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The Influence of Students' Self-Determination and Personal Achievement Goals in Learning and Engagement: A Mediation Model for Traditional and Nontraditional Students

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Abstract: Self-determination theory (SDT) and achievement goal theory (AGT) assume that students' level of self-determination and the goals they pursue in class are important factors in engagement and learning. The aims of this study were to: (1) investigate the links between the students' types of motivation and personal achievement goals; (2) explore how these two sets of variables relate to learning, engagement, and exploring mediation effects; and (3) understand the specificities of nontraditional students vs. traditional students, regarding the way these variables relate to each other. The study used a sample of 361 Portuguese adult students, 138 traditional (younger than 25 years old), and 223 nontraditional (active adults returning to education, 25 or older). The instruments used were: Self-regulation Questionnaire—Learning, Personal Achievement Goal Orientations Scale, Adult Learning Strategies Evaluation Scale and Behavioral Engagement Questionnaire. Path analysis for the total sample revealed that mastery goals mediated the relationship between autonomous motivation and all educational outcomes, and performance-avoidance goals mediated the relationship between introjected regulation, external regulation, and behavioral and emotional engagement. Multiple-group path analysis revealed a much stronger pattern of relationships for nontraditional students, especially between the SDT and AGT variables. The theoretical and practical implications of the study are discussed.

Keywords: self-determination theory; achievement goal theory; learning/engagement; traditional vs. nontraditional students



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1. Introduction

Self-determination theory (SDT) and achievement goal theory (AGT) are two of the most important contemporary theories of human motivation, namely in the field of education. SDT focuses on the degree to which learning and education activities are autonomous, i.e., self-determined by the person or, on the contrary, controlled by external factors, be it other people, uncontrollable situations, or the anticipation of rewards [1–3]. AGT studies the goals people pursue in achievement situations, focusing mainly on two goals: mastery (the most important goal is to achieve competence and knowledge) and performance (the main purpose is to show ability and outperform others) [4,5].

Research using SDT's and AGT's frameworks has helped, separately, to better understand students' motivation and how it connects to their learning, engagement, achievement, and satisfaction. Therefore, integrating the two theories will probably help strengthen them both theoretically, as well as reinforce their explanatory power. While there is some research attempting this integration in the education field [6–9], no study, to our knowledge, has compared samples of traditional and nontraditional students, i.e., research was performed exclusively with full-time traditional students who were younger than 25 years old.

Given the growing importance of nontraditional students (active adults, older than 24, returning to education), we believe it is very relevant to investigate the specificities of each population of students in order to increase their participation, persistence, and success in academic settings.

1.1. Self-Determination Theory

Self-determination theory (SDT) focuses on the why of motivated behavior—the underlying reasons for human acts. The two main types of motivation studied by SDT are autonomous and controlled. Autonomously motivated individuals experience volition or a self-endorsement of their actions, whereas people whose motivation is mainly controlled have a sense that their behavior is a consequence of an external pressure. Autonomous motivation (AM) includes intrinsic motivation, the “purest” form of AM, when people engage in activities out of interest, enjoyment, and pleasure. On the contrary, extrinsic motivation refers to the performance of an activity for the consequences or rewards that come out of it (e.g., higher grades and money) and/or to avoid negative outcomes (e.g., punishments and criticism). AM includes two internalized types of extrinsic motivation—identified regulation and integrated regulation. An individual with identified regulation begins to identify and accept the underlying value of a behavior, whereas integrated regulation means that the extrinsic motivation has become fully integrated in the individual’s values system, and it is now personally meaningful. Controlled motivation, on the other hand, includes external regulation, which refers to behaviors ruled exclusively by the anticipation of rewards, without any feelings of autonomy; introjected regulation refers to the reasons and behaviors that have been partially assimilated by the individual, but whose importance has not been really integrated, so they are still a source of internal pressure or conflict to the self. This type of regulation often links to the performance of behaviors, in order to avoid feelings of shame and guilt.

A significant number of studies related autonomous motivation to positive educational outcomes such as engagement, the use of deep learning strategies, higher grades, and satisfaction with learning [10]. On the contrary, controlled motivation is linked to test anxiety, superficial cognitive processing and procrastination [11].

1.2. Achievement Goal Theory

Achievement goals are the goals an individual is pursuing in an achievement task, such as an academic learning task [12]. The two most studied achievement goals are performance goals (also called ego-involved goals or ability goals), which relate to students’ desires of validating ability and outperforming peers, and mastery goals (also called learning goals or task goals), which relate to students’ motivation to acquire knowledge and skills [4,5]. Most authors agree that the two goals are not mutually exclusive, and that people can pursue one or another, depending on the context; however, there is some controversy regarding the effects of both goals in achievement, particularly performance goals. Some studies show that performance goals link to competitiveness, self-centeredness, and the use of surface-learning strategies (such as memorization) [13]. However, other studies showed a relation to high performance outcomes, which lead to the distinction between performance-approach (the main goal is to attain favorable judgments of competence) and performance-avoidance (the main goal is to avoid unfavorable judgments of competence) goals. Performance-approach goals showed a link to some positive effects, such as effort, persistence, and higher performance outcomes, whereas performance-avoidance goals only connected to negative outcomes [14,15]. Mastery goals are linked to positive outcomes such as use of effort, cooperativeness, self-regulation, deep-processing learning strategies, and manifesting intrinsic interest; however, they are not always linked to high grades, or only through the mediation of effort, deep learning strategies, or self-efficacy beliefs [16,17]. Some authors consider that performance goals should not be encouraged in classrooms, and even question the validity of students having these goals, stating that it is, in fact, outcome goals (wanting to have high grades) that are more frequent [13]. On the contrary,

other authors believe that students should adopt both mastery and performance-approach goals, thus reaping the benefits of each goal [18].

