

POSITIVE EMOTIONS AND ACADEMIC PERFORMANCE

1 Linking positive emotions and academic performance: The mediated role of academic
2 psychological capital and academic engagement
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5 The present study examined the relationship between positive emotions and
6 academic performance, and the mediated role played by academic psychological
7 capital and academic engagement, in a sample of 497 Chilean high school
8 students. Participants' ages ranged from 14 to 17 years old, with a mean of 15.71
9 (SD = 1.15). Findings supported our hypothesized model that academic
10 psychological capital and academic engagement mediate the relationship between
11 positive emotions and academic performance (GPA). The proposed model has
12 theoretical implications for future research and practical implications for school
13 settings. The promotion of positive emotions in students is a relevant challenge
14 for principals, teachers, and parents in attempting to build academic
15 psychological capital and academic engagement, which in turn may lead to
16 higher academic performance.
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Keywords: positive emotions; academic psychological capital; academic
engagement; academic performance; high school students

Conflict of interest:

The authors declare that they have no conflicts of interest.

Introduction

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3 Interest in Positive Psychology and its applications in educational settings has
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5 grown exponentially in recent years (Stiglbauer, Gnambs, Gamsjäger, and Batinic,
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7 2013). Special attention has been paid to the way positive emotions shape academic
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9 engagement and performance (Linnenbrik–Garcia & Pekrun, 2011; Pekrun &
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11 Linnenbrik–Garcia, 2012). In addition, some scholars have found that psychological
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13 capital (PsyCap) –a concept that was initially examined in work settings, and
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15 simultaneously encompasses efficacy, optimism, hope, and resilience– may play an
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17 important role in facilitating desirable student outcomes (Luthans, Luthans, and Jensen,
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19 2012). However, studies in the field have mainly been conducted in undergraduate
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21 university students, and none of them have focused on its antecedents. Thus, more
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23 research is needed to assess: 1) the applicability of academic PsyCap in school settings
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25 and 2) the possible antecedents of academic PsyCap.
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32 The current study addresses both issues by proposing a theory–driven model –
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34 based on the broaden–and–build (or B&B) theory (Fredrikson, 1998) and the
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36 conservation of resources (or COR) theory (Hobfoll, 2002)– to examine how positive
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38 emotions predict the appearance of personal resources, such as academic PsyCap,
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40 which, in turn, enhances desirable outcomes such as academic engagement and
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42 academic performance. In other words, the aim of the study is to examine the indirect
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44 relationship between positive emotions and academic performance through sequential
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46 mediation by academic PsyCap and academic engagement, respectively. Providing
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48 empirical evidence about the possible antecedents of academic PsyCap and its
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50 applicability in a school setting may make an important contribution to understanding
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52 how high school students build personal resources, making it possible to develop
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evidence-based future interventions designed to enhance students' academic PsyCap and academic well-being.

Literature Review

Positive Emotions and the B&B Theory

Research on positive emotions has increased since the emergence of Positive Psychology, and a landmark in its development was the appearance of the B&B theory (Fredrikson, 1998). This theory specifies two main hypotheses: the "broaden hypothesis" and the "build hypothesis". According to the broaden hypothesis, positive emotions temporarily "broaden" people's attention and thoughts, giving them the capacity to access a wider range of ideas. In turn, and according to the second hypothesis, these broadened outlooks help people to discover and "build" important personal resources (Fredrikson, 2001).

The current study focuses on the second assumption of broaden-and-build theory. People who experience and express positive emotions show an increase in their personal resources and are more likely to function at optimal levels and show high performance (Fredrikson, 2013). For example, Oriol-Granado, Mendoza-Lira, Covarrubias-Apablaza, and Molina-López (2017) found that positive emotions influence self-efficacy and academic engagement, which, in turn, predict academic performance. Furthermore, Ouweneel, Le Blanc, and Schaufeli (2011) reported that students' experiences of positive emotions predict their future personal resources, such as optimism and hope, which, in turn, predict their future academic engagement. Finally, Salanova, Llorens, and Schaufeli (2011) found that efficacy beliefs reciprocally influence academic engagement indirectly through their impact on positive affect.

