Current Psychology
https://doi.org/10.1007/s12144-022-03697-5

Emotion differentiation and negative emotional states: the mediating role of perceived academic control and the moderated effect of intrinsic motivation

Silvina Maria Zapata[1] · **Anthony J. Onwuegbuzie**[2,3]

Accepted: 23 August 2022

Abstract
University students experience academic pressure, fatigue, and changes in their everyday and social lives during their transition into college. This study explored variables that influenced first-year students' stress, anxiety, and depression at a university in Chile. The remnant of long-term social unrest, which emerged at the end of the dictatorship in 1990, has lasted for more than three decades. It is present in the education sector and might reflect the negative emotional states that Chilean students still experience. In this way, students' capacity to distinguish and to regulate stress, anxiety, and depression is crucial, especially in contexts where intense negative emotional states occur; thus, more research is needed to achieve a richer understanding in academic settings. The study involved testing hypotheses over 6 months to undertake a regression-based path analysis using simple mediation and moderated mediation analysis. Results revealed that students' perceptions of their academic control mediated the relationship between their factor differentiation of emotional experiences and stress, anxiety, and depression. The indirect effect was statistically significantly moderated by intrinsic motivation. Consequently, the effect of their ability to differentiate emotions on stress, anxiety, and depression through the mediator changed due to the levels of intrinsic motivation. Implications and recommendations are discussed.

Keywords University students · Factor differentiation · Negative emotional states · Perceived academic control · Intrinsic motivation

Introduction

Higher Education Institutions (HEIs) are challenging environments, especially for first-year university students, due to different stress factors related to their adjustment to college (Fila & Eatough, 2017). Emotions might interfere with students' abilities to overcome academic challenges (Layco, 2020). Therefore, understanding and differentiating emotions, labelling them by giving meaning to their affective states, such as fear in a threatening context or joy during a pleasant experience (Lee et al., 2017), allows individuals to regulate emotional states.

Ford and Gross (2019) reviewed previous research to learn about the beliefs on emotions—whether good or bad—to understand the link between these and mechanisms associated with emotion regulation. The authors concluded that this link significantly influenced the eventual success of individuals' differentiated understanding of emotions and emotion regulation. They added that the emotion regulation process unfolds over time as individuals move through the various stages of emotion regulation: identification, selection, implementation, and monitoring. Yih et al. (2019) provided an integration of appraisal theory and the process model of emotion regulation. They concluded that emotion regulation strategies allow the manipulation of emotions by intervening at different stages of the emotion generation system. Tamir et al. (2020) investigated the relevance of emotion regulation from a motivational perspective to understand how goal setting (i.e., desired emotions) and goal striving (i.e., guiding behaviour to achieve the desired

✉ Silvina Maria Zapata
szapata@unab.cl

Anthony J. Onwuegbuzie
tonyonwuegbuzie@aol.com

[1] Universidad Andrés Bello, Santiago, Chile

[2] University of Cambridge, Cambridge, UK

[3] University of Johannesburg, Johannesburg, South Africa

Published online: 12 September 2022

goal) shape emotion regulation and promote adaptive strategies. By manipulating emotion goal settings and influencing people to use specific emotion regulation strategies, such as cognitive reappraisal, to achieve desired emotion goals, the authors discovered that activating specific emotion goals could provoke a shift in emotions. McRae and Gross (2020) explored how often people apply cognitive reappraisal strategies, the consequences of using these strategies, and the psychological mechanisms that allow emotion regulation to occur. They concluded that regulation influences emotions.

Studies indicate that the need to reach emotional understanding and to distinguish differences among emotions increases in contexts wherein intense negative emotional states occur (Mojsa-Kaja et al., 2021). Therefore, according to Gross (2015) and Tamir et al. (2020), when individuals experience negative emotional states and become aware of how they feel, they have more chances to activate emotion regulation strategies. Furthermore, the authors concluded that these individuals could manipulate those negative emotional states, a strategy known as *response-focused emotion regulation*. Therefore, they have more chances to reach the desired shifts in emotions; in other words, they generate adaptive responses. Based on the literature and the *model of emotional regulation*, one of the relations we aimed to explore related to whether Chilean university students' ability or lack of ability to differentiate emotions influenced their negative emotional states, such as stress, anxiety, and depression. Our goal was to contribute with evidence for academic leaders to make the appropriate decisions to provide ways for students to achieve better emotional lives.

Even though emotion regulation is a relevant concept studied in psychology, and it has gradually gained attention in other fields, such as medicine, business, economics, and political science (Gross, 2015), it has not been relevant enough in educational contexts (Kumari et al., 2019; Seibert et al., 2017). Understanding the role of emotion differentiation and emotion regulation strategies for students to manage their negative emotional states is crucial for academic leaders and faculty members to know to support students during their developmental trajectories successfully. Thus, after reviewing the existing literature, we discovered that more research is needed in educational settings to understand students' ability or lack of ability to differentiate and to regulate negative emotional states in academic contexts. Consequently, we predicted that regulating emotions would become a relevant tool for students to modify, to mitigate, or to decrease negative emotional states, which was precisely one of the gaps that we intended to fill within the broader literature related to educational contexts.

Several researchers considered university students' perceptions of their academic control over their academic performance and success. For example, Respondek et al. (2017) used bivariate correlations and multi-group structural equation modelling, a multivariate statistical method, to explore whether perceived academic control and academic emotions predicted undergraduate students' academic success. They discovered that the variables positively predicted achievement and negatively predicted anxiety. According to Pekrun et al. (2017), achievement emotions are connected to students' academic performance. The authors claimed that if students can distinguish among various emotions and classify them into discrete categories, they might relate these emotions to potential success and failure. Thus, students' perceptions of control about possible academic results are relevant. Then, and based on the *process model of emotional regulation*, we predicted that students' levels of emotional awareness, and their ability to make distinctions in emotion categories are connected to their levels of perception of academic control.

Furthermore, other researchers have concluded that when students face high standards of academic demands, they feel insecure, stressed, anxious, or depressed, which can impact how they perceive challenging situations and their academic performance (Hsu & Goldsmith, 2021). For example, if students perceive control as being impossible, they become stressed, passive, and depressed (Skinner, 1996). In other words, low perceptions of academic control led to negative emotional states (Pekrun et al., 2017). Thus, and informed by the *process model of emotional regulation*, we concluded that the puzzle piece that would solve the dilemma would be to explore the association between students' abilities to distinguish among various emotions, their levels of perceived academic control, and negative emotional states. Then, and based on the literature, we predicted that stress, anxiety, and depression levels decrease if students are aware, understand, distinguish, and believe that they can manage to shift those negative emotional states.

Consequently, students will enjoy engaging in academic activities, and their perceptions of academic control will increase because they will perceive themselves as being competent at a specific task (Pekrun et al., 2017). To conclude, students' perceptions that they can academically control and influence outcomes are relevant. Accordingly, we expected that this mediates the effect of emotion differentiation on negative emotional states. Even though past research has explored similar associations to the ones we presented earlier, the way we predicted the relationships between the variables mentioned had not been examined in the same way, nor enough. For example, Zhao et al. (2021) used structural equation modelling to explore the mediating roles of perceived control and anxiety between emotion regulation and perceived learning. They concluded that there is a need to apply interventions to foster adaptive emotion regulation strategies to reduce anxiety during the learning process. Monsoon et al. (2022) tested the mediating role of emotion regulation flexibility between beliefs that emotions

can be controlled and accepted and psychological distress. They concluded that these beliefs increase control or acceptance-based emotion regulation strategies and reduce distress. Finally, Deplancke et al. (2022) focused on the mediating role of emotion regulation strategies among beliefs about emotional controllability, anxiety, and depression. They concluded that beliefs about emotion controllability lead to the use of emotion regulation strategies, which influences psychological health.

Intrinsic emotion regulation has been a particular focus in the literature on emotion regulation (Ford & Gross, 2019), and it occurs when individuals focus on their emotions (Tamir et al., 2020). Those interested in differentiating and monitoring their feelings develop intrinsic emotion regulation (Gross, 2015). Besides, when students feel intrinsically motivated, their perceptions of academic control increase, they have more chances to succeed (Daniel & Cooc, 2018) academically, and they become resilient in diminishing negative emotional states (Trigueros et al., 2020). Then, informed by the *self-determination theory*, we predicted that the relation between students' ability to distinguish emotion categories and their perceived academic control might change depending on the different levels of their intrinsic motivation. Understanding the role of these variables for university students, specifically concerning lowering negative emotional states, academic leaders and faculty members must acknowledge the relevance of intrinsic motivation in these students and, as Kotera et al. (2021) highlighted, develop means to increase their intrinsic motivation.

In brief, this study aimed to investigate variables that positively or negatively predicted first-year university students' negative emotional states at a large university in Chile. More specifically, it explored whether students' perceptions of academic control mediated the effect that their ability to differentiate emotions has on their stress, anxiety, and depression levels. Finally, we aimed to analyse whether students' levels of intrinsic motivation moderated the relationship between their ability to differentiate emotions and their perceptions of academic control. Importantly, we are unaware of studies that have focused on these associations in this same way. Thus, we concluded that, despite the relevance of motivation in education, its moderated effect on the relationship between emotional differentiation and perceptions of academic control remains to be analysed.