1.3. *Self-Determination Theory and Achievement Goal Theory: Possible Links*

SDT and AGT share some common aspects that promise the possibility of an integrated model: they both view motivation from a quality perspective (i.e., they assume that there are different types of motivation, with different effects), and they have the importance given to the influence of context in common [19]. In this regard, both argue, and research has generally validated this claim, that educational contexts that promote autonomy, competence, and mastery lead to better educational outcomes, whereas more controlled and performance-focused educational environments will generally thwart students' learning and engagement [20–22]. The two theories contrast, however, in that SDT focus more on the origin of behaviors (needs and underlying reasons) and AGT on the direction of behavior, i.e., goals. Still, this contrast allows for the two theories to be related, as far as needs or underlying reasons are concerned, as well as the more general human dispositions that lead or energize the adoption of concrete goals, as proposed by Elliot and Church's [14] hierarchical model of achievement motivation. Ciani et al. [7] noted that "although the ordering might go either way, depending on how and when constructs are measured, (. . .) [there are] numerous theoretical and empirical articles showing that broader motive dispositions are profitably conceptualized as antecedents of peoples' specific action objectives" (p. 228). These authors found that students' self-determination predicted their initial mastery goals and did not have a significant relationship with their performance-approach and performance-avoidance goals. Sommet and Elliot [9] explored the separated and combined influence of personal achievement goals and reasons for goal pursuit in beneficial experiential and learning outcomes. They found that each construct explained the independent variance in the outcomes; however, at the same time, controlling for one of the constructs diminished the predictive power of the other, suggesting that they are, at the same time, distinct and overlapping concepts. Kim et al. [8], in a study with middle school students, found that identified regulation mediated the relation between perceiving a mastery goal structure and adopting mastery goals, whereas introjected regulation mediated the relation between perceiving a performance-avoidance goal structure and adopting performance-approach and performance-avoidance goals.

Some studies also followed a hierarchical model but placed achievement goals, leading to the different types of motivation. Bortoli et al. [23] found mastery goals to be mediators of the relationship between a mastery goal structure and intrinsic and identified regulation; however, the study failed to find a significant connection between personal performance goals and external motivation and amotivation. Ntoumanis [24] found that having mastery goals were a predictor of intrinsic and identified motivation and did not predict external and introjected regulation. Barkoukis et al. [25] found that mastery-approach goals were positively related to intrinsic and identified motivation and negatively related to external motivation. Chen et al. [6] found that mastery-approach and performance-approach goals were both partial mediators of the links between autonomy and competence need support and intrinsic and external motivation. Cho and Kim [26] found that involvement in the pursuit of mastery-approach goals strengthened autonomous motivation, while weakening controlled motivation.

Overall, empirical studies seem to confirm a link between SDT and AGT constructs. Autonomous motivation (or intrinsic motivation/identified regulation) is usually positively connected to mastery goals, whereas controlled motivation (or external regulation/introjected regulation) tends to be linked to performance goals—although the latter connection is not found as often as the former.

1.4. *SDT, AGT, and Adult Learners*

Nontraditional students can also be termed adult students, mature students or adult learners. Although there is not one standard definition, the literature generally uses one or

more of the following criteria to define an adult, nontraditional student: (1) is 25 years old or older; (2) has already entered the job market on a full-time basis; (3) has delayed their enrollment in higher education, or is returning to education activities after a significant time gap [27,28]. Some authors also mention being financially independent, engaging in education as a part-time activity, and having family responsibilities (e.g., a spouse or dependents) as criteria [29]. The age criterion is the most used one to operationalize the concept [30–32], although the precise cut-off age may vary according to context or country (usually between the ages of 23 and 26, with some studies going so far as 30). Using only age to define who is an adult student, however, may prove to be problematic, as some students under 25 may have already become full-time workers and/or have delayed their enrollment [33]. Due to the high number of characteristics that may describe a nontraditional student, in her study of enrollment and persistence trends in this population, Horn [29] defines a nontraditional student as minimally nontraditional (one characteristic), moderately nontraditional (two or three characteristics), or highly nontraditional (four or more characteristics). The fact that a standard definition of nontraditional students does not exist means that caution should be exercised when analyzing and comparing data from the literature.

Adult or nontraditional-aged learners are an increasingly important population worldwide, as approximately 50% of the adult active population in OECD countries engages in some type of educational activity each year [28], whether it is formal educational activities (within the formal educational system of a country) or non-formal educational activities (organized and systematic educational activities carried on outside the framework of the formal system—e.g., professional training).

One of the main problems in adult education is the barriers faced by adults when they are considering engaging in education. These can be of a more situational nature (e.g., lack of time due to work and/or family responsibilities; lack of financial resources), dispositional nature (for instance, negative self-beliefs about oneself as a learner because of previous academic failure), or both [34]. This means that mature students are often more at risk of dropping out from education and training than younger ones [35]. Understanding why and what motivates adults older than 24 to engage in education is imperative to increasing their participation, persistence, and success, as well as helping institutions and educators in the design of more appealing programs and practices, ultimately promoting education as an end in itself and as a tool for social and economic justice [36].

SDT and AGT were both separately used as frameworks for understanding the motivation in adult, nontraditional students (AGT more than SDT). Comparative studies using the SDT framework show that nontraditional students have more intrinsic motivation and identified regulation than younger students [37–39] and less extrinsic motivation [40]. Using the AGT framework, research shows that nontraditional students are more mastery-oriented than traditional students [30–32,41–43], whereas traditional students seem to be more performance-oriented [44]. Additionally, comparative studies show that students older than 24 more frequently use deep learning strategies [45–47] and tend to have better academic performances [41–43,48]. Other studies also found that adult students show general high levels of self-efficacy and engagement [49–51]. Older students displaying better motivational and achievement patterns than younger ones can be explained by personality development theories (e.g., [52,53]) and SDT's organismic integration theory [54]. These argue that older adults' maturity and life experiences help them to assimilate the non-internalized parts of themselves into a more coherent whole and become more autonomous, self-determined, and less dependent of the expectations and/or external pressure of others. Adult cognitive development theories (e.g., [55,56]), on the other hand, state that cognitive development goes on through adulthood, and mature adults are more capable than younger ones in using relativistic/dialectical thought and metacognition, which may account for their higher use of deep learning strategies and better performances in educational contexts.