Taken together, empirical evidence shows that positive emotions can play a relevant role in explaining how students build their personal resources and, thus, seems

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1 to confirm the “build” hypothesis. The explanation here is that positive emotions are
2 associated with approach-oriented behavior (Elliot & Thrash, 2002). That is, when
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4 students are in a positive mood, they are more likely to explore novel situations, interact
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6 with other people, have higher expectations about attaining academic-related goals, and
7
8 pursue new goals (Carver, 2003).
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12 Despite the attention research has paid to examining how positive emotions are
13 associated with each individual dimension of PsyCap (e.g., efficacy: Oriol-Granado et
14 al., 2017; Salanova et al., 2011; hope, efficacy and optimism: Ouweneel et al., 2011),
15
16 there is limited research on the link between positive emotions and the entire higher-
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18 order PsyCap construct. That is, previous studies in the field have investigated PsyCap
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20 only partly and incompletely, which is an important limitation because PsyCap may
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22 have a different nomological network for each of its four components (Datu, King, and
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24 Valdez, 2016). In other words, it may be premature to consider that previous evidence
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26 about its individual components (i.e., efficacy, optimism, hope, and resilience) will be
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28 equivalent if we consider the entire PsyCap construct.
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36 Thus, based on Luthans and Youssef-Morgan (2017) and the aforementioned
37 research, we propose that positive emotions may be a key mechanism through which
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39 academic PsyCap operates.
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Academic PsyCap and the COR Theory

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46 PsyCap is an individual’s positive psychological state of development
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48 characterized by efficacy, optimism, hope, and resilience (Luthans, Youssef-Morgan,
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50 and Avolio, 2015). Efficacy refers to having enough confidence to accept and put in the
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52 necessary effort to succeed at challenging tasks. Optimism refers to making a positive
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54 attribution about succeeding now and in the future. Hope refers to persevering on goals
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56 and, when necessary, redirecting paths toward goals in order to succeed. Resilience
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1 refers to holding on and bouncing back, and even beyond, to attain success when facing
2 problems and adversity (Avolio & Youssef–Morgan, 2017).
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4 According to COR theory, resources do not exist in isolation because people try
5 to accumulate as many resources as possible (Hobfoll, 1989). An example of a
6 combination of personal resources (so-called resource caravans) is the PsyCap
7 construct. Previous research showed that it explains significant variance in desirable
8 psychological outcomes in work settings, such as job satisfaction, organizational
9 commitment, and citizenship (for a meta-analytic revision, see Avey, Reichard,
10 Luthans, and Mhatre, 2011). According to conservation of resources theory, this occurs
11 because a person who can draw on many resources has the ability to solve problems that
12 can arise in stressful situations, and s/he is likely to remain engaged during goal pursuit
13 (Hobfoll, 2002; Hobfoll, Halbesleben, Neveu, and Westman, 2018).
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28 Recently, the beneficial role of academic PsyCap in facilitating positive student
29 outcomes was reported. For example, Luthans et al. (2012) found a positive relationship
30 between academic PsyCap and academic performance in US university students. In a
31 similar sample, Riolli, Savicki, and Richards (2012) showed that academic PsyCap
32 mediated between stress and psychological symptoms. Liao and Liu (2015) reported a
33 positive relationship between academic PsyCap and competence in Chinese university
34 students. Also in a Chinese sample, Liu, Zhao, Tian, Zou, and Li (2015) reported a
35 positive relationship between academic PsyCap and academic adjustment. Finally, Siu,
36 Bakker, and Jiang (2014) established a reciprocal relationship between academic
37 PsyCap and academic engagement (i.e., vigor, dedication, and absorption). In a school
38 setting, Datu et al. (2016) reported that academic PsyCap improves motivation,
39 cognitive and affective engagement, and achievement in a sample of students from the
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Philippines. Finally, also in a Philippine sample, Datu and Valdez (2016) reported that academic PsyCap predicts flourishing, interdependent happiness, and positive affect.

Taken together, these studies show that academic PsyCap is a key resource that enhances students' ability to develop. The reason for this is that PsyCap facilitates positive cognitive appraisals of events and the processes necessary for attention, interpretation, and retention of positive and constructive memories that lead to well-being and success (Luthans & Youssef-Morgan, 2017). However, further research would make it possible to assess whether the PsyCap construct can be applied in a school setting, and examine –simultaneously– its possible antecedents (e.g., positive emotions) and consequences (e.g., academic engagement), as well as its role in objective measures of performance (i.e., GPA). These research efforts could expand the literature on academic PsyCap in the high school context and also contribute to the objective of the positive education, that is, education to achieve both traditional skills and for happiness (Seligman, Ernst, Gillham, Reivich & Linkins, 2009).

