

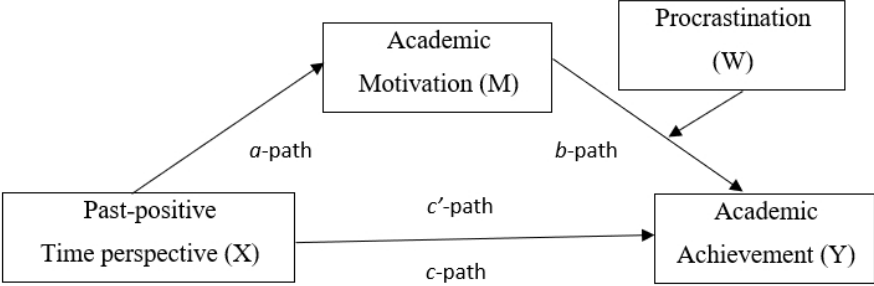


Past-positive time perspective predicts academic achievement via motivation and procrastination might not be as bad as it seems

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Manuscripts

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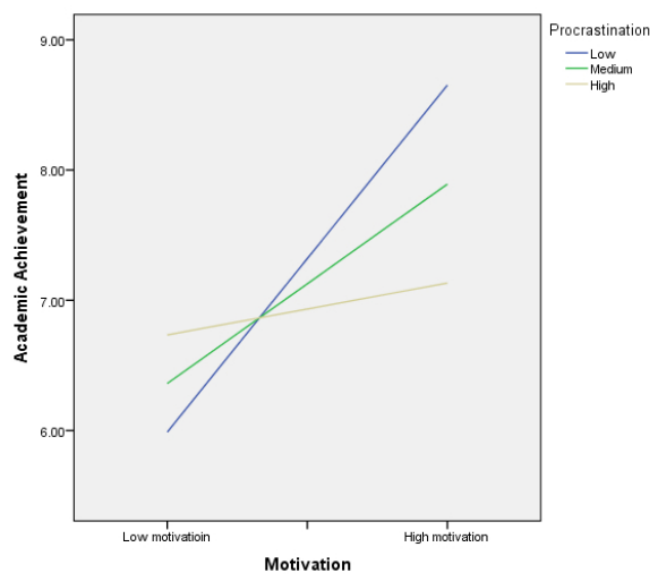


Fig. 2. Plot of the moderating effect of procrastination in the relationship between motivation and academic achievement. Color code for procrastination levels were as follows: yellow for high procrastinators (1SD above the mean), green for medium procrastinators (Mean value), and blue for low procrastinators (1SD below the mean).

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Table 1

Descriptive statistics, Cronbach's Alpha, Composite Reliability, Average Variance Explained, correlations between academic achievement, time perspectives, academic motivation, and procrastination.

	M(SD)	α	CR	AVE	1	2	3	4	5	6	7	8
1.AA	7.18(3.04)				-	.39**			-.06	.20**	.36**	-.15*
							.19**	.17**				
2.PP	3.54(.63)	.61	.84	.54		-			.09	.17**	.36**	-.10
							.25**	.17**				
3.PN	2.85(.78)	.80	.86	.48			-	.42**	.13*	-.14*	.08	.30**
4.PF	2.29(.69)	.66	.81	.51				-	.27*		-.03	.21**
									*	.20**		
5.PH	3.05(.68)	.74	.91	.62					-	-.12	.02	.22**
6.FT	3.78(.56)	.63	.85	.50						-	.24**	-.58**
7.AM	2.99(.59)	.79	.81	.40							-	-.10
8.PR	4.83(.57)	.76	.87	.49								-

Note: M = Mean value; SD = Standard deviation; α = Cronbach's Alpha; CR = Composite reliability; AVE = Average Variance Explained; AA = Academic achievement; PP = Past-positive time perspective; PN = Past-negative time perspective; PF = Present-fatalistic time perspective; PH = Present-hedonistic time perspective; FT = Future time perspective; AM = Academic motivation; PR = Procrastination; * $p < .05$; ** $p < .01$.

Table 2

Heterotrait-Monotrait ratio (HTMT) results

	AA	AM	PP	PR
Academic achievement				
Academic Motivation	.206			
Past-positive time perspective	.136	.334		

Procrastination .095 .402 .222

Note: AA = Academic achievement; PP = Past-positive time perspective; AM = Academic motivation; PR = Procrastination.

Table 3

Mediation analysis

Outcome variables	Independent variables	β	SE	t	p
Academic Motivation	Constant	3.66**	.18	19.35	< .001
	Past-positive	.33**	.05	6.30	< .001
			.13		
			39.77**		
Academic Achievement	Constant	-27.06*	8.57	-3.15	< .01
	Past-positive time perspective	1.37**	.28	4.86	< .001
	Academic motivation	6.26**	1.73	3.62	< .001
			.25		
			20.65**		

* $p < .01$; ** $p < .001$.