Background: long-term consequences of social segregation and inequalities

Students systematically failing classes and withdrawing from college are relevant topics within the Chilean HEI system (Opazo et al., 2021). Some clues can explain this phenomenon. New private HEIs emerged in 1981 during the dictatorship (1973–1990) and the private sector grew from 15% of the university population in 1990 to 53% in 2011 (Fleet & Guzmán-Concha, 2017), which yielded challenges related to the quality of the education system. Guzmán-Valenzuela (2017) added that, in 1981, the State declared a reduction of the funding of the public and private HEIs, and they had to become increasingly partially self-funded. She added that the State created a system of students' loans to finance tuition fees. However, these loans had negative consequences, which were palpable with the return to democracy by 1990 because an increased indebtedness left many students with economic vulnerability after graduation. Thus, students' movements began to emerge at the end of the dictatorship and continued up to date due to injustice (Guzmán-Concha, 2012) and socioeconomic inequalities in society, which mirrors the lack of social cohesion in Chile (Manstead, 2018).

The lack of equity and the high degree of social segregation palpable in the education sector described earlier have increased people's anger, disgust, fear, and feelings of indignation that never have been adequately addressed (Guzmán-Concha, 2012). These long-term intense and repeated emotions resulted in psychological disturbances, such as anxiety, stress, and depression, evidenced and still present among Chileans. Thus, the social unrest in Chile is the expression of the type of negative emotional states that students are still experiencing.

Theoretical considerations

We relied on Gross's (1998) *process model of emotion regulation,* which is a framework that specifies the sequence of steps related to emotion generation. According to the author, two basic types of emotion regulation strategies might regulate emotions. One is the *cognitive reappraisal strategy* that manipulates the input system known as the *antecedent-focused emotion regulation*, which occurs before the generation of the emotion. This emotion regulation strategy includes situation selection and modification, attentional deployment, and cognitive change. The other type of emotion regulation strategy is the *suppression* that manipulates the output system, known as the *response-focused emotion regulation*, which occurs after the feeling is generated and it relates response modulation. Suppressors have less understanding of their feelings, they ruminate about bad experiences, and they are less successful at modifying negative feelings than do reappraisers (Gross & John, 2003). Based on Gross's *process model of emotion regulation*, we became interested in exploring the effects of students' abilities to differentiate emotional experiences on students' perceptions of academic control and their levels of negative emotional states, such as stress, anxiety, and depression.

Further, we relied on the *self-determination theory (SDT)*, which has become the theoretical framework in several studies related to students' motivation (Dyrberg & Holmegaard,

2019). According to Ryan and Deci (2017), the SDT is an "empirically based, organismic theory of human behaviour and personality development" (p. 3) that focuses on individuals' inherent psychological needs—*autonomy, competence,* and *relatedness,* which "describe critical psychological satisfactions necessary for the healthy development of self" (p. 8) and essential for well-being. In a study conducted in Denmark to learn about university students' motivational patterns towards learning, Dyrberg and Holmegaard (2019) concluded that to understand individuals' motivation, it is relevant to consider their innate psychological needs. If these psychological needs are not satisfied, then negative emotions, such as fear, might arise. And when fear is prolonged, it can provoke negative emotional states such as anxiety. Based on the *SDT*, and on Gross's (1998) *process model of emotion regulation*, we became interested in exploring the moderated effect of intrinsic motivation on the relation between students' ability to differentiate their emotions and their perceptions of academic control.

Variables of the study

Based on an in-depth literature review related to our research topic, we considered students' stress, anxiety, and depression (SAD) as the dependent variable of the study. SAD is a negative emotional state that reduces students' coping skills and impacts their learning (Respondek et al., 2017). Additionally, we included several independent variables (i.e., factor differentiation of emotional experiences, perceived academic control, and intrinsic motivation).

Stress, anxiety, and depression Stress is a psychological state that causes difficulties in concentration (American Psychological Association, 2019) and it is experienced as harmful because of the inability to cope with the failure to manage situational demands (Tang et al., 2018), and anxiety and depression might be triggered (Bhujade, 2017). Depression combines loss of interest, feelings of guilt, low self-esteem, insomnia or excessive sleeping, and low mood, and it might cause the inability to concentrate (Bhujade, 2017). Finally, anxiety relates to recurrent worrying thoughts about future events in which the outcome is uncertain (American Psychological Association, 2019). We found negative emotional states intriguing to explore among the participants of the study to find answers as to how to support students' transition into college.

Factor differentiation Factor differentiation (FD) is a cognitive ability to distinguish differences among similar emotions (Kang & Shaver, 2004). Besides, FD, emotional awareness, and emotion regulation are related constructs (Lee et al., 2017). When individuals cannot differentiate among emotions, they experience low emotional differentiation, and when they believe emotions are relatively uncontrollable, they are less likely to select effective emotional regulation strategies (Ford & Gross, 2019). Thus, we found FD to be a relevant variable to explore in the Chilean context as an antidote to negative emotional states (Rowe et al., 2015).

Perceived academic control Perceived Academic Control (PAC) relates to students' beliefs in their influence over success or failure (Respondek et al., 2017). Individuals who perceive themselves as being in control over a particular circumstance make better use of resources to cope with challenging experiences and stress (Drewelies et al., 2020; Zheng et al., 2020). We found PAC an enlightening variable to explore in Chilean university students because, as Muntaner-Mas et al. (2017) highlighted, it is a practical skill that allows students to cope with negative emotional states.

Intrinsic motivation Intrinsic motivation (IM) is an internal state and a desire that directs goal-orientation behaviour (Deci & Ryan, 2000). IM means engaging in an activity for the innate enjoyment of just doing it and with a high personal interest in the task (Hammerschall, 2019). In other words, intrinsically motivated students experience learning as meaningful and intrinsically seek learning opportunities without focusing on mandatory activities (Kotera et al., 2021).

The present study

We addressed the following research question: What factors increase or decrease first-year university students' negative emotional states, such as stress, anxiety, and depression over an academic semester at a large and private HEI in Chile? The overall objective was to investigate the factors that influence these students' levels of negative emotional states at two points over the course of 6 months. We formulated the following specific objectives: (a) to examine factors that increase or decrease students' negative emotional states; and (b) to link students' responses collected during Time 1 (T1) and Time 2 (T2) to their levels of stress, anxiety, and depression with approximately a 6-month timeframe to examine the possible relations among the variables of the study. The way we formulated the research questions pointed to a study aimed at testing longitudinal hypotheses, which were based on the information presented earlier. The hypotheses were as follows:

> H1: The relationship between Factor Differentiation (FD) at T1 and Stress, Anxiety, and Depression (SAD) at T2 is mediated by Perceived Academic Control (PAC) at T2; therefore, high levels of FD at T1 are associated with higher levels of PAC at T2 and with lower levels of SAD at T2.

H2: The indirect effect of FD at T1 on students' SAD at T2, through students' PAC at T2, is moderated by Intrinsic Motivation at T1; therefore, it was expected that the moderated mediation effect would be statistically significant.

Method

Study design

We conducted a longitudinal quantitative research study because we wanted to test hypotheses, and we wanted to use a sample size that could be generalisable to the population from where the sample were drawn. We sought information concerning the current status of the phenomena to describe what existed regarding the variables of the study. We collected data from the same group of individuals over two points in time within approximately a 6-month timeframe to examine possible changes among the study variables. To address the research question, we analysed observed variable models. We used Hayes's PROCESS Macro for SPSS version 22 (Statistical Package for the Social Sciences) to generate the required statistics and output to estimate the study models. PROCESS allowed us better to combine mediation and moderation analyses—representing "two of the more widely used statistical methods" (Hayes, 2013, p. viii).

We developed the hypotheses as a result of considerable reflective thinking of the literature related to the research problem before collecting the data. We adopted a deductive, hypothesis-based scientific method approach, from hypotheses to implications, informally called a *top-down approach*. After we had formulated testable hypotheses, we tested them, producing measurable outcomes (Wafula & Wang, 2019).

Participants

The participants of the study were first-year university students enrolled at a large university in Chile in 2019. After receiving human participant approval from the institution where the study took place, a survey was administered. Time 1 (T1) consisted of the total population, which was 1,766. A total of 487 surveys were completed fully via SurveyMonkey and Time 2 (T2) comprised the participants who fully responded to the surveys at T1. A total of 311 students completed the surveys at T2, which represented the final sample size.

Using Krejecie and Morgan's (1970) statistical power table, for a population of 1,766, the minimum sample size needed to justify generalizing to it was 316 based on a 95% level of confidence, which was very close to the sample size of 311 for our study. Unfortunately, and due to 2019 civil protests that took place in Chile, the explosion of a social crisis occurred in October that same year, which is on hold due to the Coronavirus pandemic. Therefore, classes were interrupted, and several educational institutions, including the university where the study was conducted, decided to end the second semester's classes ahead of time. Consequently, we had to conclude our data collection process at that time. If we had had one more week, we would have reached the 316 responses that we needed. However, we were fortunate to be able to reach almost the sample size that we had desired.

