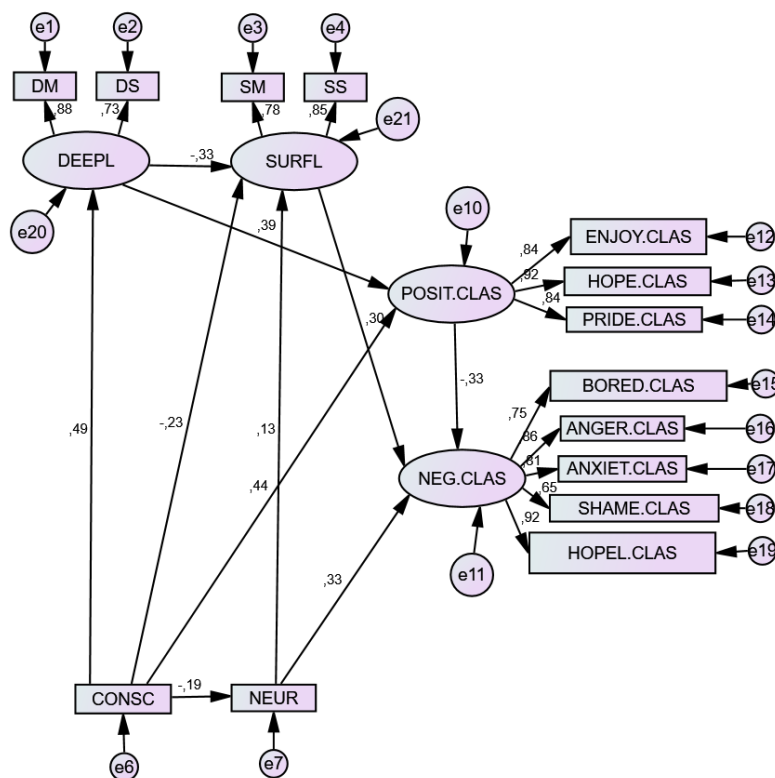
#### 3.5.2. Indirect Effects

There were several indirect positive effects of the Conscientiousness factor on DA factors and on *Positive Emotions*, as well as negative effects on SA factors and on *Negative Emotions*. In the case of Neuroticism, the positive effect was on SA factors and on *Negative Emotions*. Also worth noting is the negative indirect effect of the DA factor on the SA factor, as well as on *Negative Emotions*, and the positive effect of the SA factor on *Negative Emotions*. See Table 9 for more details. Figure 1 graphically illustrates these effects.

**Table 9.** Standardized Indirect Effects (Default model): Class situation.

Variables	CONS	NEUR	DA	SA	POSEM	NEGEM
<b>NEUR</b>						
DA						
SA	-0.183					
DM	0.358					
DS	0.428					
SM	-0.353	0.099	-0.275			
SS	-0.326	0.107	-0.255			
POSEM	0.191					
NEGEM	-0.393	0.037	-0.224			
ENJOYM	0.529		0.330			
HOPE	0.577		0.360			
PRIDE	0.529		0.327			
BOREDOM	-0.294	0.273	-0.168	0.221	-0.245	
ANGER	-0.338	0.314	-0.193	0.255	-0.282	
ANXIETY	-0.319	0.296	-0.182	0.240	-0.266	
SHAME	-0.257	0.239	-0.147	0.193	-0.214	
HOPELE	-0.360	0.335	-0.206	0.272	-0.310	

Note. CONS = Conscientiousness; NEUR = Neuroticism; POSEM = Positive Emotions; NEGEM = Negative Emotions; DA = Deep Approaches; SA = Surface Approaches; DM = Deep Motivation; DS = Deep Strategies; SM = Surface Motivation; SS = Surface Strategies. HOPELE = Hopelessness.



**Figure 1.** Predictive relationships of two Factors of the Big Five model (Conscientiousness and Neuroticism) on the Learning Approach and Achievement Emotions, in a Class Situation.

### 3.6. Model 2. Study Situation

#### 3.6.1. Direct effects

The Conscientiousness factor (C) showed a negative direct effect on Neuroticism (N). It also had a positive effect on DA and a negative effect on SA, as well as on *Positive Emotions*. The N factor, however,

was a positive, indirect predictor of SA and of Negative Emotions. DA appeared as a negative predictor of SA and positive predictor of *Positive Emotions*. SA appeared as a positive predictor of Negative Emotions. See Table 10 for further details.