Table 4

Moderated mediation analysis when treating academic motivation as a mediator

	β	SE	t	p
Constant	2.26*	1.01	2.23	< .05
Past-positive time perspective	1.37***	.28	4.86	< .001
Academic motivation	1.33***	.31	4.27	< .001
Procrastination	-.32	.28	-1.13	.25
Academic motivation x Procrastination	-1.64**	.56	-2.89	< .01

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

Table 5

Conditional indirect effect at specific levels of moderator when academic motivation is the mediator

	B	Boot SE	Boot LL CI	Boot UL CI
Low (- 1SD)	.76***	.16	.48	1.10
Medium (mean)	.44***	.11	.23	.67
High (+ 1SD)	.11	.18	-.27	.46

*** $p < .001$

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3 **Past-positive time perspective predicts academic achievement via motivation and**
4 **procrastination might not be as bad as it seems**
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12 **Abstract**
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14 **Purpose** –Academic achievement has always been a concern in the high undergraduate’s
15 community. Numerous studies have addressed psychological aspects of students’ academic
16 life, however, past-positive time perspective (PP) -a warm and sentimental view of past events
17 that took place in someone’s life-, has not been profoundly contemplated. The fact that students
18 might organize their activities, employ different strategies to fulfill their tasks, and motivate
19 themselves to pursue their academic goals based primarily on their past experiences calls the
20 attention on conducting research on this time perspective dimension and its relationship with
21 procrastination and academic motivation. It was hypothesized that PP time perspective would
22 positively predict academic achievement via the mediation of academic motivation in a way
23 that the potentiate effect of PP time perspective on academic achievement would be increased
24 in highly motivated students, but this effect would be reduced in less motivated students. Also,
25 it was hypothesized that the relationship between motivation and academic achievement would
26 be negatively moderated by procrastination, such that academic achievement would increase
27 with academic motivation, however, that increase would be attenuated by procrastination.
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39 **Design/methodology/approach** - The present research was online questionnaire-based. 256
40 undergraduate Psychology students aged 18–44 ($M = 23.61$; $SD = .57$) from the Pontific
41 Catholic University of Argentina took part in the study (137 women; 53.3%). A
42 sociodemographic and academic survey and the locally adapted versions of the Zimbardo Time
43 Perspective Inventory, the Motivated Strategies for Learning Questionnaire, and the Tuckman
44 Procrastination Scale were used in this study. Participants were contacted by an email
45 advertisement in which the main purpose of the study was explained, and the instruments
46 remained open from September to November of 2021. Descriptive analyses -means, standard
47 deviations and frequencies- were calculated using IBM SPSS v.25 and mediation and
48 moderation analyses were conducted on PROCESS macro.
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57 **Findings** – Academic achievement was positively associated with PP time perspective ($r = .39$;
58 $p < .01$) and academic motivation ($.36$; $p < .01$), and negatively associated with procrastination
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($r = -.15; p < .05$). Results showed that academic motivation mediated the relationship between PP time perspective and academic achievement ($\beta = 1.37; R^2 = .21; p < .001$). Additionally, procrastination moderated the relationship between academic motivation and academic achievement but only at the low ($\beta = .76; p < .001$) and medium ($\beta = .44; p < .001$) levels of procrastination, while at high levels of procrastination, that relationship was not statistically significant ($\beta = .11; p > .05$).

Originality – This is the **first** study that examined the mediated role of academic motivation in the relationship between PP time perspective and academic achievement, and that included the moderating role of procrastination.

Key words: past-positive; time perspective; academic achievement; academic motivation; procrastination

Paper type Research paper

Introduction

Academic achievement is a complex and multidimensional construct (Garcia de Fanelli, 2014; Lamas, 2015; Roldan, 2016), both in its conceptualization and in its assessment, that is associated with and determined by factors of different nature, such as, personal -age, sex, intellectual aptitudes, personality, motivation, perceived self-efficacy-, social -social differences, family environment, parents' educational level, socioeconomic level, and institutional aspects -student environment, student-professor relationship, chosen career, institutional support services, economic, human and building resources of the academic system- (Freiberg-Hoffmann *et al.*, 2017; García, 2014).

Tejedor-Tejedor (2003) divides academic achievement into two major aspects for its conceptualization. According to whether it is *immediate* -results and grades obtained by students in their student career- or *deferred* -an assessment is made of the knowledge acquired based on its application or usefulness in reality-. Likewise, within immediate performance, there are other aspects that are considered to evaluate the variable:

a) Performance in a broad sense, which refers to the completion, or not, of the course within the expected time frame.

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3 b) Performance in terms of academic regularity as the student complies with the approval of
4 the minimum number of subjects required.