We sent several e-mails to the 1,766 students enrolled in 2019 during T1, together with an invitation letter to participate in the study. Also, we attached a link that took them to the participant information sheet, the informed consent form, and the online surveys. Instructions in each survey specified that participants had to focus on their experiences attending classes, working on assignments, and preparing for examinations when answering each of the items. Once they had read the informed consent and clicked the button to continue, it was an indication of students' willingness to participate. In conclusion, participants voluntarily accepted to be part of the research project during the time that it lasted.

As a preliminary analysis related to the participants' demographics across the 6-month study period, the first-wave response consisted of 56.9% women and 43.1% men between the ages of 17 and 46 years ($M = 20.09$, $SD = 3.77$). The second-wave response consisted of 56.6% women and 43.4% men between the ages of 17 and 46 years ($M = 20.62$, $SD = 4.08$). The majority of the participants' parents had completed an undergraduate level of education. At T1, 48.7% of the participants responded that their parents had completed an undergraduate degree, and 48.2% at T2. Then, 35.1% of the respondents claimed that their parents had finished high school, and 35.4% did so at T2. Also, at T1, 12.7% of the students declared that their parents had reached a graduate level and 13.2% at T2. Finally, 3.5% mentioned that their parents had only reached Primary School level at T1 and 3.4% did so at T2.

Instruments

We computed Cronbach's alpha values using the final sample size of 311 to estimate the internal score consistency of the items involved in each of the four instruments that we had administered.

Depression, Anxiety, and Stress Scale-21 (DASS-21)

To determine the level of stress, anxiety, and depression, we administered the DASS-21, which comprises three subscales, depression, anxiety, and stress, with seven items

representing each subscale. For the current research, participants had to indicate how true these items were for them on a 4-point, Likert-format scale. High scores represent high levels of symptoms, and low scores represent low levels of symptoms in each subscale.

We also decided to report the results of single-construct subscales rather than only on the instrument items as a whole to calculate the Cronbach's alpha values. Scores pertaining to the DASS-21 Scale yielded an α reliability coefficient of 0.93 in T1 and 0.94 in T2. Scores pertaining to the Anxiety Subscale yielded an α reliability coefficient of 0.83 in T1 and 0.84 in T2; pertaining to the Stress Subscale, yielded an α reliability coefficient of 0.85 in T1 and 0.87 in T2; and, finally, pertaining to the Depression Subscale, yielded an α reliability coefficient of 0.87 in T1 and 0.87 in T2.

Factor Differentiation of Emotional Experience Subscale

To collect information regarding students' emotional awareness, we administered the score-validated Range and Differentiation of Emotional Experience Scale (RDEES). It is a 14-item instrument that has been found to yield acceptable internal consistency (Kang & Shaver, 2004), and it contains two subscales (i.e., Factor Range and Factor Differentiation) with seven items in each. More specifically, we only used the Factor Differentiation of Emotional Experiences Subscale (FDEES) for this study because we were interested in learning about how capable an individual was to distinguish differences among similar emotions. Participants responded to each item using a 5-point, Likert-format scale. High scores indicate high levels of factor differentiation of emotional experiences, and low scores indicate low levels of factor differentiation of emotional experiences. For the current research, scores pertaining to the FDEES yielded an α reliability coefficient of 0.72 in T1 and 0.75 in T2.

Perceived Academic Control Scale (PAC)

To assess the level of students' PAC, we administered the PAC Scale. Individuals rated the items using a 5-point, Likert-format scale. High scores represent high levels of PAC, and low scores represent low levels of PAC. For the current research, scores pertaining to the PAC scale yielded an α reliability coefficient of 0.71 in T1 and 0.72 in T2.

Intrinsic Motivation Inventory (IMI)

To assess the levels of IM, we administered the IMI, which assesses motivation in several situations and contexts. It was measured via a 7-point, Likert-format scale. High scores represent high levels of intrinsic motivation, and low scores represent low levels of intrinsic motivation. For the present study, scores pertaining to the IMI yielded an α reliability coefficient of 0.87 in T1 and 0.86 in T2.

Little's (1988) Missing Completely at Random (MCAR)

It was crucial to determine whether the collected data were missing completely at random or not before engaging in the data analysis and presenting the study's findings. Consequently, we performed a statistical test called Little's (1988) Missing Completely at Random (MCAR). One hundred seventy-six students dropped out of the survey at T2 and represented the missing data of the current study. We tested the missing values for each of the items of the surveys because we wanted to determine whether the data were missing completely at random or not. We concluded that the data were missing completely at random because the statistical significance value in each scale was higher than 0.05 (See Table 1). The statistical significance value on the demographic variables was higher than 0.05; thus, we concluded that the data were missing completely at random (See Table 1).

Data analysis

Multiple regression analysis

We used Hayes's PROCESS Macro for SPSS version 22 to conduct a multiple regression analysis of the 311 complete responses in T1 and T2. We conducted this analysis using a 95% confidence interval for the indirect effect with 5,000 bootstrap samples. We used moderation and mediation models as inferential statistical techniques to analyse the relations among variables

Table 1 Little's (1988) Missing Completely at Random MCAR Test (Phase 1, $n = 487$)

Scales	Chi-square	Degrees of freedom	Sig
IMI	8.12	9	.52
PAC	3.66	8	.89
FD	12.71	7	.08
DASS-21	29.92	21	.09
Anxiety	10.56	7	.16
Stress	9.24	7	.24
Depression	5.66	7	.58
Demographic variables	Chi-square	Degrees of freedom	Sig
Gender	0.04	1	.85
Age	0.29	1	.59

IMI = Intrinsic Motivation Inventory; PAC = Perceived Academic Control Scale; FD = Factor Differentiation of Emotional Experience Scale; DASS-21 = Depression, Anxiety and Stress Scale-21

(Cohen et al., 2011) and to predict the extent to which changes in the independent variables (X) influenced students' levels of stress, anxiety, and depression, the dependent variables (Y). For Hypothesis 1, we treated Factor Differentiation (FD) at T1 as the independent variable and PAC at T2 as the mediator. For Hypothesis 2, we included the same variables used in Hypothesis 1, but we treated intrinsic motivation (IM) at T1 as the moderator of the indirect effect. The dependent variable was Stress, Anxiety, and Depression at T2 in both models.

To test Hypothesis 1, we performed a simple mediation analysis that included one mediator variable. We used Model 4 of the PROCESS (Hayes, 2013). We focused on two pathways; one represented the direct effect of X on Y without passing through the mediator variable and the second pathway represented the indirect effect of X on Y through the mediator variable. First, we wanted to determine whether changes in X were influencing and provoking changes in Y because of the presence of the mediator variable. We analysed the correlation between the independent and the mediator variables, and, finally, we focused on the relation between the mediator and the dependent variable. We expected to find that the correlations were statistically significant. In the case of Hypothesis 2, we performed a moderated mediation analysis, using Model 7 of the PROCESS (Hayes, 2013) to analyse the conditional effect that occurred when the impact of the independent variable on the dependent variable through a mediator variable changed depending on the levels of the moderator.

Results

Preliminary analysis

For each of the variables of the current study, means, standard deviation, and Pearson's *r* correlations with the other variables were calculated and are reported in the correlation matrix in Table 2 ($n = 311$). Two-tailed *p* values were reported for each of these correlations. Because the purpose of this study was to examine the mediation and moderation models assumed to underlie these data, the correlation matrix was not interpreted.

Research hypotheses analysis

Hypothesis 1

We analysed a simple mediation model with one mediator variable, perceived academic control (PAC) at T2, and two pathways by which factor differentiation (FD) at T1 was proposed as influencing stress, anxiety, and depression (SAD) at T2. To confirm the mediator and the statistical significance in the model, we analysed whether FD lost its statistical significance when PAC was included in the model. We determined that students' FD at T1 was statistically significantly and positively related to students' levels of PAC at T2, but the correlation coefficient was weak ($r = 0.16$, $p < 0.01$).