**Table 10.** Standardized Direct Effects (Default model): Study situation.

Variables	CONS	NEUR	DA	SA	POSEM	NEGEM
NEUR	−0.195					
DA	0.486					
SA	−0.225	0.130	−0.332			
DM			0.869			
DS			0.738			
SM				0.776		
SS				0.853		
POSEM	0.417		0.374			
NEGEM		0.401		0.233	−0.348	
ENJOYMT					0.865	
HOPE					0.860	
PRIDE					0.864	
BOREDOM						0.777
ANGER						0.845
ANXIETY						0.822
SHAME						0.820
HOPELE						0.913

Note. CONS = Conscientiousness; NEUR = Neuroticism; POSEM = Positive Emotions; NEGEM = Negative Emotions; DA = Deep Approaches; SA = Surface Approaches; DM = Deep Motivation; DS = Deep Strategies; SM = Surface Motivation; SS = Surface Strategies. HOPELE = Hopelessness.

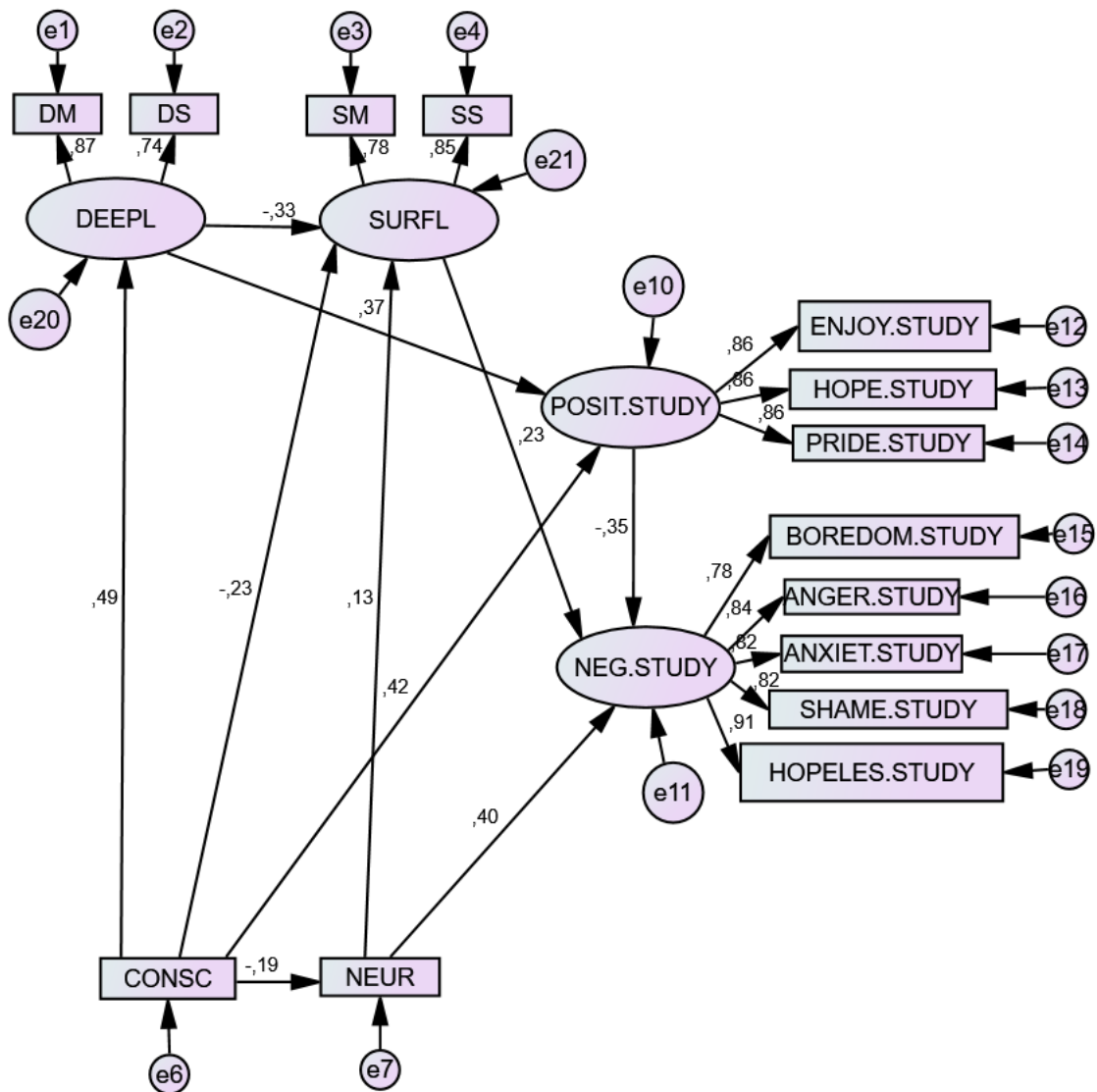
### 3.6.2. Indirect Effects

In a complementary fashion, the C factor had numerous positive indirect effects on the DA factor and its components, as well as on *positive emotions*. The N factor showed these effects in the opposite direction. Similarly, the Deep Approach showed an indirect predictive effect on emotions, positively predicting Positive Emotions, and negatively predicting Negative Emotions. See Table 11 and Figure 2 for further details.

**Table 11.** Standardized Indirect Effects (Default model): Study situation.

Variables	CONS	NEUR	DA	SA	POSEM	NEGEM
NEUR	−0.187					