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7 c) Performance in the strict sense, which refers only to the grades obtained in the evaluations.
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10 In regards of the last one, some authors (De Miguel & Arias, 1997; Freiberg-Hoffmann *et al.*,
11 2017; Garcia de Fanelli, 2004) have considered the number of assignments approved per year,
12 which has a direct impact on the student's graduation rate. Additionally, although high
13 academic performance occurs within the framework of objective conditions imposed by
14 educational institutions, which are the ones that certify school results, it is a social and historical
15 construction in which both the student's previous experiences and the sociocultural context
16 intervene (Alarcón-Montiel *et al.*, 2019).
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22 When inquiring about the problems related to the students' academic life, it becomes essential
23 to mention aspects related to procrastination. The term *procrastination* has been conceptualized
24 as the delay in accomplishing a task or making a decision, also as the tendency of leaving things
25 to overdue deadlines just to feel enough pressure for the individual to be academic motivated
26 to finalize the assignment (Ferrari & Specter, 2000).
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31 One critical fact is that the prevalence of procrastination in general population has consistently
32 increased throughout the last decades (Ferrari *et al.*, 2005; Ferrari *et al.*, 2007), least to say
33 among students (Afzal & Jami, 2018; Khan *et al.*, 2014; Steel & Klingsieck, 2016). This
34 phenomenon has been considered by many authors as a self-limiting behavior that leads to
35 wasted time, increased stress, lack of motivation, increased anxiety and, in the academic
36 setting, low performance (Constantin *et al.*, 2017; Grunschel *et al.*, 2016; Steel & Klingsieck,
37 2016).
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44 A relevant aspect in the comprehension of procrastination's nature refers to what several
45 authors point out as the intentionality of the action (Fernie *et al.*, 2017; Wolters, 2003). In this
46 sense, delay in behavior does not become procrastination unless there is a deliberate intention
47 to complete the task, regardless of whether this delay is unnecessary. Furthermore, the question
48 if procrastination affects negatively academic achievement is yet to be completely responded,
49 since some studies have failed to report an association between these variables (Seo, 2011;
50 Solomon & Rothblum, 1984), or have even stated a positive relationship (Brinthaupt & Shin,
51 2001; Schraw & Wadkins, 2007).
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3 Since procrastination has been considered as a form of temporal self-regulation deficit (Sirois,
4 2014), evaluating time and the processing that each individual makes of it turns vital. The study
5 of psychological time has received considerable attention for the past decades, especially the
6 construct *time perspective* (Davis & Cernas-Ortiz, 2017; Sircova *et al.*, 2014; Stolarski *et al.*,
7 2020; Worrell *et al.*, 2018), which stands for “the often nonconscious personal attitude that
8 each of us holds towards time and the process associated with allocation of one’s attentional
9 resources whereby the continual flow of existence is bundled into time categories that help to
10 give order, coherence, and meaning to our lives” (Zimbardo & Boyd, 2008, p. 51).

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12 By far, the most widespread instrument to measure time perspective is the Zimbardo Time
13 Perspective Inventory (ZTPI), which allows to define the five time perspectives coined by
14 Zimbardo and Boyd (1999): *Past-Negative* -aversive personal view of unpleasant or traumatic
15 events that had taken place in someone’s life-, *Present-Hedonistic* -a continual search for
16 immediate pleasures reflecting a risky attitude in life-, *Future* -directive behavior towards goals
17 achievement and the rewards at a long term-, *Past-Positive* -a warm and sentimental view of
18 past events that took place in someone’s life-, *Present-Fatalistic* -a pessimistic experience of
19 the present, revealing a powerless, desperate attitude with negative expectations towards the
20 future and life-.

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22 Several studies have shown that procrastination is closely related to the student’s time
23 perspective (Choy & Cheung, 2018; González-Lomelí *et al.*, 2018; Kim *et al.*, 2017; Sirois &
24 Pychyl, 2016). In general terms, it has been found that individuals that are more orientated to
25 present time perspectives and less oriented towards the future exhibit behavioral patterns that
26 make them prefer activities that grant immediate but minor rewards, instead of undertaking
27 more responsible actions, that do not cause gratification in the moment, but provide a greater
28 reward later. Furthermore, time perspective has been associated with a wide range of different
29 psychological outcomes such as, mental health, wellbeing, life satisfaction, and academic
30 performance, among others (Acee *et al.*, 2020; McKay *et al.*, 2016; Janeiro *et al.*, 2017;
31 Oyandel & Buena-Casal, 2014; Rönnlund & Carelli, 2018).