Academic Engagement

In previous research, school engagement –the engagement that occurs in a school setting– has typically been defined as a construct that includes behavioral, cognitive, and affective components (Fredricks, Blumenfeld, and Paris, 2004; Salmela-Aro, 2015). However, recent research in this area demonstrated that school engagement can also be considered an overall concept –called schoolwork or academic engagement– which refers to a positive, fulfilling, study-related state of mind characterized by vigor, dedication, and absorption (Schaufeli, Martinez, Marques-Pinto, Salanova, and Bakker, 2002).

Of these three dimensions, vigor refers to high levels of mental resilience while studying, a willingness to invest effort in one's schoolwork, and a positive approach

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1 (Schaufeli et al., 2002). Dedication is characterized by a sense of significance,
2 enthusiasm, pride, identification, and inspiration toward school, in addition to
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4 perceiving schoolwork as meaningful (Schaufeli et al., 2002). Absorption is
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6 characterized by behavioral accomplishments and flow-like experiences, such as being
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8 so fully immersed and happily engrossed in one's studying that time passes quickly
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10 (Schaufeli et al., 2002).
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14 Previous research conducted in high school populations has shown that this
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16 academic engagement approach –which was initially proposed as a work-related
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18 construct– is positively associated with self-esteem (Salmela-Aro & Upadyaya, 2012),
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20 self-efficacy (Salmela-Aro & Upadyaya, 2014), satisfaction with studies (Upadyaya &
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22 Salmela-Aro, 2014), and academic performance (Wang, Chow, Hofkens, and Salmela-
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24 Aro, 2015). In other words, personal resources –such as self-efficacy and self-esteem–
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26 foster academic engagement and have positive consequences for students, such as high
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28 academic performance and satisfaction. In addition, academic engagement is negatively
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30 associated with school burnout, study demands, and depressive symptoms (Salmela-
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32 Aro & Upadyaya, 2014).
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39 Although Schaufeli and colleagues' engagement approach has gained empirical
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41 support in school settings (see Salmela-Aro, 2015), little is known about its relationship
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43 with other constructs borrowed from the industrial-organizational context, such as
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45 academic PsyCap. In other words, the relationship between academic PsyCap and
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47 academic engagement has not been investigated. Providing empirical evidence about the
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49 relationship between these constructs is of interest because previous research in work
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51 settings has demonstrated that PsyCap is an important predictor of longitudinal changes
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53 in work engagement (Alessandri, Consiglio, Luthans, and Borgogni, 2018). This result
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55 could indicate –according to the previously mentioned research in school settings
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(Salmela–Aro & Upadyaya, 2014; Upadyaya & Salmela–Aro, 2014; Wang et al., 2015)– that PsyCap (a personal resource) operates as a facilitator of increased work engagement.

Present Study

The aim of the current study is to examine the indirect relationship between positive emotions and academic performance through sequential mediation by academic PsyCap and academic engagement, respectively. The line of reasoning is the following: When students experience positive emotions more often –according to B&B theory– they will probably report a large number of personal resources (in our case, academic PsyCap), and –according to COR theory– these PsyCap may facilitate students’ engagement with their academic tasks, which will probably be translated into better academic performance. In other words, positive emotions will help students to envision goals and challenges and open their minds to productive ways of thinking and problem–solving, thus making them feel more engaged in their studies and, hence, achieve higher academic performance (Pekrun, Goetz, Titz, and Perry, 2002).

Based on the arguments presented, we have specified and tested a structural equations model (Figure 1) that allows us to test the following hypothesis: Positive emotions are indirectly and sequentially associated with academic performance through academic PsyCap and academic engagement, respectively.

PLEASE INSERT FIGURE 1 OVER HERE

Method

Participants and Procedures

The sample comprised 497 (51% female) Chilean high school students. The

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1 students came from 36 classes in three different secondary schools (each of them hosted
2 approximately 500 students). They ranged from 14 to 17 years old ($M = 15.71$, $SD =$
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4 1.15). Of the 497 students, 16.5% ($n = 82$) were 14 years old, 29.4% ($n = 146$) were 15
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6 years old, 25.8% ($n = 128$) were 16 years old, and 28.3% ($n = 140$) were 17 years old
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8 when the data were collected.
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11 This study was part of a project designed to examine the role of non-intellectual
12 variables in academic performance, and it received approval from the Research Ethics
13 Committee of the host university. The study took place over 5 days in the middle of a
14 regular academic semester, and two trained administrators supervised it. The students
15 who agreed to participate in the study –after school principals and parents gave their
16 permission– were taken to a classroom where a computer was available containing the
17 questionnaire. Participants were encouraged to respond as truthfully as they could, and
18 they received assurance that their responses would be anonymous. They took about 20
19 minutes to fill out the questionnaire.
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Measures