DA	0.182					
SA	−0.383		−0.208			
DM	0.423					
DS	−0.359					
SM	−0.320	0.110	−0.283			
SS	−0.352	0.101	−0.253			
POSEM	0.182					
NEGEM	−0.187	0.030				
ENJOYMT	0.515		0.324			
HOPE	0.518		0.322			
PRIDE	0.515		0.323			
BOREDOM	−0.298	0.335	−0.161	0.181	−0.271	
ANGER	−0.323	0.364	−0.175	0.197	−0.294	
ANXIETY	−0.315	0.355	−0.171	0.192	−0.286	
SHAME	−0.314	0.354	−0.170	0.1910	−0.286	
HOPELE	−0.349	0.394	−0.189	0.213	−0.318	

Note. CONS = Conscientiousness; NEUR = Neuroticism; POSEM = Positive Emotions; NEGEM = Negative Emotions; DA = Deep Approaches; SA = Surface Approaches; DM = Deep Motivation; DS = Deep Strategies; SM = Surface Motivation; SS = Surface Strategies. HOPELE = Hopelessness.



**Figure 2.** Predictive relationships of two Factors of the Big Five model (Conscientiousness and Neuroticism) on the Learning Approach and Achievement Emotions, in a Study Situation.

3.7. Model 3. Test Situation

3.7.1. Direct Effects

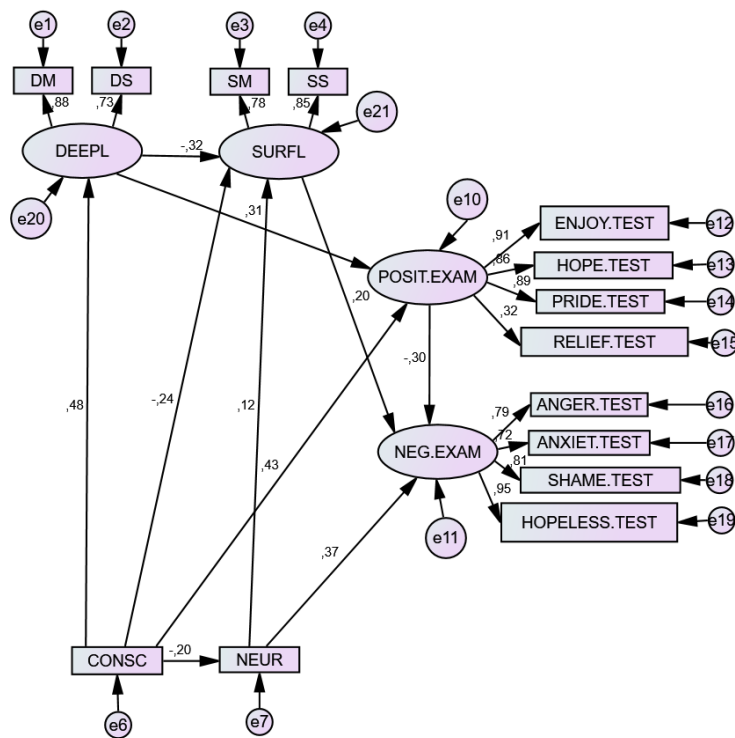
The C factor negatively predicted N and SA, while positively predicting DA and Positive Emotions. The N factor positively predicted SA and negatively predicted Negative Emotions. The Deep Approach positively predicted Positive Emotions, while the Surface Approach predicted Negative Emotions. See Table 12 and Figure 3 for further details.