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33 As Zimbardo and Boyd have stated (2008), past-oriented people are relatively rare to be found
34 in general population, yet time perspective is subjected also to cultural aspects, so it could be
35 plausible that different time perspective distributions are found worldwide around (Flaherty,
36 2017; Fulmer & Gelfand, 2014). The main characteristics of past-oriented individuals reside
37 on making decisions and acting according to the recollection of information that is available in
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3 memory that could be useful in dealing with similar situations. Past-oriented individuals highly
4 value family, friends, tradition, and social responsibility; they carry a rather conservative
5 profile and fear for new experiences or what is different. Also, this people would find it easier
6 to avoid present time rewards and temptations to fulfill their obligations, meet arrangements,
7 and conduct procedures, since their behavior is heavily influenced by guilt in case of not acting
8 in the already committed way. A positive aspect of past orientation is the remembrance of good
9 experiences that lead to a sense of rootedness and a stable sense of self as time passes.

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16 When inquiring about the problems related to the academic life, it becomes essential to mention
17 aspects related to motivation -set of processes involved in the activation, direction, and
18 persistence of behavior- (Moreno-Murcia *et al.*, 2015). Specifically, academic motivation is
19 the general process in which a behavior is oriented towards the achievement of an academic or
20 learning goal, involving cognitive and affective variables (Moreno-Murcia *et al.*, 2015).
21 Cognitive variables are linked to thinking skills and behaviors to achieve the proposed goals,
22 while affective variables involve self-worth or self-concept (Gil-López *et al.*, 2019).

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29 In the academic domain, it has been reported that students procrastinate less when they manifest
30 a determined intention to finish a school task (Lin & Bai, 2014), and when they have the habit
31 of thinking more carefully about what they are doing (Ferrari & Pychyl, 2012). However, a
32 clear difference between the numerous motivational processes involved has been reported.
33 Intrinsically motivated students -oriented towards the fulfillment of their goals for reasons
34 related to the interest in learning itself- and those who have higher self-efficacy beliefs, are less
35 likely to delay dedication to study, and instead, more willing to achieve learning of greater
36 depth than students motivated by extrinsic reasons -their main motivators are external aspects
37 such as grades- (Cerino, 2014). Pintrich *et al.* (1991) described a model in which academic
38 motivation is addressed from a three-dimensional approach that includes the components of
39 *expectation* -students' beliefs about their own abilities to perform an academic task-, of *value*
40 -students' goals of the and beliefs about the importance and interest for academic tasks-, and
41 of *affection* -students' emotional reactions to academic tasks-.

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3 A strong relationship between time perspective and academic motivation has been reported in
4 scientific literature (Andre *et al.*, 2018; Ilustrisimo, 2016; Pavliuk *et al.*, 2018; Peetsma *et al.*,
5 2017; Slijper *et al.*, 2016). A primacy of future time has been predominantly associated with
6 the fulfillment of long-term goals and plans, increased motivation, persevering and disciplined
7 behavior of subjects (Boyd & Zimbardo, 2005), greater cognitive control (Steindam, 2016) and
8 successful coping mechanisms (Bolotova & Hachaturova, 2013), which in sum has a positive
9 effect on academic performance and consequently on degree completion (Bukharina &
10 Tolstykh, 2019; Janeiro *et al.*, 2017; Phan, 2009; Steel *et al.*, 2018). Conversely, students that
11 are more past and present time orientated report less control of their own learning, postpone
12 academic tasks, and exhibit lower academic performance (Barnett *et al.*, 2020; De Bilde *et al.*,
13 2011; Horstmanshof & Zimitat, 2007; Kim *et al.*, 2017; Kooji *et al.*, 2018; Robles-Ojeda *et al.*,
14 2017).

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25 **Nonetheless**, past time perspectives influencing motivation and academic performance is not
26 so well documented. Some studies have indicated for instance that past academic experiences,
27 parental support, transmission of values related to knowledge acquisition, and how individuals
28 are introduced to formal education play a relevant role in understanding differences in how
29 students face academic challenges, and therefore in their academic performance (Alarcón-
30 Montiel *et al.*, 2019; Barber *et al.*, 2009; Boonk *et al.*, 2018; Garcia de Fanelli, 2014; Jan *et al.*,
31 2014). For instance, Alarcón-Montiel *et al.* (2019) argued that the habits of each student are
32 acquired within the family, since it has a preponderant role in teaching in the first years of life.
33 The main attitudes modeled directly or indirectly by parental figures were respect,
34 responsibility, effort, dedication, and the transmission of desire to excel. These attitudes were
35 accompanied by the parents' high valuation of school and studies. The transmission of these
36 values in some way seeks to guarantee that the children will be successful in the educational
37 environment.