1.5. The Present Study

At a theoretical level, this study aims to contribute to a better understanding of the links between SDT and AGT, making their explanatory power, in regard to education, clear, and examine their relevance into clarifying the motivational forces that are specific to younger and older students. This research may also have practical implications, in that a better understanding of how motivation works and the differences between diverse types of students (traditional and nontraditional) helps educational institutions design more effective programs, with teachers, trainers, and other professionals adopting more adjusted pedagogical practices and support.

In short, the main goals for the present study were as follows: (a) to investigate the links between SDT and AGT theories, particularly the connections between students' types of motivation (autonomous and controlled motivation) and their personal achievement goals (mastery, performance-approach, and performance-avoidance goals); (b) to explore how these two sets of variables relate to students' learning and both behavioral and emotional engagement, creating an integrated path model and exploring the possible mediation effects; and (c) to understand the specificities of nontraditional students vs. traditional students, in the way the motivational variables (types of motivation and personal achievement goals) relate to each other and to the educational outcomes, using multiple-group path analysis.

2. Methods

2.1. Participants and Procedure

The participants were 361 Portuguese adults (57.3% female), with ages ranging from 18 to 64 years old ($M = 30.49$; $SD = 11.31$). A total of 138 participants were less than 25 years old and full-time students (traditional students); 223 participants were 25 or older and active adults returning to education (nontraditional students). The sample attended one of the following modalities of the courses: short-term courses (21.3% of the total sample) of 25 to 175 h length; long-term, mainly vocational courses (23% of the total sample) of approximately two years length; or long-term academic courses (55.7%) of approximately four years length. All adults had voluntarily enrolled in their courses.

Questionnaires were administered in two time periods: the self-regulation questionnaire learning during the first week after the courses had started; the personal achievement goal orientations, adult learning strategies evaluation, and self-reported engagement scales about three months later. At least one researcher was present during data collection. Students completed the surveys in approximately 20 min in each period. Participation was voluntary, and anonymity was guaranteed.

We performed confirmatory factor analysis (CFA) for all the scales in order to confirm their respective factor structure. For each scale, when the initial model using all original items of a scale did not show acceptable fit, that is, did not meet the cut-off criteria based on comparative fit index (CFI) greater than 0.90 and root-mean-square error of approximation (RMSEA) less than 0.10 [57], we considered modification indices to make theoretical pertinent changes in the model, e.g., errors within the same factor were allowed to correlate in order to improve fit indices. Items that had loadings on a factor of less than 0.40 were excluded. In all scales, participants rated their agreement with each item using a 4-point scale (1 = totally disagree, 4 = totally agree or 1 = not at all true, 4 = very true).

2.2. Measures

Self-regulation questionnaire learning [58]. SRQ-L belongs to a group of scales developed within Self-Determination Theory. There are three groups of items (A, B, and C), each with four items (12 in total). Because the original scale was designed for medical students, the content of the items was adapted. Although the original scale was designed to have just two "super" categories of regulation, autonomous and controlled motivation, a previous study [51] suggested a three-factor structure, in which the controlled scale is split in two factors: external and introjected regulation. We performed a CFA to test this three-factor structure, and the results showed that the structure was appropriate, and all items

were retained: $\chi^2(28) = 106.58, p = 0.00$; CFI = 0.91; RMSEA = 0.09. Alpha-values were 0.80 for the autonomous motivation scale, 0.60 for the external regulation scale, and 0.64 for the introjected regulation scale.

Personal achievement goal orientations. We used a scale from PALS (patterns of adaptive learning scales) [59] to measure learners' personal achievement goal orientations. CFA confirmed the three latent factor structure, and all items were retained. Fit indices were: $\chi^2(72) = 254.62, p = 0.00$; CFI = 0.93; RMSEA = 0.09. Alpha values were 0.83 for the mastery goal orientation scale, 0.85 for the performance-approach goal orientation scale, and 0.77 for the performance-avoidance goal orientation scale.

Adult learning strategies evaluation scale. This ten-item, self-rated scale was developed to evaluate the use of deep learning strategies by adult learners [51]. The scale was based on Pintrich et al. [60] and Entwistle and Ramsden's [61] questionnaires and evaluates the following dimensions: critical thinking; metacognitive self-regulation; elaboration, organization; receptivity to; attitudes towards. and interest in learning; skills and thought processes related to identifying, acquiring, and constructing meaning for new information and ideas; and being motivated intrinsically to learn and attempting to comprehend underlying meanings of a learning task. Values of internal consistency were good ($\alpha = 0.87$). Fit indices of CFA were: $\chi^2(32) = 105.91, p = 0.00$; CFI = 0.94; RMSEA = 0.08, with all ten items retained.

Behavioral engagement questionnaire [62]. BEQ measures two dimensions of engagement: a behavioral dimension (e.g., "I am very focused when in class") and an emotional dimension (e.g., "When I am in class, I feel happy"). Behavioral engagement is conceptualized in the literature as participation, commitment and involvement in academic tasks, and includes behaviors such as effort, persistence, concentration and attention. Emotional engagement relates to positive and negative affective reactions in the classroom, including interest, boredom, happiness, sadness and anxiety. Due to its multifaceted nature, academic engagement is used thoroughly in education research, both as a predictor of achievement and dropping out and as an educational outcome in itself [62–64]. For parsimony reasons, of the total of 55 items of the original scale, we selected 28 that were deemed more appropriate for adult students: 17 behavioral and 11 emotional. CFA, however, revealed that some items had to be removed due to low loadings, so the behavioral subscale ended up with 15 items and the emotional subscale with 8 items. Final fit indices were: $\chi^2(206) = 618.52, p = 0.00$; CFI = 0.90; RMSEA = 0.08. The final two subscales showed good values of internal consistency — $\alpha = 0.88$ (behavioral dimension) and $\alpha = 0.84$ (emotional dimension).