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38 Positive emotions were measured using the Scale of Positive and Negative
39 Experiences (SPANE; Diener et al., 2010), adapted to the Chilean academic context
40 (author, 2018a). This scale includes 12 items that measure positive (six items) and
41 negative (six items) emotional experiences, rated on a scale of 1 (*very rarely or never*)
42 to 5 (*very often or always*). For the purposes of this study, only the positive feelings
43 subscale was used, and the scale instructions were adjusted by adding a specific
44 reference to the academic context (e.g., “My studies make me feel happy”). Cronbach’s
45 alpha for the overall scale was .92.
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57 Academic PsyCap was measured using the Psychological Capital
58 Questionnaire–12 (PCQ–12; Avey, Avolio, and Luthans, 2011), adapted to the Chilean
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1 academic context (author, 2018b). The Academic PCQ–12 contains 12 items that
2 measure the four dimensions of the PsyCap construct: (1) efficacy (e.g. “I feel sure
3 when sharing information about my studies with other people”); (2) hope (e.g. “Right
4 now I see myself as being pretty successful in my studies”); (3) optimism (e.g.
5 “Concerning my studies, I’m optimistic about what the future offers me”); and (4)
6 resilience (e.g. “I usually take the stressful aspects of my studies in stride”). Responses
7 were given on a Likert–type scale with scores from 1 (*strongly disagree*) to 6 (*strongly*
8 *agree*). Cronbach’s alpha for overall academic PsyCap was .85.

9 Academic engagement was measured using the student version of the Utrecht
10 Work Engagement Scale (UWES–9; Schaufeli, Bakker, and Salanova, 2006), adapted to
11 the Chilean context (Author, 2018c). This scale contained 9 items that measure the three
12 components of the engagement construct: vigor (e.g. “When I get up in the morning, I
13 feel like going to class”); dedication (e.g. “I’m enthusiastic about my studies”); and
14 absorption (e.g., “I get carried away when I am studying”). Participants gave their
15 responses on a Likert–type scale with scores from 0 (*never*) to 6 (*always*). In the present
16 study, we excluded the third dimension of engagement, absorption, because vigor and
17 dedication have been found to make up the core of engagement (Schaufeli & Salanova,
18 2007). Cronbach’s alpha for overall academic engagement was .83.

19 Academic performance was measured as the grade point average (GPA) in two
20 core subjects in the Chilean education program: math and language. The GPA ranged
21 from 1 (*poor*) to 7 (*excellent*). The GPA was recorded at the end of the semester, when
22 the data collection took place. Thus, each academic performance indicator covered the
23 period when the questionnaire was administered.

Data Analysis

24 First, to test for common method variance bias, we applied Harman’s single–

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1 factor test. Second, a confirmatory factor analysis (CFA) was specified to test the
2 proposed measurement structure underlying the data. Third, structural equation
3 modelling (SEM) analysis tested the structural relations in the hypothesized model. We
4 used maximum likelihood estimation methods, and we evaluated the goodness-of-fit
5 using: chi-square (χ^2) and normed chi-square (χ^2/df), Root-Mean-Squared Error of
6 Approximation (RMSEA), Comparative Fit Index (CFI), and Standardized Root Mean
7 Residual (SRMR). To help evaluate the cut-off point and ascertain model fit, we
8 followed previous recommendations from the European Journal of Psychological
9 Assessment (Schweizer, 2010). Fourth, to test indirect effects, we implemented the
10 bootstrap procedure with 5000 re-samples, constructing 95% bias-corrected and
11 accelerated (BCa) confidence intervals (CI).
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Results