48 **Current study**

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50 The purpose of this study was to expand upon research investigating the role of PP time
51 perspective in academic achievement and to test the possible mediation and moderation effects
52 that academic motivation and procrastination could have in this relationship. To do so, a
53 moderated mediation model was tested (Fig. 1) where PP time perspective would be positively
54 related to academic achievement in way that academic motivation would mediate that
55 relationship, that is that higher values on PP time perspective would positively correlate with
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3 academic achievement via higher levels of academic motivation. Also, the relationship between
4 academic motivation and academic achievement would be negatively moderated by
5 procrastination, in a way that at different values of academic motivation students would have
6 a differential academic performance in terms of levels of procrastination.
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10 For this study it was hypothesized that a) PP time perspective would be positively associated
11 with academic achievement; b) PP time perspective would be positively associated with
12 academic motivation; c) Academic motivation would mediate the association between PP time
13 perspective and academic achievement; and d) Procrastination would moderate the relationship
14 between academic motivation and academic achievement.
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25 *Note:* X = predictor; M = mediator; Y = outcome; W = moderator. One moderated mediation
26 model estimated the direct effect of PP time perspective on academic motivation (a -path),
27 direct effect of academic motivation on academic achievement (b -path), direct effect of PP
28 time perspective on academic achievement (c -path), and the indirect effect of PP time
29 perspective on academic achievement through academic motivation (c' -path). In the model,
30 procrastination was tested as a moderator of b -path.
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41 **Method**

42 *Participants*

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45 A total of 257 Psychology college students (137 women; 53.3%; 120 men, 46.7%) between the
46 ages of 18 and 44 years ($M = 23.61$; $SD = .57$), were recruited through volunteer sampling from
47 the undergraduate community of the Argentinian Catholic University. All the participants lived
48 in urban areas: City of Buenos Aires (93.7%) and its suburbs (6.3%). 46 students were coursing
49 the first year of the career (17.9%), 10 students were in second year (3.9%), 65 students were
50 in third year (25.3%), 51 students were in fourth year (19.8%), and finally, 85 students were in
51 the last year of the career (33.1%).
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Measures

Demographic and academic information: participants completed a questionnaire that collected information, such as age, gender, location, course of degree, year in which they had initiated the career, number of approved signatures.

Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999): brief local version by Germano and Brenlla (2020) was used to measure past-positive time perspective. The ZTPI consists of 29 items distributed among five subscales: Past-Negative scale (7 items, e.g., *I often think of what I should have done differently in my life*), Past-Positive (6 items, e.g., *I enjoy stories about how things used to be in good old times*), Present-Fatalistic (4 items, e.g., *Since whatever will be will be, it doesn't really matter what I do*), Present-Hedonistic (6 items, e.g., *Taking risks keeps my life from becoming boring*), and Future (6 items, e.g., *Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play*). The participants were asked to score on a five-point Likert scale the degree to which each statement referred to him/her (1 = Completely False, 5 = Completely True).

Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich *et al.*, 1991): local version by Rinaudo *et al.* (2003) was used to measure one of the two main scales of the instrument, being one motivation (31 items) and the second one, learning strategies (50 items). The scale of motivation is divided into six subscales: intrinsic goal orientation (4 items, e.g., *In a class like this, I prefer course material that really challenges me so I can learn new things*), extrinsic goal orientation (4 items, e.g., *Getting a good grade in this class is the most satisfying thing for me right now*), task value (6 items, e.g., *I think I will be able to use what I learn in this course in other courses*), control beliefs about learning (4 items, e.g., *If I study in appropriate ways, then I will be able to learn the material in this course*), self-efficacy for learning and performance (8 items, e.g., *I believe I will receive an excellent grade in this class*), and test anxiety (5 items, e.g., *When I take tests I think of the consequences of failing*). Participants were asked to respond to a series of statement concerning their motivation and attitudes towards a specific course that they had taken according to a 7-point Likert Scale (1 = strongly disagree, 7 = strongly agree).

Tuckman Procrastination Scale (TPS; Tuckman, 1990): the TPS is a one-dimensional measure of the tendency to waste time, postpone or delaying in doing things that should have been already finished. The local version by Furlan *et al.*, (2012) was used, which comprised of 15

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3 items (e.g., *I put off projects until the last minute; I frequently find myself putting important*
4 *deadlines off*). Participants were asked to rate with a 5-point Likert scale the degree of
5 frequency they would engage in the described behaviors (1 = Never, 5 = Always).
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10 11 *Procedure*

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13 Participants were contacted by an email advertisement in which the main purpose of the study
14 was explained; all of them were provided with the online versions of the techniques utilized
15 in this study along with an informed written consent that they had to accept prior to
16 answering any questionnaire. All participants were assessed from September to November of
17 2021. The research was conducted in accordance with the principles expressed in the
18 Declaration of Helsinki (World Medical Association [WMA], 2001). The average time for
19 survey completion was approximately 20 minutes.
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26 *Data analysis*