2.3. Plan of Analysis

We used path analysis to test a path model in which students' personal achievement goals mediated the relationship between their types of motivation and three educational outcomes (use of deep learning strategies, behavioral engagement, and emotional engagement). More specifically, based on theory and previous research, our hypothesized path model predicted that mastery goals would mediate the relationship between autonomous motivation and the three educational outcomes, whereas performance goals (approach and avoidance) would mediate the relationship between introjected and external regulation (i.e., the two types of controlled motivation) and the three educational outcomes (Figure 1).

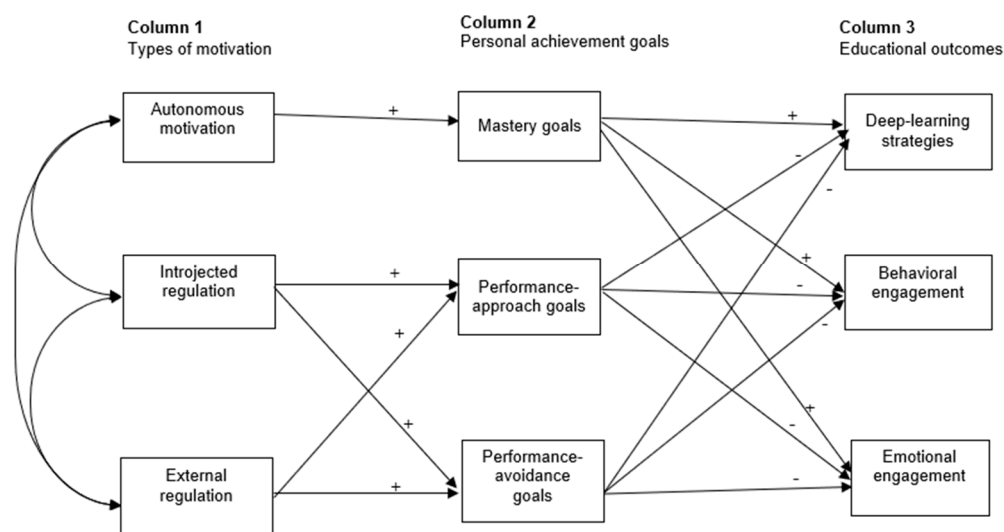


Figure 1. Hypothesized path model.

Multiple-group path analysis was used to explore the differences in the paths between traditional and nontraditional students. Multiple-group path analysis entails establishing measurement invariance in the factor structure of the latent variables between the groups of interest, then comparing the fit of a set of structural models where paths are either unconstrained or constrained to be equal between the two groups. Then, a chi-square difference test is used to determine whether the hypothesized associations differ between the two groups.

All analyses in the present study were performed using version 23 of the statistical program SPSS AMOS (IBM, Armonk, NY, US). We used the chi-square test to examine model fit to the data. A non-significant chi-square indicates that the model has an acceptable fit to the sample data. Because chi-square is very influenced by sample size [65], complementary fit indices were used, namely the comparative fit index (CFI) and root-mean-square error of approximation (RMSEA). We followed Hu and Bentler's [66] recommendations: $CFI \geq 0.95$ and $RMSEA \leq 0.06$.

3. Results

3.1. Descriptive Statistics

Independent t-tests showed that men scored significantly higher than women in external ($t = 3.274$; $p < 0.01$; $d = 0.35$) and introjected ($t = 2.260$; $p < 0.05$; $d = 0.24$) regulation; an analysis of variance showed that students attending long-term academic courses scored significantly lower than students attending both short-term courses and long-term vocational courses in behavioral ($F = 10.561$; $p < 0.001$; $\eta^2 = 0.056$) and emotional ($F = 18.173$; $p < 0.001$; $\eta^2 = 0.092$) engagement. Because there were no other significant differences and the effect sizes were small, gender and modality were left out of all other analysis.

The means, standard deviations, and bivariate correlations between all measured variables are shown in Table 1. Autonomous motivation showed positive relationships with all three educational outcomes, as well as with mastery goals, and a negative relationship with external regulation. External regulation showed exactly the opposite pattern: significant negative relationships with deep learning strategies, behavioral engagement and mastery goals, and positive relationships with performance goals. Introjected regulation showed positive relationships with all types of student goal orientations, as well as positive relationships with the three outcomes. Mastery goals related positively to the three outcomes, whereas both types of performance goal orientations related negatively to engagement (behavioral and emotional).