FD was a statistically significant predictor for SAD, but the correlation coefficient was low (C' = 0.23, $p = 0.001$), and the total effect remained statistically significant, but

Table 2 Means, standard deviation, correlation coefficients, and the value of Pearson's r

		M	*SD*	1	2	3	4	5	6	7	8	9	10
1	IM_T1	4.31	.57										
2	IM_T2	4.23	.52	.38									
3	PAC_T1	4.01	.52	.32	.24								
4	PAC_T2	4.00	.51	.20	.33	.47							
5	FD_1	3.91	.51	.33	.26	.15	.16						
6	FD_2	3.90	.52	.05	.23	.07	.16	.34					
7	SAD_T1	1.90	.59	-.01	-.06	-.38	-.29	.10	.00				
8	SAD_T2	1.91	.61	.04	-.11	-.26	-.26	.15	.06	.67			
9	Gender	1.44	.51	-.18	-.17	-.04	-.05	-.19	-.10	-.14	-.11		
10	Age	4.16	4.02	.15	.19	.08	.10	.10	.12	-.14	-.15	.10	

$N = 311$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

**Correlation is statistically significant at the .01 level (2 tailed)

*Correlation is statistically significant at the .05 (2 tailed)

IMI = Intrinsic Motivation; PAC = Perceived Academic Control; FD = Factor Differentiation of Emotional Experience; SAD = Stress, Anxiety, and Depression

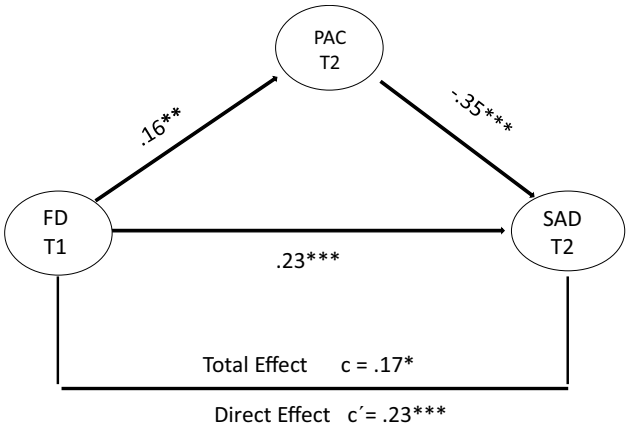

Fig. 1 Simple mediation: perceived academic control mediates the relationship between factor differentiation and stress, anxiety, and depression

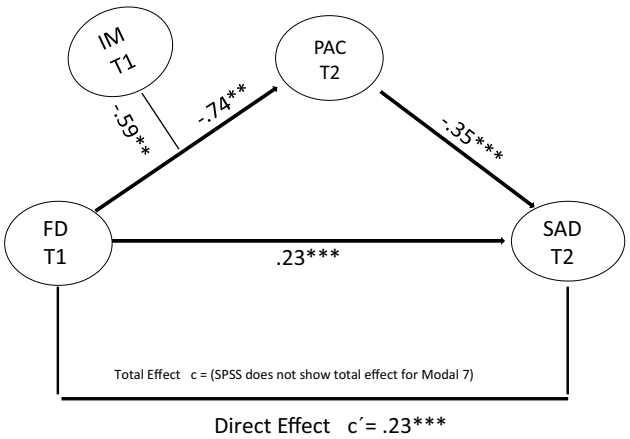

Fig. 2 Moderated mediation model: Intrinsic motivation (W) has a nonzero weight in the function linking the indirect effect of factor differentiation (X) on stress, anxiety, and depression (Y) through perceived academic control (M), to the moderator

the correlation coefficient was small (C = 0.17, $p = 0.01$). Finally, students' levels of PAC at T2 were moderate and statistically significantly and negatively related to students' SAD at T2 ($r = -0.35$, $p < 0.001$).

Based on these results, this hypothesis was supported, and we concluded that the mediator, PAC, was statistically significant in the model and that the independent variable, FD, did not lose its statistical significance when PAC was included in the model (see Figs. 1 and 2). The indirect effect of FD on SAD through PAC fell between the lower and the upper bound (95% CI = [-0.089, -0.012]) (see Table 3).

Hypothesis 2

We tested a moderated mediation model, and we included the same variables used in Hypothesis 1, but we treated intrinsic motivation (IM) at T1 as the moderator of the indirect effect. The strength of the mediation was contingent on the moderating effect of the moderator variable. The new path, IM at T1, influenced the relation between factor differentiation (FD) at T1 and perceived academic control (PAC) at T2. Consequently, this time, students' levels of FD at T1 were statistically significantly strong and not small as it was in Hypothesis 1 ($r = 0.16$, $p < 0.01$), and negatively related to students' levels of PAC at T2 ($r = -0.74$, $p < 0.01$) (see Table 4).

The interaction between factor differentiation (FD) at T1 and intrinsic motivation (IM) at T1 was positively and statistically significant ($r = 0.20$, $p < 0.001$) (see Table 4). Therefore, there is a positive relationship between the effect of the FD and the product or interaction. In other words, when the levels of FD increase, the impact of the interaction also increases. Besides, we found that students who were low in IM at T1 and low in FD at T1 showed lower levels of perceived academic control PAC at T2 as well, compared to those with high levels of IM at T1. Moreover, students with high levels of IM at T1 and high levels of FD at T1 presented higher levels of PAC at T2, compared to those with low levels of IM at T1. Thus, higher levels of PAC at T2, as well as higher levels of FD at T1, were observed in students who presented higher levels of IM at T1 than among those who are less IM. In the case of students who presented high levels of IM at T1, the slope is considerably steeper than for those who presented lower levels of IM at T1, as students' levels of FD at T1 and PAC at T2 increased (see Fig. 3).

The effect of factor differentiation (FD) at T1 on stress, anxiety, and depression (SAD) at T2, through the mediator perceived academic control (PAC) at T2 changed due to the levels of intrinsic motivation (IM) at T1, the moderator (see Table 4). We concluded that IM at T1 influenced the strength of the indirect effect of FD at T1 on SAD at T2, through PAC at T2, and the moderated mediation effect was statistically significant. The conditional effect of the FD at T1 on PAC

Table 3 Completely standardized indirect effects through Factor Differentiation (FD) and Stress, Anxiety, and Depression (SAD)

IV	DV	Mediator	β	BootSE	BootLLCI Lower 95%	BootULCI Upper 95%
FD (T1)	SAD (T2)	PAC (T2)	-.05	.02	-.089	-.012

Independent Variable = IV; Dependent Variable = DV; Factor Differentiation = FD; Stress, Anxiety, and Depression = SAD; Perceived Academic Control (PAC)

Table 4 Perceived Academic Control (PAC) at T2: a dependent variable model

PAC = as DV	β	SE	LLCI Lower 95%	ULCI Upper 95%
Factor Differentiation (T1)	-.74**	.23	-1.194	-.290
Intrinsic Motivation (T1)	-.59**	.19	-.984	-.201
FD x IM (Int_1)	.20***	.05	.099	.311
Conditional Effect of the Focal Predictor Factor Differentiation (FD) at T1 on Perceived Academic Control (PAC) at T2 at Values of Intrinsic Motivation (IM) at T1 as the Moderator				
Conditional effect of FD (T1) over PAC (T2) at values of the moderator IM (T1)	β	SE	LLCI Lower 95%	ULCI Upper 95%
-1 SD IM T1	.05	.05	-.057	.171
Mean IM T1	.15*	.05	.034	.261
+1 SD IM T1	.26***	.07	.125	.399
Conditional Indirect Effect of Factor Differentiation (FD) T1 on Stress, Anxiety, and Depression (SAD) T2, and Index of Moderated Mediation for Perceived Academic Control (PAC) at T2				
Conditional indirect effect of FD T1 on SAD T2	β	BootSE	BootLLCI Lower 95%	BootULCI Upper 95%
-1 SD IM T1	-.02	.02	-.069	.028
Mean IM T1	-.05	.02	-.099	-.009
+1 SD IM T1	-09	.03	-.153	-.036
Index of moderated mediation for PAC T2	β	BootSE	BootLLCI Lower 95%	BootULCI Upper 95%
IM T1	-.07	.02	-.125	-.007

*$p < .05$, **$p < .01$, ***$p < .001$

at T2 with IM as the moderator at T1 was more influential among students experiencing more IM ($r = 0.26$, $p < 0.001$) than among those experiencing less IM ($r = 0.05$, $p = 0.33$) (see Table 4). We concluded that it was statistically significantly different from zero only at higher levels of the moderator. However, it was not statistically significantly different from zero at lower levels of the moderator (see Table 4).

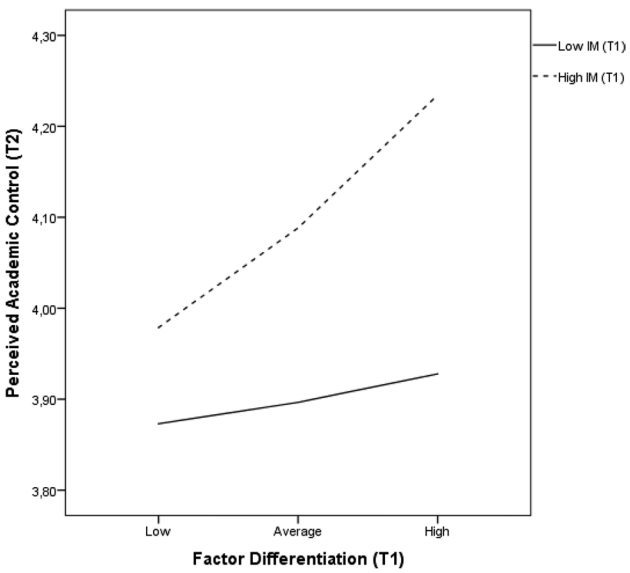

Fig. 3 Interaction between factor differentiation and intrinsic motivation

We estimated the difference between the conditional indirect effects of factor differentiation (FD) at T1 on stress, anxiety, and depression (SAD) at T2 through PAC at T2 at the two values of the moderator intrinsic motivation (IM) at T1. We concluded that it was statistically significantly different from zero only at higher levels of the moderator. However, it was not statistically different from zero at lower levels of the moderator (see Table 4). Finally, the index of the moderated mediation showed that it was statistically significantly different from zero. Thus, the mediation is moderated because the moderator has a nonzero weight in the function linking the indirect effect of FD at T1 on SAD at T2 through PAC at T2 to IM at T1 because the confidence interval did not contain a zero (95% CI = -0.125, -0.007) (see Table 4). We concluded that the findings supported this hypothesis.