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28 A power analysis conducted in G*Power 3.1 determined that the sample size was adequate to
29 detect a small effect of partial R^2 increase of .05 (alpha = .05) with a power of .95 (Faul et al.,
30 2009). Descriptive analyses including means, standard deviations and frequencies were
31 calculated to characterize the sample and the assessed variables. Reliability of all measures
32 was estimated by Cronbach's Alpha and Composite Reliability (CR). To provide evidence of
33 convergent and discriminant validity of the measures, a series of procedures were conducted.
34 Average Variance Extracted (AVE) was checked with a threshold of acceptance of at .50 and
35 above (Fornell & Larcker, 1981). Discriminant validity was evaluated through the
36 Heterotrait-Monotrait ratio (HTMT), which has been found as an adequate to detect lack of
37 validity of measures, a cutoff value less than .85 should be confirmed (Henseler et al., 2015).
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39 To test the hypothesis formulated, analysis was conducted using IBM SPSS v.25 for
40 Windows employing regression analysis with bootstrapping method using Andrew F. Hayes
41 PROCESS macro (Hayes, 2018). Statistical significance was defined as a two-tailed p-value
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56 **Results**

57 *Preliminary analysis*

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The collected data was subjected to an Exploratory Factor Analysis (EFA) and to a Confirmatory Factor Analysis (CFA) to detect the existence of common method bias (CMB) that happens to be a rather frequent scenario in self-reported measures (Podsakoff et al., 2003, Krishnaveni & Deepa, 2013). Results obtained from the EFA revealed that the primary factor component only explained 11.74% of the variance, which is below the threshold of 50% variance according to Harman's single-factor test (Podsakoff et al., 2003). Furthermore, after conducting CFA to test whether the factors were related to the measures (Kline, 2010), results showed that the single-factor model did not fit data well, $\chi^2 = 6708.208$, $p < .001$, Goodness-of-Fit Index (GFI) = .597, Comparative Fit Index (CFI) = .434, Tucker-Lewis Index (TLI) = .413, Standardized Root Mean-square Residual (SRMR) = .095, Root Mean Square Error of Approximation (RMSEA) = .077. Therefore, CMB was not a concern in this study.

Table 1 shows the means, standard deviations, Cronbach's Alpha, Composite Reliability, Average Variance Explained, and correlation coefficients between all the variables assessed, however, only PP time perspective was contemplated in the model that tested in this study. Academic Achievement was positively correlated with past-positive time perspective and academic motivation, and negatively correlated with procrastination. Past-positive time perspective was positively correlated with academic motivation. Cronbach's Alpha and CR values met the acceptable level of .60 suggested (George & Mallery, 2003; Fornell & Larcker, 1981), which indicated that the measurement items have an adequate degree of internal reliability.

At the inspection of AVE values, it was found that only PP time perspective measure surpassed the recommended cutoff value of .50, while academic motivation and procrastination scales were below this value, ranging the AVE for these two measures between 40% and 49%. According to Fornell and Larcker (1981), the AVE may be a more conservative estimate of the measurement model's validity, and "on the basis of p_n (composite reliability) alone, the researcher may conclude that the convergent validity of the construct is adequate, even though more than 50% of the variance is due to error" (p. 46). Thus, since the CR of the considered measures were above the recommended level, the convergent validity of the instruments is acceptable.

The analysis for discriminant validity can be appreciated in table 2, where it has been confirmed that all values were below the cutoff criteria of .85, resulting in the fact that discriminant validity of the model has been established.

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15 *Testing for mediation model*

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17 The results of the mediation analysis are displayed in table 3. PP time perspective was
18 directly related to academic motivation ($\beta = .33, p < .001$) and was also significantly
19 associated with academic achievement ($\beta = 1.37, p < .001$). Academic motivation had a
20 positive effect on academic achievement ($\beta = 6.26, p < .001$). Additionally, the bootstrapped
21 95% confidence interval (CI) confirmed that the indirect effects of academic motivation in
22 the relationship between PP time perspective and academic achievement were statistically
23 significant (Effect = 1.37; SE = .28; LL CI = .82; UL CI = 1.93).
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33 [Place to insert table 3]
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38 *Testing for moderated mediation model*