**Table 12.** Standardized Direct Effects (Default model): Testing situation.

Variables	CONS	NEUR	DA	SA	POSEM	NEGEM
NEUR	-0.201					
DA	0.485					
SA	-0.243	0.125	-0.323			
DM			0.875			
DS			0.734			
SM				0.779		
SS				0.851		
POSEM	0.426		0.306			
NEGEM		0.369		0.198	-0.298	
ENJOYMENT					0.980	
HOPE					0.856	
PRIDE					0.886	
RELIEF					0.319	
ANGER						0.792
ANXIETY						0.716
SHAME						0.811
HOPELE						0.951

Note. CONS = Conscientiousness; NEUR = Neuroticism; POSEM = Positive Emotions; NEGEM = Negative Emotions; DA = Deep Approaches; SA = Surface Approaches; DM = Deep Motivation; DS = Deep Strategies; SM = Surface Motivation; SS = Surface Strategies. HOPELE = Hopelessness.



**Figure 3.** Predictive relationships of two Factors of the Big Five model (Conscientiousness and Neuroticism) on the Learning Approach and Achievement Emotions, in a Testing Situation.

3.7.2. Indirect Effects

The C factor had a negative predictive effect on N, SA, and *Negative Emotions*. It also had a positive effect toward DM, its components, and *Positive Emotions*. The N factor produced effects in the opposite direction. As for predictive effects on DA, C was a positive predictor, and N was a negative predictor. See Table 13 and Figure 3 for further details.

**Table 13.** Standardized Indirect Effects (Default model): Testing situation.

Variables	CONS	NEUR	DA	SA	POSEM	NEGEM
NEUR	−0.182					
DA						
SA	−0.182					
DM	0.424		0.252			
DS	0.357		0.275			
SM	−0.325	0.97				
SS	0.355	0.106				
POSEM	0.148					
NEGEM	−0.328	0.025	−0.155			
ENJOYMT	0.521		0.278			
HOPE	0.491		0.262			
PRIDE	0.509		0.271			
RELIEF	0.183		0.98			
ANGER	−0.260	0.312	−0.123	0.157	−0.236	
ANXIETY		0.282	−0.111	0.142	−0.213	
SHAME		0.319	−0.126	0.161	−0.241	
HOPELE		0.375	−0.148	0.188	−0.283	

Note. CONS = Conscientiousness; NEUR = Neuroticism; POSEM = Positive Emotions; NEGEM = Negative Emotions; DA = Deep Approaches; SA = Surface Approaches; DM = Deep Motivation; DS = Deep Strategies; SM = Surface Motivation; SS = Surface Strategies. HOPELE = Hopelessness.

#### 4. Discussion

Generally speaking, the results support our hypotheses. Regarding the *first hypothesis*, on the potential association and linear prediction between personality variables and learning approaches, the relationships found here confirmed prior evidence. While Conscientiousness positively predicted the Deep Approach and negatively predicted the Surface Approach and its components, Neuroticism positively predicted the SA approach and its components. These results are similar to those reported in previous research, where these two factors appear as protective vs. risk factors with respect to achievement [14,49,51,52,59,81,82]. These results remain unchanged in the three situations analyzed (class, study, testing); This would suggest a constant effect of personality factors on motivation, with either positive or negative directionality [83].

Regarding the *second hypothesis*, on the possible association and predictive relationship of learning approaches and achievement emotions, there was a consistent relationship between DA and *Positive Emotions*, and between SA and *Negative Emotions*. These results are novel because they offer precise evidence of how learning approaches also possess an unmistakable emotional component [84]. The classical view of learning approaches, as eminently cognitive-motivational variables, should therefore incorporate these affective-type results [85] (Sharp, Sharp, & Young, 2020). It seems reasonable to assume that positive emotions (enjoyment, etc.) positively reinforce one's motivational state during class, study and testing; while the feedback of negative emotions (anger, anxiety, etc.) interferes with learning [86–88]. The latter would contribute to greater avoidance and flight responses because of the negative emotional component of this learning profile. It is furthermore interesting to note that, while the positive emotions of DA are more associated with the DM component, in the case of SA, emotions are linearly associated with SS more than with SM, indicating that the emotional state affects the cognitive processes of surface strategy, and not only the surface motivational state [66]. The negative deactivating emotion of boredom has greater weight in class and study situations, while the positive deactivating emotion of relief is more relevant in testing situations. However, the relationship is maintained in the three situations, revealing stability in the students' emotional responses, according to their learning approaches. This would confer on learning approaches a personalistic component, or a stable motivational-affective style [50,88,89].