Discussion

This study reports on an investigation into variables that potentiate or debilitate first-year university students' negative emotional states, such as stress, anxiety, and depression, over an academic semester at a large university in Chile. The purpose was to link students' responses collected at two points over 6 months to examine correlations and possible changes among the study variables. In this section, we provide a reflection and a discussion of the findings to connect them and to contrast them with prior researchers' studies presented in the literature review.

Research hypotheses discussion

Hypothesis 1

We analysed the relationship between perceived academic control (PAC) at T2, factor differentiation (FD) at T1 and stress, anxiety, and depression (SAD) at T2. Our findings showed that students' FD (e.g., their abilities to distinguish differences among emotions) at T1 was statistically significantly and positively related to students' levels of PAC at T2. In other words, students who are aware of their emotions and distinguish them have more chances to regulate their feelings and enjoy higher levels of PAC. Our findings are consistent with Zhao et al. (2021), who also observed that emotion regulation influences perceived control. They found that reappraisers (e.g., those who activate antecedent-focused strategies before full activation of emotional responses) perceived higher control than did suppressors (e.g., those who activate response-focused strategies after the feeling is generated). Besides, the authors claimed that reappraisers learned more than suppressors, who showed lower perceived control and higher anxiety levels during the learning process.

We found that FD was a statistically significant predictor for SAD, which confirms the results of previous studies regarding emotion regulation resources and the effect on mitigating negative emotional states (Ye et al., 2020) and fostering higher adaptive psychological functioning (Lumma et al., 2017). Furthermore, Mojsa-Kaja et al. (2021) highlighted that when individuals are under highly challenging and stressful situations, they require adaptive coping strategies to prevent stress-related disorders. Thus, activating emotion regulation is crucial when intense negative emotions increase. In other words, based on the literature and on the *process model of emotional regulation*, students are better positioned to change strong negative emotional states when they can differentiate emotions. They do this by intervening in the emotion production system at the different stages mentioned earlier (Yih et al., 2019; Zhao et al., 2021). Thus, FD and emotional regulation act as tools that buffer students against negative emotional consequences, allowing them to cope better with their emotional states (Mojsa-Kaja et al., 2021).

High-standard academic demands challenge students, which might influence their control over their academic performance (Respondek et al., 2017), especially when they have deficient levels of PAC and high anxiety levels (Stupnisky et al., 2013). Prior researchers have claimed that perceived control predicts academic emotions related to students' feelings in academic achievement contexts (Muntaner-Mas et al., 2017). Moreover, achievement emotions flourish when students feel in control and negative emotional states decrease (Pekrun et al., 2017). We found that students' levels of PAC at T2 were moderate and statistically significantly and negatively related to students' SAD at T2. This finding is consistent with that of Stupnisky et al. (2013), who highlighted that students' PAC has a negative association with negative emotional states, such as SAD. The authors added that when individuals believe that they are not in control or cannot influence adverse outcomes, they might feel stressed—that is, perceptions of control negatively predict stress. Thus, when students' levels of PAC decrease, this increases students' levels of negative emotional states, which is why we stated that there is a negative relation between PAC and SAD among the study participants. Similarly, Zhao et al. (2021) found that students with high perceived control experienced less anxiety than did those with low perceived control.

To conclude, the higher the levels of emotional differentiation, the higher their PAC (Stupnisky et al., 2013), mitigating negative emotional states (Ye et al., 2020). Thus, it was reasonable to expect that FD at T1 did not lose its statistical significance when PAC at T2 was included in the model, given that emotion differentiation allows individuals to control their emotions. Then, PAC at T2 and FD at T1 were factors that decreased students' levels of SAD at T2. A fundamental proposition of the *process model of emotion regulation* is that it impacts emotions (e.g., increasing, maintaining, or decreasing). Besides, according to Zhao et al. (2021), perceived control is one mechanism through which emotion regulation strategies influence emotions. In conclusion, our findings supported our hypothesis and were consistent with other studies. However, because we decided to add a new path to the relation between students' FD at T1 and students' PAC at T2, the strength of the mediation, this time, would depend on the levels of the moderator variable we chose to add to the model.

Hypothesis 2

We tested a moderated mediation model using the same variables used in Hypothesis 1, and we treated intrinsic motivation (IM) at T1 as a moderator. We found that IM at T1 influenced the relationship between factor differentiation (FD) at T1 and perceived academic control (PAC) at T2. As we mentioned in the introduction section, we are not aware of studies testing these associations as we have. However, by reviewing and reflecting on the literature, some findings fit our results in some way or another. For example, Gross (2015) claimed that individuals who seek to differentiate their emotions are interested in regulating their emotions, which he referred to as intrinsic emotion regulation. Thus, we concluded that individuals who can differentiate their emotions are intrinsically motivated with a high personal interest in the task, a relation we will expand on below. Furthermore, when individuals identify a particular emotion

as bad and feel they have the possibility to attempt to *control* that emotion intentionally, they experience an intrinsic force and motivation to regulate that emotion (Ford & Gross, 2019). So, we can infer that intrinsically motivated individuals also enjoy perceptions of control, and it is reasonable to expect that IM at T1 influenced the relation between FD at T1 and PAC at T2.

The *interaction* between FD at T1 and IM at T1 was positively statistically significant, which means that when the levels of FD increase, the impact of the interaction also increases. Besides, we found a moderated effect, which was more robust for students who experienced higher levels of IM compared to those who experienced lower levels of IM. The *conditional effect* of FD at T1 on PAC at T2 with IM as the moderator at T1 was more influential among students experiencing more IM than among those experiencing less IM. We concluded that it was statistically significantly different from zero only at higher levels of the moderator, IM. Thus, FD influenced individuals with high levels of IM, but it did not influence individuals with low levels of IM. Moreover, high levels of IM, and high levels of FD were associated with higher levels of PAC. However, students with low levels of IM, but low levels of FD presented low levels of PAC as well, compared to those with high levels of IM. Thus, FD is relevant in the interaction between FD at T1 and IM at T1 over PAC at T2 because it is affecting more those who experience high levels of IM than those experiencing less IM.

We concluded that our findings are consistent with those of other researchers because when people experience high levels of IM, they can better engage in their learning processes. Thus, this provokes academic satisfaction, and their ability to perceive control over their academics increases (Oriol et al., 2016) compared with those with low levels of IM. Consequently, these individuals would be willing to focus on identifying, understanding, regulating, and controlling their emotions (Ford & Gross, 2019; Gross, 2015). Finally, it is reasonable to expect that those highly intrinsically motivated students, who have intense learning and goal-oriented behaviours (Kotera et al., 2021), will be more willing to activate a goal to influence their emotion trajectories and to employ emotion regulation strategies than will those who are less motivated.

We estimated the difference between the *conditional indirect effects* of FD at T1 on SAD at T2 through PAC at T2 at the two values of the moderator IM at T1. We relied on the self-determination theory that focuses on individuals' inherent and innate psychological needs that are basic for self-motivation (Hammerschall, 2019). IM relates to autonomous forms of motivation (Kotera et al., 2021), which is why it is not surprising that students who have teachers with autonomy orientation teaching techniques find academic activities meaningful and report high levels of IM (Daniel & Cooc, 2018). Besides, prior researchers noted that IM significantly affects students' learning processes. It influences what, how, and when they will decide to learn; in other words, students take an active role, enjoy engaging in academic activities, and adopt a more profound approach to learning than do those with low IM (Fırat et al., 2018). Thus, this relates to our findings when we concluded that the difference between the *conditional indirect effects* of FD at T1 on SAD at T2 through PAC at T2 at the two values of the moderator IM at T1 was statistically significantly different from zero only at higher levels of the moderator.

The *index of moderated mediation* showed that this index did not contain a zero. Thus, the mediation is moderated because the moderator has a nonzero weight in the function linking the indirect effect of factor differentiation (FD) at T1 on stress, anxiety, and depression (SAD) at T2 through perceived academic control (PAC) at T2 to intrinsic motivation (IM) at T1 because the confidence interval did not contain a zero. To conclude, the effect of FD at T1 on SAD at T2, through the mediator PAC at T2, changed due to the levels of IM at T1. We concluded that IM at T1 influenced the strength of the indirect effect of FD at T1 on SAD at T2 through PAC at T2, and the moderated mediation effect was statistically significant. In conclusion, the findings supported our hypothesis.