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40 When the moderated mediation analysis was performed, academic motivation appeared to be
41 a significant mediator. Table 4 shows the results of the moderated mediation analysis
42 considering academic motivation as the mediator, and procrastination as the moderator in the
43 relationship between past-positive and academic achievement. The results suggested that the
44 interaction between academic motivation and procrastination was statistically significant for
45 past-positive ($< .01$). Thus, the effect of academic motivation on academic achievement was
46 moderated by the different levels of procrastination.
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52 The effect of academic motivation on academic achievement was examined by a simple main
53 effects analysis at 1SD above and 1SD below the mean of procrastination. At examining the
54 interaction plot (Fig. 2) academic achievement increased with academic motivation, however,
55 that increase was attenuated by procrastination. At the high level of procrastination (mean +
56 1SD), the main effect of academic motivation was not statistically significant, but it could be
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3 noted that a lower level of academic motivation was related to a lower level of academic
4 achievement ($\beta = .34, p = .45$). Furthermore, at the low level of procrastination (mean - 1SD),
5 the main effect of academic motivation on academic achievement was statistically significant.
6 Thus, the higher level of academic motivation was related to a higher level of academic
7 achievement ($\beta = 2.32, p < .001$). Although at a lower level of academic motivation the
8 academic achievement was higher for the high level of procrastination, at the comparison to
9 the low level of procrastination, the low level of procrastination gave a steeper line. When
10 academic motivation increased, the academic achievement increased further ($\beta = 1.33, p <$
11 $.001$).

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31 To evaluate the conditional indirect effect of the level of past-positive on academic
32 achievement via academic motivation, as a function of different ranges of procrastination, the
33 bootstrap method for analysis was used. Indirect effects at three levels of procrastination (1SD
34 above the mean, the mean, and at the 1SD below the mean) were examined by using 95% CIs
35 of the bootstrap method. As shown in Table 5, the conditional indirect effect on academic
36 achievement arose from past-positive via academic motivation. This effect changed according
37 to the range of procrastination and was its weakest at 1 SD above the mean of the
38 procrastination levels. These results indicate that the more aligned to a past-positive time
39 perspective a student is, the more likely they are to exhibit a high academic achievement.
40 Students with lower levels of procrastination who are more motivated can achieve a more
41 successful academic performance than those with higher levels of procrastination.
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53 **[Place to insert table 5]**

54 **Discussion**

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3 This study aimed to extend the investigation of time perspective on the academic field. Several
4 researchers have shown the importance of understanding students' time perspectives profiles
5 (Stolarski *et al.*, 2018; Witowska & Zajenkowski, 2021), however, most of these studies have
6 focused on future time perspective (Andre *et al.*, 2018; Jin *et al.*, 2019) or have totally excluded
7 the time perspective theory *per se*.
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12 To fulfill this goal a moderated mediation model was tested taking PP time perspective as the
13 main predictor of academic achievement via the mediation of academic motivation. Also, the
14 relationship of academic motivation and academic achievement was stated to be moderated by
15 procrastination. It was hypothesized that a) PP time perspective would be positively associated
16 with academic achievement; b) PP time perspective would be positively associated with
17 academic motivation; c) Academic motivation would mediate the association between PP time
18 perspective and academic achievement, and d) Procrastination would moderate the relationship
19 between academic motivation and academic achievement.
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27 Statistically significant relationships among the examined variables were found. On one side,
28 PP time perspective, academic achievement, and academic motivation were positively
29 correlated, which was expected considering the existent literature (Andre *et al.*, 2018; Barnett
30 *et al.*, 2020; Ilustrisimo, 2016; Kim *et al.*, 2017; Kooji *et al.*, 2018; Nausheen, 2016; Pavliuk
31 *et al.*, 2018; Peetsma *et al.*, 2017; Slijper *et al.*, 2016) and the theoretical implications that
32 recollecting one's past positive memories, especially if they are based on academic experiences
33 or events, could have on being academically motivated to accomplish academic goals. On the other
34 side, procrastination was negatively associated with academic achievement, but it did not
35 associate in a statistically significant way with PP time perspective and academic motivation
36 (yet it was still a negative relationship). This finding is in accordance with numerous studies
37 that support the negative impact that procrastination has on academic performance (Goroshit
38 & Hen, 2021; Kim & Seo, 2015; Klingsieck, 2013; Kljajic & Gaudrau, 2018; Steel, 2007).
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48 Results indicated that the relationship between PP time perspective and academic achievement
49 was mediated by academic motivation. Overall, the amount of variance explained by the model
50 when academic achievement was the outcome variable was higher at introducing academic
51 motivation (25%). This result may suggest that students higher in PP time perspective feel more
52 academically motivated, which implies higher levels of self-efficacy and control beliefs for
53 learning, intrinsic and extrinsic motivation, and being more appreciative of the academic tasks
54 they engage in, which ultimately would lead to a better academic performance in the long term.
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3 The socio-cognitive approach can also shed some light on these results, especially considering
4 the construct of self-efficacy, that is an agentic motivational orientation that leads to persistence
5 when facing difficulties, that increases intentionality and long-term planning, and builds up
6 self-regulation (Bandura, 2001). In the academic field, a student that believes in his or her
7 abilities and skills to acquire information and process it into knowledge has been proved to be
8 more successful in learning (Komarraju & Nadler, 2013; Razzaq *et al.*, 2018), leading to a
9 higher academic achievement (Malkoç & Kesen-Mutlu, 2018). Among the multiple aspects
10 that represent self-efficacy's information sources, past experiences have been reported to be a
11 better predictor of self-efficacy than more objective measures (Joët *et al.*, 2011). Another
12 possible explanation resides on the relationship that time perspective, especially past positive
13 time orientation, has exhibited with the ability of the individual to adjust to the environment,
14 develop proper coping mechanisms in the face of difficulties, potentiate psychological well-
15 being, and promote resilience (Ge *et al.*, 2020; Drake *et al.*, 2008; Dwivedi & Rastogi, 2017;
16 Lasota & Mroz, 2021; O'Neil *et al.*, 2020; Tomich *et al.*, 2021). It could be interpreted that
17 students that went through positive experiences in general, and more specifically within the
18 academic life, are more willing to be and feel competent enough to motivate themselves into
19 pursuing their academic goals, therefore, obtaining a higher academic performance.
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33 Another interesting result was that of procrastination partly moderating the relationship
34 between academic motivation and academic achievement. Mostly, at different levels of
35 procrastination, when academic motivation increased the academic achievement increased
36 further, which is consistent with previous literature (Akpur, 2017; Demir & Kutlu, 2018; Diaz-
37 Morales, 2019; Klassen & Kuzucu, 2009; Rasoli-Khorsidi *et al.*, 2019; Malkoç & Kesen-Mutlu,
38 2018; Seo, 2011). In both cases, at low and medium level of procrastination, the impact of
39 academic motivation on academic achievement was statically significant, that is, at low levels
40 of academic motivation students ranked their lower in academic performance, while, at high
41 levels of academic motivation students showed a higher academic achievement. Furthermore,
42 at the low level of academic motivation, students low in procrastination exhibited lower
43 academic achievement than students that scored medium in procrastination, but the effect on
44 the first one was larger. Nonetheless, at the highest level of procrastination, the impact of
45 academic motivation on academic achievement was not statistically significant. This result
46 could indicate that regardless of how motivated a student might be, when the habit of delaying
47 the fulfillment of tasks or making decisions is quite intense, the academic achievement would
48 not be highly altered. In line with several studies, it has been found that some forms of
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3 procrastination, such as active procrastination, may not have the negative impact in academic
4 aspects as it was initially thought (Chowdhury & Pychyl, 2018; Liu et al., 2017; Pinxten et al.,
5 2019; Sowon et al., 2017; Wessel et al., 2019). Moreover, it can be argued that the act of
6 delaying the fulfilment of assignments until deadlines are close or studying for a programmed
7 exam the last day might not necessarily impact negatively in the whole academic trajectory.
8 Students could perform not as well as expected but still maintain themselves in career by
9 approving assignments with at least the lower required grade.