Regarding the *third hypothesis*, the results present three structural predictive models, which are quite similar in the three situations analyzed. This demonstrates that the relationship between the

BF characteristics (C and N, as essential factors), learning approaches (as a mediating variable), and achievement emotions is stable in the three situations (class, study, testing), despite the differences between them. The differences in emotional response between one situation and another, according to their level of additional stress, has been analyzed previously [90].

That emotions would be jointly predicted by personality variables and learning approaches, the structural models have shown two consistent triangles—seen graphically in our figures. One triangle represents *protective variables* of learning (C- > DA- > PE) and one triangle represents *risk variables* (N- > SA- > NE). Moreover, the two triangles are produced consistently across the three learning situations. Although this result is modulated by the statistically greater predictive strength of the personality variables (C and N), it clearly shows the role of learning approaches in predicting positive vs. negative achievement emotions [91]. This relationship shows that personality factors would also have a direct predictive effect on learning approaches, and an indirect effect on achievement emotions; in this relationship, learning approaches would also predict different types of emotions. If we join this relationship to prior evidence that shows that positive emotions predispose problem-focused coping strategies and engagement, while negative emotions predispose emotion-focused strategies and burnout [71], we can conclude that surface learning approaches would tend toward burnout, while deep approaches tend toward engagement. This complex relationship introduces new emotional factors that have not been sufficiently addressed in the research to date.

## 5. Conclusions

In summary, this research has shown that learning approaches also have a positive or negative emotional dimension that is worthy of consideration. Thus, while the metacognitive component of learning approaches helps regulate cognitive strategies [70,92,93] (there also seems to be an emotion-regulating component. The Deep Approach not only involves cognitive regulation but also emotion regulation, thanks to the Conscientiousness factor. However, in the case of the Surface Approach, the opposite occurs, that is, it is associated with a lack of cognitive and emotional regulation, due to the effect of Neuroticism.

### 5.1. Limitations and Future Research

The present research study also has limitations. The first limitation of this study refers to its limited sample. Future research should expand on student characteristics and different university origins. Another relevant limitation to consider is that the characteristics of the teaching process under way have not been taken into account when measuring the learning approaches. Recent research has shown how the teaching process induces modifying effects on motivation [94] (Kaplan & Patrick, 2016).

Another important limitation refers to the male/female imbalance in our sample. Prior research has shown the importance of the female gender in learning approaches [95]. Emerging adult women also show greater interindividual variability than men in N and C, in their trajectories between the ages of 16 and 20 years [96]. Consequently, these aspects should be analyzed in future research.

Finally, one important limitation in the present research has to do with the absence of context variables in the analysis. It must not be forgotten that learning approaches are also mediated by factors from the teaching context, and may also mediate the relationships presented here [97–100]. Future research must integrate analysis of the role of context variables in learning approaches.

### 5.2. Practical Implications: Psychoeducational Intervention

One important practical implication for *Educational Psychologists* is the need to become aware of students' individual differences, to detect personal characteristics that may be predictive of inappropriate learning approaches. This is especially important in reference to emotional experiences [101] (Li, 2020). University Guidance and Counseling services have a very important role in this preventive evaluation. Assessment of university students' personality characteristics and achievement emotions, in the three situations analyzed, can be a first-order preventive strategy.

This information would allow us to detect adaptive or maladaptive emotional states in students, so that we can adjust our intervention to each situation. For example, intervention for the emotion of boredom in class is different from intervention to improve enjoyment while learning or test anxiety during exams.

Another implication for *students* is the need to assess the student variable of approach to learning, and so be able to promote any help they may need, and to identify students who will most likely need psychoeducational counseling during the course of their university studies. It would be interesting to implement a comprehensive program for managing emotions and coping with stress at university, given the effect that negative emotions have on students and how they may trigger academic burnout [42]. Students with surface approaches to learning are more likely to experience negative emotionality and, consequently, to end in an emotional state of burnout; a deep approach can also lead a high level of perfectionism [71]. Intervention for improving and adjusting coping strategies during study, personalized for each student, might be of considerable help.

Finally, it is essential that *teaching faculties* become familiar with this evidence and are aware of the relationships between these variables in their students. Effective or regulatory teaching helps to minimize harmful factors, and is largely dependent on the university teacher [17]. Teachers should know their students' approach to learning in order to adjust the teaching process and help students improve their learning process, whether in class, study time, or an exam situation [101,102].

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