Conclusions

Our findings showed that students' factor differentiation (FD) at T1 was statistically significantly and positively related to students' levels of perceived academic control (PAC) at T2. Besides, we found that FD was a statistically significant predictor for stress, anxiety, and depression (SAD,) which means that FD acts as a tool that buffers students against negative emotional consequences (Mojsa-Kaja et al., 2021). When students experience high levels of psychological distress, they tend to procrastinate about meeting deadlines to avoid unpleasant feelings, regardless of future negative consequences (Constantin et al., 2018). However, when they can differentiate emotions and believe that they can regulate them, they become inherently willing to change their negative emotional states to avoid adverse experiences, such as anxiety and depression, and to reach desirable and positive outcomes (Zhao et al., 2021). Besides, we found that students' levels of PAC at T2 were moderate and statistically significantly and negatively related to students' SAD at T2. In other words, students' perceptions of their control over academics negatively affect SAD (Stupnisky et al., 2013). Finally, we predicted and found that the higher the levels of emotional differentiation and regulation of emotions, the higher their PAC, which according to Ye et al. (2020), mitigates negative emotional states. Then, PAC at T2 and FD at

T1 were factors that decreased students' levels of SAD at T2. Finally, FD at T1 did not lose its statistical significance when PAC at T2 was included in the model. Thus, the findings supported our hypothesis.

In addition, we added a new path, intrinsic motivation (IM) acting as a moderator, to the relation between students' FD at T1 and students' PAC at T2, and we found that the effect of FD at T1 on SAD at T2 through the mediator PAC at T2, changed due to the levels of IM at T1. There was a moderated effect, which was more robust for students who experienced higher levels of IM compared to those who experienced lower levels of IM. We concluded that IM at T1 influenced the strength of the *indirect effect* of FD at T1 on SAD at T2 through PAC at T2, and the moderated mediation effect was statistically significant. Furthermore, we learned that the *conditional effect* of FD at T1 on PAC at T2 with IM as the moderator at T1 was more influential among students experiencing more IM than among those experiencing less IM. The reason is that IM students have a high personal interest in the task (Kotera et al., 2021) and are more interested in regulating emotions than those who do not experience a deep satisfaction when engaging in the task. Also, when these students identify negative emotional states and apply emotion regulation, they believe they can control those emotions (Ford & Gross, 2019). According to our findings, this is more influential among students experiencing more intrinsic motivation than those experiencing less IM. Even though motivation in academic settings is gaining importance (Kotera et al., 2021), the IM moderated effect on the relationship between FD and PAC remains to be analysed. Finally, the mediation is moderated because the moderator has a nonzero weight in the function linking the indirect effect of FD at T1 on SAD at T2 through PAC at T2 to IM at T1. In conclusion, the findings supported our hypothesis.

We used Hayes's PROCESS Macro for SPSS to generate the required statistics and output to estimate our study models. According to Hayes et al. (2017), this computational tool "simplifies the implementation of mediation, moderation, and conditional process analysis with observed variables" (p. 2). The authors added that any Structural Equation Modelling (SEM) program "can generate path analysis with observed variables as PROCESS does"; however, "PROCESS produces the analysis automatically" (p. 2). Also, PROCESS allowed us better to combine mediation and moderation analysis. In SEM, the model needs to fit, which means that "the estimation stops when further modification to the estimates does not improve the correspondence more than as required by the convergence criterion" (Hayes et al., 2017, p. 2). Even though we understand that this can be more robust, it also gave us less space when analysing mediations and moderated mediations, which is why we chose PROCESS. Finally, we did not use SEM to estimate the models of our study because we did not seek to fulfil any stability hypothesis.

Limitations of study

At the data collection stage, we present and discuss two possible threats to internal validity (i.e., *history* and *instrumentation*) and one potential threat to external validity (i.e., *population validity*). In longitudinal studies, *history* might represent a threat to legitimation because the data collection occurs on more than one occasion (Creswell, 2012). Thus, there are more chances that events might happen and change the analysis of the group of people under investigation (Cohen et al., 2007). As we mentioned earlier, income and challenges related to equity in Chile have evolved since 1990, and they persist. Even though the data collection occurred in peaceful times—that is, it concluded before the protests started—the findings might contain hidden discontent.

Another possible internal threat to legitimation relates to the reversed items from one of the four scales that we administered: the Perceived Academic Control Scale (see Table 5). We analysed the percentages of disagreement and agreement of this instrument. We concluded that students had difficulties in understanding the reversed items, which is why the responses from the reversed items were inconsistent. Consequently, it is possible that this significantly lowered the score reliability, which, in turn, likely attenuated the relationships associated with perceived academic control in the models that we tested.

We focused on *population validity* regarding the external threats to legitimation at the data collection stage of the research process. Especially in quantitative research, the extent to which findings are generalisable from the sample to the total population might become a threat. We could only generalise our conclusions if we focus on universities that harbour students who share similar backgrounds—for example, several students at our institution experience socio-cultural or economic demands. Almost 80% of the students belong to a low socio-cultural and financial environment, and 58% are first-generation. Besides, students with state-sponsored loans at our institution have increased over the past 3 years—from 54,4% in 2017 to 61,2% in 2019. Thus, these specific characteristics of the participants' backgrounds might bring particular and unique results. As such, replications are recommended to ascertain whether the present findings are generalisable to Chilean university students.

Table 5 Descriptive Statistics for all Items on the Perceived Academic Control Scale (1–5)[a]

Item Number	Item	% Disagreeing	% Neutral	% Agreeing	*M*	*SD*
1	I have a great deal of control over my academic performance in my courses	12.2 (10.9)	17.7 (18.3)	70.1 (70.7)	3.69 (3.68)	0.86 (0.81)
2	The more effort I put into my courses, the better I do in them	7.1 (5.8)	8.7 (10.0)	84.2 (84.2)	4.15 (4.20)	0.93 (0.84)
3	No matter what I do, I can't seem to do well in my courses (reversed item)	11.6 (9.6)	22.5 (21.2)	65.9 (69.1)	3.74 (3.84)	1.01 (0.94)
4	I see myself as largely responsible for my performance throughout my college career	1.0 (1.6)	6.1 (7.1)	92.9 (91.3)	4.35 (4.28)	0.64 (0.66)
5	How well I do in my courses is often the "luck of the draw." (reversed item)	6.4 (7.1)	10.9 (11.6)	82.6 (81.4)	4.17 (4.09)	0.91 (0.91)
6	There is little I can do about my performance in university (reversed item)	4.8 (7.1)	9.0 (10.9)	86.2 (82.0)	4.25 (4.17)	0.85 (0.95)
7	When I do poorly in a course, it is usually because I haven't given it my best effort	13.8 (9.2)	11.6 (13.2)	74.6 (77.2)	3.82 (3.90)	1.03 (0.92)
8	My grades are basically determined by things beyond my control, and there is little I can do to change that (reversed item)	7.7 (8.0)	17.7 (18.3)	74.6 (73.6)	3.98 (3.91)	0.95 (0.90)

[a] The numbers that are not in parentheses represent Time 1 and the numbers that are in parentheses represent Time 2

Recommendations for future research

As mentioned earlier, the findings of the study might contain hidden discontent, and this might be a limitation and an opportunity to suggest recommendations for future research. The lack of equity (Guzmán-Concha, 2017), the feelings of injustice, and the lack of free speech and fear that Chileans experienced during the dictatorship are still present among many families due to the suppression of free expression (Gonzalez, 2019). Consequently, these negative experiences might have generated excessive tension and stress among the Chilean citizens, which might have triggered the violence that gave origin to the last social outburst in October 2019. Therefore, the findings indicate the need for further research on how inhibitory situations to emotional experiences (Patel, 2019) can influence Chilean university students' levels and emotional states.

The study's findings cannot be generalized across the pandemic because the data collection process concluded before it started. Then, future replications are needed to examine further the effects of COVID-19 on emotional states and students' capacity to regulate emotions that influence their well-being and, consequently, affect their perceptions of their academic control and academic performance. To conclude, we did not use SEM to estimate the models of our study because we did not seek to fulfil any stability hypothesis; however, and for future research, it would be of added value to analyse the variables of the current study using SEM and including latent variables, instead of PROCESS Macro for SPSS.

Implications

Implications for counsellors and faculty members of a higher education institution

Counsellors and faculty members have to be aware of students' emotions, their ability to regulate stress and anxiety, and any possible adverse psychological environment affecting them. A way of increasing this awareness is for teachers to meet and to talk informally with each student and to use a specific set of guided questions to identify and to reach a better understanding of potential challenges. Also, teachers can become sensitive to suspicious signs of emotional threats via a periodical application of surveys and by generating a connection with the students to increase instructor immediacy (Hsu & Goldsmith, 2021). We recommend that teachers and counsellors work closely together. Counsellors should offer specific psychological strategies for teachers to use with their students to help them regulate negative emotional states. For example, one type of emotion regulation strategy that teachers can teach their students to use is the *antecedent-focused emotion regulation*, which we mentioned earlier. It modifies the influence of emotions by evaluating an emotional stimulus to alter emotions (Gross, 1998), allowing early efforts at mood repair (Ford & Gross, 2019). The other strategy is *response-focused emotion regulation*, which intervenes late after the feeling is generated (Gross, 1998).

Emotion regulation influences adaptive functioning and has significant consequences for personal well-being and

psychological and physical health (Tamir et al., 2020). Thus, developing first the ability in students to differentiate their emotions will help them regulate and mitigate negative emotions and avoid adverse experiences, such as anxiety and depression, and reach positive outcomes (Zhao et al., 2021). Besides, students who inherently and intentionally seek to regulate their emotions experience intrinsic emotion regulation (Gross, 2015) and tend to perceive themselves as being capable of attaining good academic results (Kılıçoğlu, 2018). Therefore, teachers should provide the tools for students to self-regulate and to learn how to choose the appropriate courses of action to manage circumstances they might experience. A way that teachers can cultivate and teach this skill explicitly is by tailoring their classroom instructions to each student's emotional needs and perceptions of their academic abilities. In other words, teachers can adjust and develop teaching strategies tailored to students' emotional and learning needs.