16 **Limitations and recommendations**

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18 There are several limitations in this research. Firstly, a cross-sectional study design was
19 performed, so the results should be interpreted with caution. Future research should engage in
20 a longitudinal or experimental study design to expand these present findings. Secondly, the fact
21 that self-reported measures were employed could lead to an underestimation of the variables
22 that were tested, given that individuals tend to distort their responses in order to provide a better
23 image of themselves. Thirdly, the way academic achievement was operationalized in terms of
24 number of approved signatures by years that had passed since the student initiated the career
25 could not be the most adequate measure of academic performance, especially considering that
26 procrastination might not necessarily affects the approval of a signature but the delay in
27 fulfilling academic tasks. And fourthly, participants were recruited by a non-probabilistic
28 sampling method and only Psychology students were assessed, which can hardly be taken to
29 generalize these findings. Students from other careers should be evaluated in future studies.

39 **Conclusion**

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42 This study examined the mediated role of academic motivation in the relationship between PP
43 time perspective and academic achievement, and the moderating role that procrastination might
44 have on academic motivations predicting academic achievement.

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47 Correlation analyses revealed a positive and statistically significant association of academic
48 achievement was found between PP time perspective and academic motivation, and a negative
49 one with procrastination.

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52 Moderated mediation analyses revealed that academic motivation mediated the relationship
53 between PP time perspective and academic achievement, and that procrastination moderated
54 the relationship between academic motivation and academic achievement but only at the low
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and medium levels of procrastination, while at high levels of procrastination, the moderating effect was not significant.

These findings may increase the understanding of the role of other time perspectives and academic achievement, particularly among Psychology students, and have potential significant value for professors and psychologists, who could include the development of more adaptive time perspectives and balance them in their therapeutic work with students experiencing a shady view of their past or with lower levels of PP time perspective. Furthermore, prevention measures to promote positive experiences in the initial educational levels should be undertaken to develop motivation and competitiveness in students leading to higher education.

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