Preliminary Analysis

31 Table 1 shows means, standard deviations, skewness, kurtosis, reliability, and
32 the relationship between study variables. Cronbach's alpha was satisfactory for all study
33 variables (i.e., $\alpha > .60$). However, in order to cross-validate our findings –following
34 Sijtsma (2009)– we also computed McDonald's omega reliability index, which
35 produced similar results. Moreover, Harman's single factor test reveals indicators under
36 the recommended fit standards (Table 3, M1). Thus, we concluded that it is unlikely that
37 bias due to common method variance may have affected the study results. In addition,
38 t-tests did not reveal any significant gender, age, or grade differences in the study
39 variables.
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Measurement and Structural Model

The measurement model (M2) consisted of four latent factors and 14 indicators. Specifically, positive emotions had six indicators (i.e., feeling positive, good, pleasant, happy, joyful, and contented); academic PsyCap had four indicators (i.e., efficacy, hope, resilience, and optimism); academic engagement had two indicators (i.e., vigor and dedication); and academic performance had two indicators (i.e., math performance and language performance).

PLEASE INSERT TABLE 2 OVER HERE

The results of the CFA showed an acceptable fit for the measurement model (see Table 3, M2). As Table 2 reveals, the factor loadings were statistically significant at $p < .001$, and they achieved the factor-loading criterion of .35 (Byrne, 2010). In addition, factor correlation estimates were statistically significant and in the expected direction.

Considering the acceptable fit of the measurement model (M2), we conducted a SEM analysis to test the hypothesized model. Results showed that the proposed model exceeded the recommended standards and provided a good representation of the sample relations (see Table 3, M3). Figure 2 displays this model with standardized regression weights. The significant direct path coefficients were: 1) from positive emotions to academic PsyCap ($\beta = .63, p < .05$), 2) from academic PsyCap to academic engagement ($\beta = .76, p < .05$), and 3) from academic engagement to academic performance ($\beta = .17, p < .05$). The figure shows the following non-significant direct path coefficients: 1) from positive emotions to academic engagement ($\beta = .02, p > .05$), 2) from academic PsyCap to academic performance ($\beta = .11, p > .05$), and 3) from positive emotions to academic performance ($\beta = .03, p > .05$). The proposed model explained significant proportions of variance in academic PsyCap (39%), academic engagement (56%), and academic performance (6%).

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4 **Test for Mediation**
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7 The significance of the indirect effect was determined at the level of .05 in this
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9 study; the indirect effect was considered statistically significant if the estimates of the
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11 95% CI did not contain zero. Supporting our hypothesis, we found a significant indirect
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13 effect from positive emotions to academic performance via academic PsyCap and
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15 academic engagement; $ab = .12$, $SE = .02$, BCa 95% CI [.08, .18].
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19 ***PLEASE INSERT FIGURE 2 OVER HERE***
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23 **Additional Analysis**
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26 In order to assess the plausibility of an alternative sequence, we tested an
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28 additional model (i.e., positive emotions → academic engagement → academic PsyCap
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30 → academic performance) because previous research has found reciprocal relations
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32 between PsyCap and engagement (Alessandri et al., 2018; Siu et al., 2014). Results did
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34 not support this alternative model because the direct effect from PsyCap to academic
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36 performance ($\beta = .10$, $p > .05$) was not statistically significant.
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42 **Discussion**
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45 This study and its findings are relevant in many ways. The theoretical
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47 contribution emphasizes the role of PsyCap and engagement in the positive emotions
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49 and performance relationships, whereas the practical contribution lies in focusing on the
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51 possible ways to increase the study variables through future evidence-based programs.
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53 In addition, although some limitations must be mentioned, this study's strongest point is
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55 that it allows us to propose suggestions for future research. We describe each one next.
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Theoretical Contribution