Another important finding that emerged from the current study was that students with high levels of IM and high levels of emotional differentiation experienced higher levels of perceived academic control (PAC), compared to those with low levels of IM. Consequently, and as we mentioned previously, emotional differentiation was more influential on those students who experienced higher levels of IM than on those experiencing lower levels of IM. In other words, the moderated effect was more robust for students who experienced higher IM levels than for those who experienced lower levels of IM. Besides, students' IM and ability to perceive control over their academics increased when the activity provoked satisfaction (Oriol et al., 2016). Thus, students' IM influenced the relation between emotion differentiation and their PAC, a relationship consistent with the support for Hypothesis 2 from our study. In this respect, cultivating emotional regulation, PAC, and IM is beneficial and crucial. Teachers can stimulate students' IM through positive psychology techniques in their classes, such as asking them to reflect on and to write about potential intrinsic goals (e.g., highlighting and writing about something interesting that they learn in each class). Also, they can foster students to choose topics of interest in class projects. Teachers can use this information to prepare meaningful classes to engage students in a particular activity of their interest.

Counsellors should offer psychosocial interventions to support students who are emotionally challenged. They should explicitly teach emotion regulation techniques to enhance students' ability to differentiate their feelings, especially when they experience high levels of negative emotions (Seah et al., 2020). Students need to activate emotion regulation and adaptive coping strategies to change that negative feeling before it intensifies (Ye et al., 2020). The relation found in the current study (more specifically the support for Hypothesis 1) between emotional differentiation and PAC suggested that the more chances students have to regulate their feelings, the higher their levels of PAC, as also found by Zhao et al. (2021). Consequently, these students can enjoy better adaptive emotions because their anxiety and stress levels decrease (Ye et al., 2020). To conclude, and as noted previously, counsellors and faculty members need to work closely together and explicitly teach students to label their emotions into discrete categories to apply adaptive responses when they need them.

Implications for administrators

The results of our study evidenced the triggers and buffers of students' potential mental health problems and needs. They also bring ideas and light to future researchers to design instructional and counselling programmes adapted to target the needs that students have, which is crucial for early detection and psychological consultation (Tang et al., 2018). Moreover, it is crucial to offer psychosocial interventions to provide students with the support they need. In this way, students can benefit and meet their psychological needs to progress (Froiland, 2018). For this, administrators should create awareness among students in seeking help. Leaders have to foster the development of appropriate emotional support services, such as counselling and psychotherapy treatments when needed, to contribute to students' well-being. Besides, administrators can offer a career counselling course to provide support during students' induction into college to help them make efficient academic programme choices to have more chances to succeed academically, as well as to provide information on what they will be capable of doing once they graduate (e.g., their potential workplace)—to name a few ideas.

Implications for students

Emotional conflicts interfere with students' cognitive development processes (Fredrickson, 2000). Therefore, students need to become aware of their emotions to have more chances to regulate and to control how they feel (Oriol et al., 2016). Consequently, they might reach higher adaptive psychological functioning (Lumma et al., 2017), which will mitigate exposures of negative emotions (Ye et al., 2020). To summarize, when students experience high levels of negative emotions, it is crucial to reach emotional differentiation and emotional regulation because these elements provide meaningful insights on stress and anxiety resilience. One way to reach this is by keeping a journal in which students write down their negative experiences and negative emotions as a technique to keep track of how they feel in order to understand and to regulate emotions (Patel, 2019). Finally, students should know that, if they go through stressing experiences and anxiety, they

are not alone. They should stay in touch with peers and, most importantly, they should look for help through talking to an expert and engaging in counselling sessions.

Several researchers have documented that students must believe in their influence over success or failure (Respondek et al., 2017). Our findings are consistent with prior researchers who have claimed that when students do not trust their academic skills and cannot regulate negative emotions (Gross, 2015), their feelings and perceptions of being in academic control decrease (Pekrun et al., 2017). A way for students to regulate their levels of worries and uncertainty-based emotions of anxiety and depression is by shifting how they perceive threatening experiences (Stupnisky et al., 2013). In other words, we suggest students to perceive intimidating experiences as opportunities to increase their self-efficacy and to believe in their ability to cope with challenges.

Our findings contribute to education because they provide evidence of vital significance in understanding several variables and their effects on students' negative emotional states. Thus, our results provide the foundation for future research on developing effective academic support programmes to prevent academic stress and its adverse effects among university students. These programmes could give students light on ways of regulating emotional states to withstand stressful situations and unfold emotional responses to influence adaptation features, known as primary control (Fernández-Rodríguez et al., 2019; Zhao et al., 2021).

Data availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Informed consent Informed consent was obtained from all individual participants included in the study.

References

American Psychological Association. (2019). https://www.apa.org/

Bhujade, V. M. (2017). Depression, anxiety and academic stress among college students: A brief review. *Indian Journal of Health & Well-being, 8*, 748–751.

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* (6th ed.). Routledge.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education* (7th ed.). Routledge.

Constantin, K., English, M. M., & Mazmanian, D. (2018). Anxiety, depression, and procrastination among students: Rumination plays a larger mediating role than worry. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 36*, 15–27. https://doi.org/10.1007/s10942-017-0271-5

Creswell, J. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Pearson Education.

Daniel, J. R., & Cooc, N. (2018). Teachers' perceptions of academic intrinsic motivation for students with disabilities. *Journal of Special Education, 52*(2), 101–112. https://doi.org/10.1177/0022466918765276

Deci, E. L., & Ryan, R. M. (2000). The "what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Deplancke, C., Somerville, M. P., Harrison, A., & Vuillier, L. (2022). It's all about beliefs: Believing emotions are uncontrollable is linked to symptoms of anxiety and depression through cognitive reappraisal and expressive suppression. *Current Psychology*. https://doi.org/10.1007/s12144-022-03252-2

Drewelies, J., Schade, H., & H€ul€ur, G., Hoppmann, C.A., Ram, N., & Gerstorf, D. (2020). The more we are in control, the merrier? Partner perceived control and negative affect in the daily lives of older couples. *Journals of Gerontology, 75*(2), 338–348.

Dyrberg, N. R., & Holmegaard, H. T. (2019). Motivational patterns in STEM education: A self-determination perspective on first year courses. *Research in Science & Technological Education, 37*(1), 90–109. https://doi.org/10.1080/02635143.2017.1421529

Fernández-Rodríguez, C., Soto-López, T., & Cuesta, M. (2019). Needs and demands for psychological care in university students. *Psicothema, 31*(4), 414–421. https://doi.org/10.7334/psicothema2019.78

Fila, M. J., & Eatough, E. (2017). Extending knowledge of illegitimate tasks: Student satisfaction, anxiety, and emotional exhaustion. *Stress and Health, 34*(1), 152–162. https://doi.org/10.1002/smi.2768

Fırat, M., Kılınç, H., & Yüzer, T. V. (2018). Level of intrinsic motivation of distance education students in e-learning environments. *Journal of Computer Assisted Learning, 34*(1), 63–70. https://doi.org/10.1111/jcal.1221

Fleet, N., & Guzmán-Concha, C. (2017). Mass higher education and the 2011 student movement in Chile: Material and ideological implications. *Bulletin of Latin American Research, 36*, 160–176. https://doi.org/10.1111/blar.12471

Ford, B. Q., & Gross, J. J. (2019). Why beliefs about emotion matter: An emotion-regulation perspective. *Current Directions in Psychological Science, 28*(1), 74–81. https://doi.org/10.1177/0963721418806697

Fredrickson, B. L. (2000). Why positive emotions matter in organizations: Lessons from the broaden-and-build model. *The Psychologist-Manager Journal, 4*, 131–142. https://doi.org/10.1037/h0095887

Froiland, J. M. (2018). Promoting gratitude and positive feelings about learning among young adults. *Journal of Adult Development, 25*, 251–258. https://doi.org/10.1007/s10804-018-9294-0

Gonzalez, A. (2019). *Free speech and free press around the world, Chile*. https://freespeechfreepress.wordpress.com/south-america/chile/

Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74*, 224–237. https://doi.org/10.1037/0022-3514.74.1.224

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry, 26*, 1–26. https://doi.org/10.1080/1047840X.2014.940781

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*, 348–362. https://doi.org/10.1037/0022-3514.85.2.348

Guzmán-Concha, C. (2012). The students' rebellion in Chile: Occupy protest or classic social movement? *Social Movement Studies, 11*(3/4), 408–415. https://doi.org/10.1080/14742837.2012.710748

Guzmán-Concha, C. (2017). Undoing the neoliberal higher education system? Student protests and the Bachelet reforms in Chile. *World Social and Economic Review of Contemporary Policy Issues, 36*, 32–43.

Guzmán-Valenzuela, C. (2017). Tendencias globales en educación superior y su impacto en América Latina: Desafíos Pendientes. *Lenguas Modernas, 50*, 15–32.