Table 1. Means, standard deviations, and correlations between all the measured variables.

| Variables | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------------------------------|------|------|---|----------|---------|----------|---------|---------|----------|---------|----------|
| 1. Autonomous motivation | 3.44 | 0.40 | 1 | −0.28 ** | 0.31 ** | 0.40 ** | −0.07 | −0.07 | 0.36 ** | 0.30 ** | 0.19 ** |
| 2. External regulation | 1.49 | 0.55 | — | 1 | 0.13 * | −0.24 ** | 0.23 ** | 0.17 ** | −0.20 ** | −0.12 * | 0.05 |
| 3. Introjected regulation | 2.69 | 0.68 | — | — | 1 | 0.24 ** | 0.19 ** | 0.19 ** | 0.18 ** | 0.10 ** | 0.04 |
| 4. Mastery goals | 3.62 | 0.38 | — | — | — | 1 | 0.16 ** | 0.21 ** | 0.40 ** | 0.39 ** | 0.18 ** |
| 5. Performance-approach goals | 1.94 | 0.64 | — | — | — | — | 1 | 0.84 ** | 0.06 | −0.11 * | −0.17 ** |
| 6. Performance-avoidance goals | 2.15 | 0.66 | — | — | — | — | — | 1 | 0.08 | −0.11 * | −0.19 ** |
| 7. Deep learning strategies | 3.03 | 0.45 | — | — | — | — | — | — | 1 | 0.51 ** | 0.30 ** |
| 8. Behavioral engagement | 3.25 | 0.38 | — | — | — | — | — | — | — | 1 | 0.62 ** |
| 9. Emotional engagement | 3.22 | 0.39 | — | — | — | — | — | — | — | — | 1 |

Note: * $p < 0.05$; ** $p < 0.01$.

3.2. Path Analysis: Total Sample

The original hypothesized model (Figure 1) was first tested for the total sample. Following the modification indices, two paths were added: from external regulation to mastery goals and from introjected regulation to mastery goals. Non-significant paths were removed individually in order to improve final fit indices. The model fit the data well, as chi-square test was non-significant: $\chi^2(9, N = 361) = 11.67, p = 0.23$, and additional fit indices were also good: CFI = 0.99; RMSEA = 0.03.

The final results of the path model are shown in Figure 2. Autonomous motivation was positively related to mastery goals ($\beta = 0.32, p < 0.01$); introjected regulation related positively to both performance-approach ($\beta = 0.16, p < 0.01$), performance-avoidance ($\beta = 0.17, p < 0.01$), and mastery ($\beta = 0.16, p < 0.01$) goals. External regulation related positively to both performance-approach ($\beta = 0.21, p < 0.01$) and performance-avoidance ($\beta = 0.15, p < 0.01$) goals, but related negatively to mastery goals ($\beta = -0.17, p < 0.01$).

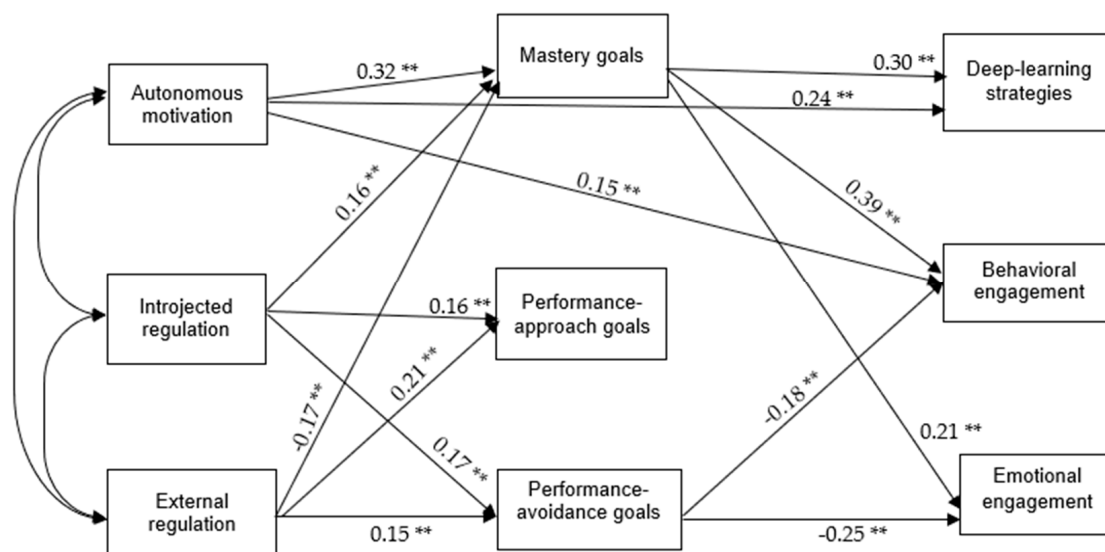


Figure 2. Total sample path model. Note: only significant paths are presented. ** $p \leq 0.01$.

Autonomous motivation significantly predicted deep learning strategies ($\beta = 0.24, p < 0.01$) and behavioral engagement ($\beta = 0.15, p < 0.01$), while introjected and external regulation did not have any significant relationship with any of the outcomes. Among personal achievement goals, mastery goals were a significant positive predictor of deep learning strategies ($\beta = 0.30, p < 0.01$), behavioral engagement ($\beta = 0.39, p < 0.01$), and emotional engagement ($\beta = 0.21, p < 0.01$), whereas performance-avoidance goals were a significant negative predictor of behavioral ($\beta = -0.18, p < 0.01$) and emotional ($\beta = -0.25, p < 0.01$) engagement.

In regard to indirect effects, mastery goals mediated the relationship between autonomous motivation and each of the outcomes (standardized indirect effect for deep

learning strategies = 0.11, $p = 0.001$; for behavioral engagement = 0.12; $p = 0.001$; and for emotional engagement = 0.07, $p = 0.001$); performance-avoidance goals were also a (negative) mediator, although with a small effect between introjected regulation and emotional engagement (-0.03 ; $p = 0.001$) and behavioral engagement (-0.02 ; $p = 0.028$), as well as between external regulation and, again, emotional (-0.03 ; $p = 0.003$) and behavioral engagement (-0.02 ; $p = 0.023$).

Squared multiple correlations results show that 21% of the variance in behavioral engagement, 21% of the variance in deep learning strategies, and 9% of the variance in emotional engagement are accounted for by the model.

3.3. Multiple-Group Path Analysis

We wanted to investigate whether the relationships in the model varied between traditional and nontraditional students, so we conducted a multiple-group path analysis.