Hammerschall, U. (2019). A gamification framework for long-term engagement in education based on self determination theory and the transtheoretical model of change. *Global Engineering Education Conference, 95*,. https://doi.org/10.1109/EDUCON.2019.8725251

Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis*. The Guilford Press.

Hayes, A. F., Montoya, A. K., & Rockwood, N. J. (2017). The analysis of mechanisms and their contingencies: PROCESS versus structural equation modelling. *Australasian Marketing Journal, 1*, 76. https://doi.org/10.1016/j.ausmj.2017.02.001

Hsu, J. L., & Goldsmith, G. R. (2021). Instructor strategies to alleviate stress and anxiety among college and university STEM students. *CBE Life Sciences Education, 20*(1), 1–13. https://doi.org/10.1187/cbe.20-08-0189

Kang, S. M., & Shaver, P. R. (2004). Individual differences in emotional complexity: Their psychological implications. *Journal of Personality, 72*, 687–726. https://doi.org/10.1111/j.0022-3506.2004.00277.x

Kılıçoğlu, G. (2018). Study on the relationship between social studies course self-efficacy and motivation levels of secondary school students. *Universal Journal of Educational Research*, *6*(8), 1743–1748. https://doi.org/10.13189/ujer.2018.060816

Kotera, Y., Taylor, E., Fido, D., Williams, D., & Tsuda-McCaie, F. (2021). Motivation of UK graduate students in education: Self-compassion moderates pathway from extrinsic motivation to intrinsic motivation. *Current Psychology, 2018*,. https://doi.org/10.1007/s12144-021-02301-6

Krejecie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*, 607–610. https://doi.org/10.1177/001316447003000308

Kumari, R., Langer, B., Jandial, S., Gupta, R., Raina, S. K., & Singh, P. (2019). Psycho-social health problems: Prevalence and associated factors among students of professional colleges in Jammu. *Indian Journal of Community Health, 31*(1), 43–49. https://doi.org/10.47203/IJCH.2019.v31i01.008

Layco, E. P. (2020). The role of metacognition and its interaction on students' negative academic emotions towards their academic buoyancy and achievement in mathematics. *Universal Journal of Educational Research*, *8*(12A), 7500–7510. https://doi.org/10.13189/ujer.2020.082534

Lee, J. Y., Lindquist, K. A., & Nam, C. S. (2017). Emotional granularity effects on event-related brain potentials during affective picture processing. *Frontiers in Human Neuroscience, 11*, 1–18. https://doi.org/10.3389/fnhum.2017.00133

Little, R. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*(404), 1198–1202. https://doi.org/10.2307/2290157

Lumma, A., Böckler, A., Vrticka, P., & Singer, T. (2017). Who am I? Differential effects of three contemplative mental trainings on emotional word use in self-descriptions. *Self and Identity, 16*, 607–628. https://doi.org/10.1080/15298868.2017.1294107

Manstead, A. S. R. (2018). The psychology of social class: How socioeconomic status impacts thought, feelings, and behaviour. *The British Journal of Social Psychology, 57*(2), 267–291. https://doi.org/10.1111/bjso.12251

McRae, K., & Gross, J. J. (2020). Emotion regulation. *Emotion, 20*(1), 1–9. https://doi.org/10.1037/emo0000703

Mojsa-Kaja, J., Szklarczyk, K., González-Yubero, S., & Palomera, R. (2021). Cognitive emotion regulation strategies mediate the relationships between Dark Triad traits and negative emotional states experienced during the COVID-19 pandemic. *Personality and Individual Differences*. https://doi.org/10.1016/j.paid.2021.111018

Monsoon, A. D., Preece, D. A., & Becerra, R. (2022). Control and acceptance beliefs about emotions: Associations with psychological distress and the mediating role of emotion regulation flexibility. *Australian Psychologist, 1–13*. https://doi.org/10.1080/00050067.2022.2089542

Muntaner-Mas, A., Vidal-Conti, J., Sesé, A., & Palou, P. (2017). Teaching skills, students' emotions, perceived control and academic achievement in university students: A SEM approach. *Teaching and Teacher Education, 67*, 1–8. https://doi.org/10.1016/j.tate.2017.05.013

Opazo, D., Moreno, S., Álvarez-Miranda, E., & Pereira, J. (2021). Analysis of first-year university student dropout through machine learning models: A comparison between universities. *Mathematics, 9*(20), 1–27. https://doi.org/10.3390/math9202599

Oriol, X., Amutio, A., Mendoza, M., Da Costa, S., & Miranda, R. (2016). Emotional creativity as predictor of intrinsic motivation and academic engagement in university students: The mediating role of positive emotions. *Frontiers in Psychology, 7*, 1–9. https://doi.org/10.3389/fpsyg.2016.01243

Patel, J. (2019). Consequences of repression of emotion: Physical health, mental health and general well being. *International Journal of Psychotherapy Practice and Research*, *1*(3), 16–21. https://doi.org/10.14302/issn.2574-612X.ijpr-18-2564. https://oap-journals.org/ijpr/article/999

Pekrun, R., Lichtenfeld, S., Marsh, H. W., Murayama, K., & Goetz, T. (2017). Achievement emotions and academic performance: A longitudinal model of reciprocal effects. *Child Development, 88*, 1653–1670. https://doi.org/10.1111/cdev.12704

Respondek, L., Seufert, T., Stupnisky, R., & Nett,. (2017). Perceived academic control and academic emotions predict undergraduate university student success: Examining effects on dropout intention and achievement. *Frontiers in Psychology, 8*. https://doi.org/10.3389/fpsyg.2017.00243

Rowe, A. D., Fitness, J., & Wood, L. N. (2015). University student and lecturer perceptions of positive emotions in learning. *International Journal of Qualitative Studies in Education, 28*(1), 1–20. https://doi.org/10.1080/09518398.2013.847506

Ryan, R. M., & Deci, E. L. (2017). Self-determination theory an introduction and overview. In *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. https://doi.org/10.1521/978.14625/28806

Seah, T. H. S., Aurora, P., & Coifman, K. G. (2020). Emotion differentiation as a protective factor against the behavioral consequences of rumination: A Cconceptual replication and extension in the context of social anxiety. *Behavior Therapy, 51*(1), 135–148. https://doi.org/10.1016/j.beth.2019.05.011

Seibert, G. S., Bauer, K. N., May, R. W., & Fincham, F. D. (2017). Emotion regulation and academic underperformance: The role of school burnout. *Learning and Individual Differences, 60*, 1–9. https://doi.org/10.1016/j.lindif.2017.10.001

Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71*(3), 549–570. https://doi.org/10.1037/0022-3514.71.3.549

Stupnisky, R. H., Perry, R. P., Renaud, R. D., & Hladkyj, S. (2013). Looking beyond grades: Comparing self-esteem and perceived academic control as predictors of first-year college students' well-being. *Learning and Individual Differences, 23*, 151–157. https://doi.org/10.1016/j.lindif.2012.07.008

Tamir, M., Vishkin, A., & Gutentag, T. (2020). Emotion regulation is motivated. *Emotion, 20*(1), 115–119. https://doi.org/10.1037/emo0000635

Tang, F., Byrne, M., & Qin, P. (2018). Research paper: Psychological distress and risk for suicidal behavior among university students in contemporary China. *Journal of Affective Disorders, 228*, 101–108. https://doi.org/10.1016/j.jad.2017.12.005

Trigueros, R., Aguilar-Parra, J. M., Álvarez, J. F., Cangas, A. J., & López-Liria, R. (2020). The effect of motivation on the resilience and anxiety of the athlete. *Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte*, *20*(77), 73–86. https://doi.org/10.15366/rimcafd2020.77.005

Wafula, K., & Wang, Y. (2019). Carve: A scientific method-based threat hunting hypothesis development model. *IEEE International Conference on Electro Information Technology (EIT), 2019*, 1–6. https://doi.org/10.1109/EIT.2019.8833792

Ye, Z., Yang, X., Zeng, C., Wang, Y., Shen, Z., Li, X., & Lin, D. (2020). Resilience, social support, and coping as mediators between COVID-19-related stressful experiences and acute Sstress disorder among college students in China. *Applied Psychology: Health and Well-Being, 12*(4), 1074–1094. https://doi.org/10.1111/aphw.12211

Yih, J., Uusberg, A., Taxer, J. L., & Gross, J. J. (2019). Better together: A unified perspective on appraisal and emotion regulation. *Cognition and Emotion, 33*(1), 41–47. https://doi.org/10.1080/02699931.2018.1504749

Zhao, T., Fu, Z., Lian, X., Ye, L., & Huang, W. (2021). Exploring emotion regulation and perceived control as antecedents of anxiety and its consequences during Covid-19 full remote learning. *Frontiers in Psychology*, *12*(July). https://doi.org/10.3389/fpsyg.2021.675910

Zheng, L., Miao, M., & Gan, Y. (2020). Perceived control buffers the effects of the COVID-19 pandemic on general health and life satisfaction: The mediating role of psychological distance. *Applied Psychology: Health and Well-Being, 12*(4), 1095–1114. https://doi.org/10.1111/aphw.12232