3.3.1. Test of Measurement Invariance between Groups

Multiple-group analysis requires the test of measurement invariance between the groups of interest. If measurement invariance is found, it means that items are understood similarly across groups. Due the relatively large number of latent variables, we tested the measurement invariance separately for each set of variables: first, for students' types of motivation; next, for students' personal achievement goals; and finally, for learning and engagement. To test for measurement invariance of types of motivation, we first estimated a model in which the measurement parameters (factor loadings) in the two groups were simultaneously and freely estimated. This initial unconstrained model had acceptable fit indices: $\chi^2(56) = 127.28$, $p = 0.00$; CFI = 0.92; RMSEA = 0.06. Next, we constructed a model in which factor loadings across the two groups were constrained to be equal, and fit indices of this model were comparable with the ones from the original model: $\chi^2(63) = 137.93$, $p = 0.00$; CFI = 0.91; RMSEA = 0.06. The chi-square difference test between the unconstrained and constrained models was non-significant: $\Delta\chi^2(7) = 10.65$, $p = 0.155$, which indicates measurement equivalency between the two groups, i.e., that items are understood in essentially the same way by traditional and nontraditional students. We repeated this procedure for the other set of variables. For personal achievement goals, the results were the following: unconstrained model: $\chi^2(144) = 370.57$, $p = 0.00$; CFI = 0.91; RMSEA = 0.07; constrained model: $\chi^2(155) = 377.24$, $p = 0.00$; CFI = 0.91; RMSEA = 0.07; chi-square difference test: $\Delta\chi^2(11) = 6.67$; $p = 0.83$. Deep learning strategies: unconstrained model: $\chi^2(62) = 151.40$, $p = 0.00$; CFI = 0.94; RMSEA = 0.07; constrained model: $\chi^2(71) = 166.43$, $p = 0.00$; CFI = 0.93; RMSEA = 0.06; chi-square difference test: $\Delta\chi^2(9) = 15.04$; $p = 0.09$. For engagement, however, the chi-square difference test between the unconstrained and constrained models was significant, indicating that some of the parameters differ significantly across the two groups. Two of the parameters that did not seem to be invariant across groups were released from being equal, and the chi-square difference test became non-significant: unconstrained model: $\chi^2(402) = 781.34$, $p = 0.00$; CFI = 0.90; RMSEA = 0.05; constrained model: $\chi^2(420) = 805.72$, $p = 0.00$; CFI = 0.90; RMSEA = 0.05; chi-square difference test: $\Delta\chi^2(18) = 24.38$; $p = 0.14$. In short, the measurement equivalence was confirmed for all variables, with the exception of engagement, in which, nevertheless, partial invariance was achieved.

3.3.2. Test of Structural Equivalence between Groups

Next, to examine possible differences between the two groups, we tested for structural model equivalence across the groups. As with testing of measurement invariance, one needs to compare the fit of an unconstrained structural model to a model in which paths are constrained to be equal. The fit of the unconstrained model was rather good— $\chi^2(18, N = 361) = 29.986$, $p = 0.038$, CFI = 0.99, RMSEA = 0.04—and the fit of the constrained model, although not as good, was still reasonable— $\chi^2(36, N = 361) = 74.645$, $p = 0.000$, CFI = 0.97, RMSEA = 0.06. The chi-square difference test between the two models was significant,

which indicates that the model is significantly different for traditional vs. nontraditional students, i.e., that some of the parameters differ substantially between the two groups: $\Delta\chi^2(18, N = 361) = 44.66, p = 0.000$.

The results for the two groups are shown in Figures 3 and 4, and Table 2. Concerning the *relations between SDT and AGT variables*, only for nontraditional students was autonomous motivation a significant positive predictor of mastery goals, and, again, only for this group were introjected and external regulation significant positive predictors of performance goals (both approach and avoidance), with introjected regulation also positively predicting mastery goals in this group. The only significant effect for the traditional student group (in regard to SDT–AGT links) was the negative relation between external regulation and mastery goals.

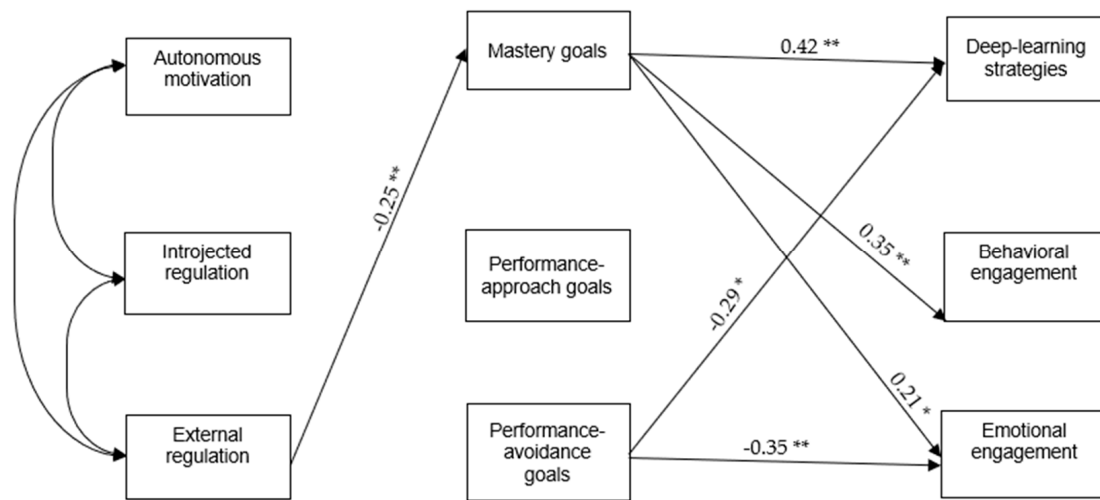


Figure 3. Path model for the traditional students group. Note: only significant paths are presented. * $p \leq 0.05$; ** $p \leq 0.01$.

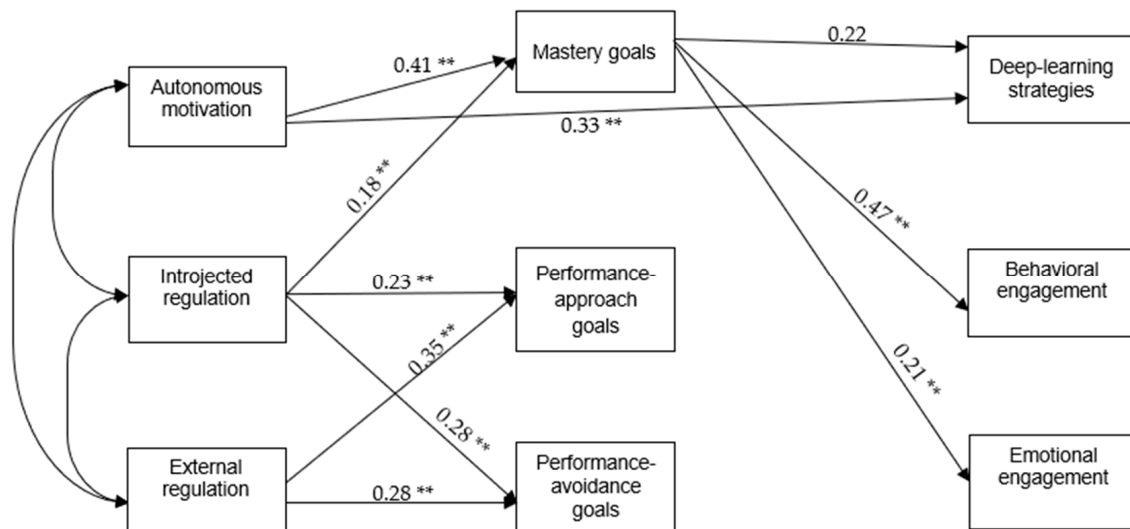


Figure 4. Path model for the nontraditional students group. Note: only significant paths are presented. ** $p \leq 0.01$.

Table 2. Standardized values of direct and indirect effects of the multiple-group path model.

| Paths | Traditional Students | Nontraditional Students |
|--|----------------------|-------------------------|
| | Estimates | Estimates |
| Autonomous motivation→mastery goals | — | 0.41 *** |
| Introjected regulation→mastery goals | — | 0.18 ** |
| Introjected regulation→performance-approach goals | — | 0.23 *** |
| Introjected regulation→performance-avoidance goals | — | 0.28 *** |
| External regulation→performance-approach goals | — | 0.35 *** |
| External regulation→performance-avoidance goals | — | 0.28 *** |
| External regulation→mastery goals | −0.25 ** | — |
| Autonomous motivation→deep learning strategies | — | 0.33 *** |
| Mastery goals→deep learning strategies | 0.42 *** | 0.22 ** |
| Mastery goals→behavioral engagement | 0.35 *** | 0.47 *** |
| Mastery goals→emotional engagement | 0.21 * | 0.21 ** |
| Performance-avoidance goals→behavioral engagement | −0.35 *** | — |
| Performance-avoidance goals→emotional engagement | −0.29 * | — |
| Autonomous motivation→mastery goals→deep learning strategies | — | 0.10 ** |
| Autonomous motivation→mastery goals→behavioral engagement | — | 0.15 *** |
| Autonomous motivation→mastery goals→emotional engagement | — | 0.08 ** |

Note: Only significant paths are shown. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

As for the *relations between SDT/AGT and the educational outcomes*, mastery goals were a positive predictor of the three educational outcomes in both groups, whereas autonomous motivation only positively predicted one outcome, i.e., deep learning strategies in the non-traditional group. On the other hand, performance-avoidance goals negatively predicted both emotional and behavioral engagement in only the traditional student group.

Indirect effects for the multiple-group path model are shown in Table 2. Only for nontraditional students were there significant indirect effects: mastery goals were a significant mediator in the relationship between autonomous motivation and each one of the three outcomes.

4. Discussion

The first goal of our study was to investigate the links between SDT's types of motivation and AGT's personal achievement goals. As expected, according to theory and research [7,8,19,23], we found a positive link between autonomous motivation and mastery goals, as well as between external regulation and both types of performance goals. Although we did not make an explicit hypothesis regarding the relationship between external regulation and mastery goals, this turned out to be negative, which would be expected theoretically and was also found in some studies [25]. Introjected regulation related positively (albeit with low values) to both mastery and performance goals. Although a controlled type of motivation, introjected regulation refers to reasons and behaviors that have been partially assimilated by the individual; so, some connection with the desire to learn besides wanting to show a good performance would be expected. It is also important to note that one of the three items of the introjected regulation subscale related specifically to grades ("I am going to commit to this course because it is a way of getting higher grades"). Some authors have suggested that the desire to achieve good grades can be seen as an equivalent for learning and mastery and not exclusively as an extrinsic incentive [67,68].

The second goal of the study was to explore how students' types of motivation and personal achievement goals relate to learning and engagement, using an integrated path analysis model, and investigate possible mediation effects. Both mastery goals and autonomous motivation emerged as significant positive predictors. However, mastery goals were generally a stronger predictor; indeed, as hypothesized, they were a significant mediator in the relationship between autonomous motivation and the outcomes. It was a partial mediation for deep learning strategies and behavioral engagement and a full mediation for emotional engagement, as without the presence of the mediator, the autonomous

motivation–emotional engagement relationship was not significant. This result indicates that students being self-determined will only have a significant positive effect on their emotional engagement (i.e., feeling interested, satisfied, and not bored when in class) if learning is their main achievement goal. Performance-avoidance goals, on the other hand, were the only significant negative predictor of the outcomes (in this case, of both types of engagement), which is in accordance with the theory and research that show that this type of goal orientation is the one with the more debilitating effects [14,15]. Performance-approach goals did not emerge as a significant predictor, which is not surprising, as this type of goal generally predicts surface learning, grade aspiration, and study persistence outcomes that we did not tap in this particular study. There was a small, but still significant, negative indirect effect of both the introjected and external regulation of behavioral and emotional engagement through performance-avoidance goals (that did not emerge in the multiple-group analysis). Again, as this was a full mediation (no direct effect between independent and dependent variables), it reinforces the importance of achievement goals, i.e., the negative effects of feeling pressured to study in students' engagement can only emerge if they also adopt certain behaviors to avoid not appearing a good student. Overall, these results give support to Elliot and Church's [14] hierarchical model of achievement motivation, which conceptualizes the *reasons*, broader human dispositions, as leading to *goals*, with more concrete action objectives. SDT's types of motivation explain why students may adopt certain behaviors; however, it is important, for motivation to have more impact, that these general desires are materialized in specific goals and behaviors.

The third main goal of the study was to understand the specificities of nontraditional students vs. traditional students, in the way that SDT and AGT constructs relate to each other and educational outcomes; we did this by means of a multiple-group path analysis. The chi-square difference test showed a significant difference between the two groups; indeed, an analysis of the standardized estimates makes it clear that the groups are very different. Only for nontraditional students were the main expected connections between SDT and AGT variables significant (i.e., Aut.→Mast.G; Introj. + Ext.→Perf.G); the only significant link for traditional students was the negative one between external regulation and mastery goals. Previous research indicated that nontraditional students have "better" motivation than younger ones, i.e., more autonomous motivation [38], more mastery goals [32], and less performance goals [44]. However, our study is the first to show that nontraditional students also show a more integrated pattern of motivation, i.e., in this group, the reasons for engaging in education are translated into coherent, concrete goals. As for the relations between the SDT and AGT variables and educational outcomes, mastery goals were a positive predictor of the three educational outcomes in both groups, with comparable values; however, autonomous motivation only positively predicted deep learning strategies in the nontraditional (NT) group. Additionally, only for NT students was mastery goals orientation a significant mediator in the relationship between autonomous motivation and each one of the three outcomes. As previously noted, mastery goals seem to have a crucial role in making autonomous motivation effective, but this result elucidates, again, that an integrated and coherent chain (i.e., reasons→goals→outcomes) is much more evident for older students. Personality and cognitive development, as well as the autonomy inherent to being an active, independent adult, may help explain why this happens [52–54]. For older students, choosing to engage in education when it implies often having to juggle it with other life responsibilities, such as work and family, comes naturally with a lot of thought and weighting of the costs and benefits of enrolling [34]. If education comes with a high cost, one has to be highly motivated, and this motivation must be of "high quality" to be beneficial, i.e., learning and acquiring more knowledge must be the main goal, and this must be a meaningful and important goal. Showing one's competence and outperforming others loses importance for older adults, as these clearly do not lead to changes in their learning and engagement. The fact that, in the traditional students' group, the expected relationships between reasons and goals were nonsignificant seems to indicate that younger students have not yet developed a consistent and marked self-determination

profile. Additionally, for them, goals (both mastery and performance goals), which are a variable of a more situated or contextual nature, influence their educational outcomes much more significantly than reasons, which is a variable of a more individual nature. We argue that developmental reasons and lack of experience help to account for these results, although more research is needed in the future on this topic. Interestingly, performance-avoidance goals were a negative predictor of both emotional and behavioral engagement for only traditional students, and external regulation only negatively affected the adoption of mastery goals in this group. Taken together, these results suggest more detrimental effects of external regulation and performance goals in younger students. Again, probably due to being more immature and not fully developed, these students are more vulnerable to letting the pressure and judgement of others affect their learning and engagement.

Limitations and Future Research Directions

A number of limitations in this study should be taken into account. First, it is important to underline that many of the effects found were rather small (especially the ones for the total sample) and should thus be read with caution—this study should ideally be replicated in the future in larger samples.

Although there was a time lag between the collection of some of the data, a more multiple-moments longitudinal research method will be needed in the future in order to have a more robust basis to infer the causal relationships between the variables. This study also presents as a limitation the exclusive use of self-reported measures, which might have artificially boosted the strength of the relationship between the variables through common method bias. In addition, self-reported instruments, such as the ones used in this study, might be susceptible to social desirability. Future research should use teacher-reported learning and achievement variables, such as grade point average (GPA), as well as drop-out rates, to overcome this problem.

Future research should also try to focus on different populations of adult nontraditional students, especially those that are more vulnerable to failure and drop-out (for instance, adults with low education levels, from disadvantaged social groups, and immigrants), and attempt to understand the role of social and contextual variables in their motivation, persistence, and success. In fact, it would be important to not only study the adults that enroll in education, but also those who do not, as those are the ones that educational institutions should target and appeal to.

5. Conclusions

This study contributes to the existing research that supports the significant connections between students' goals and the reasons underlying these goals, i.e., the autonomous motivation linked to mastery goals and two types of controlled motivation, introjected and external regulation, linked to performance goals. It also indicated that mastery goals, along with autonomous motivation, are positive predictors of outcomes such as engagement and learning; therefore, they should be encouraged in educational settings. Performance goals and controlled motivation have a more negative and detrimental effect, especially for younger students. A unique contribution of the study was showing nontraditional students' stronger patterns of relationships between motivational variables, which seems to indicate that this group has a more coherent and integrated motivational functioning. Moreover, motivation appears to play a more influential role in determining their learning outcomes, when compared with traditional students. These findings have implications for the designing of lifelong learning education programs.

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Data Availability Statement: The data presented in this study are available upon request. The data are not publicly available due to privacy restrictions.

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