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3 First, consistent with previous research on the B&B theory (Fredrikson, 1998),
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5 we found that students who more frequently experienced positive emotions related to
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7 their studies were more likely to report higher levels of personal resources in the form
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9 of PsyCap (Oriol–Granado et al., 2017; Ouweneel et al., 2011; Salanova et al., 2011). In
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11 a similar vein, our findings confirmed that the academic PsyCap construct plays a key
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13 role in the educational setting. In addition, our results showed that positive emotions
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15 could be considered a key variable associated with academic PsyCap.
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19 Second, consistent with previous research on the COR theory (Hobfoll, 2002),
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21 we found that students who showed high levels of personal resources (academic PsyCap
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23 in our case) were more likely to show positive outcomes (Oriol–Granado et al., 2017;
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25 Ouweneel et al., 2011; Salanova et al., 2011). As a positive outcome, we considered
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27 academic engagement, which has recently been adapted from the organizational context
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29 (Schaufeli et al., 2002) to the school context (Salmela–Aro & Upadyaya, 2012). Thus,
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31 our findings showed that (academic) PsyCap can be considered a relevant personal
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33 resource in explaining academic engagement, which is consistent with prior research in
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35 the work setting emphasizing the role of PsyCap in work engagement (see Alessandri et
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37 al., 2018).
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41 Third, consistent with previous research on academic engagement, the results
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43 showed that students who experienced more vigor and dedication in their studies had a
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45 greater probability of achieving high academic performance (Salmela–Aro &
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47 Upadyaya, 2012). Furthermore, this result is consistent with extensive research that
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49 demonstrated a significant relationship between work engagement and job performance
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51 (see Schaufeli, 2017). Thus, academic performance was more effective when students
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1 had positive and active attitudes, with affect (dedication) and energy (vigor) in doing
2 their schoolwork.
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4 Fourth, consistent with previous cross-sectional, longitudinal, and experimental
5 research on the hypothesis that happiness precedes and leads to (academic) success (see,
6 Lyubomirsky, King, and Diener, 2005; Walsh, Boehm, and Lyubomirsky, 2018), we
7 found that students who experienced a higher frequency of positive emotions were more
8 likely –through academic PsyCap and academic engagement– to obtain high academic
9 performance. Thus, the results confirmed our hypothesized model, whereas an
10 alternative model in which the order of the two mediators was switched did not confirm
11 the sequential mediation effect. In addition, given that the introduction of academic
12 PsyCap and academic engagement reduced the direct effect of positive emotions on
13 academic performance to zero, we can conclude that academic PsyCap and academic
14 engagement fully mediated the relationship between positive emotions and academic
15 performance.
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33 Overall, our study’s contribution to the research on the association between
34 positive emotions and objective school performance is innovative because it emphasizes
35 the intermediate role of academic PsyCap and engagement.
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43 **Practical Implications**

44 The first practical implication of our study is related to the possible
45 consequences of increasing students’ positive emotions. Rather than focusing
46 exclusively on increasing knowledge and academic skills (i.e., academic performance),
47 our results suggest that teachers should also focus on students’ feelings. This focus on
48 increasing positive emotions will ultimately –through academic PsyCap and academic
49 engagement– translate into better academic performance. Along these lines, there are
50 several ways teachers can improve the frequency of positive emotions, for example, by
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encouraging students' capability and giving positive feedback about their effort.

Furthermore, teachers can demonstrate involvement (i.e., caring about and showing interest in the student), provide structure (i.e., setting clear rules and following through), and be supportive of autonomy (i.e., allowing students the freedom to make choices and identifying connections between academic work and students' interests). In other words, teachers can support the basic psychological needs of their students (Deci & Ryan, 2002).

Second, following the logic of our model, directly increasing academic PsyCap and/or academic engagement will also increase academic performance. Previous research has shown the possibility of developing PsyCap, focusing on the promotion of its four components (Luthans, Avey, and Patera, 2008; Luthans, Avey, Avolio, and Peterson, 2010). It would be interesting to analyze this possibility in a school context because, to date, there is no previous research in the field. Furthermore, based on the demands–resources model (Bakker & Demerouti, 2007), it is possible (and desirable) to provide a balance between study resources (e.g. social support) and study demands (e.g., homework overload) as a way to increase academic engagement and decrease academic burnout (see Hodge, Wright, and Bennett, 2017; Salmela–Aro & Upadyaya, 2014).

Third, the notion of crossover –the process that operates when a stressor or psychological strain experienced by one person affects the level of strain of another person in the same social environment– could be taken into account in order to provide the transferred emotions, PsyCap, and engagement levels among the students (see Westman, Etzion, and Chen, 2009; Westman, Shadach, and Keinan, 2013). For instance, Westman (2001) proposed that crossover mechanisms (i.e., direct, indirect, and spurious) can be applied to both negative and positive experiences and resources.

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1 Thus, just as strain in one partner may yield an empathic response in the other,
2 increasing his/her strain, the positive emotions, PsyCap, and engagement in one partner
3 may increase the other partner's engagement (Hobfoll et al., 2018).
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8 **Strengths, Weaknesses, and Suggestions for Future Research**

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11 The strong points of the current study are: first, it successfully integrates the
12 B&B theory and the COR theory, in that positive emotions lead to personal resources
13 (i.e., academic PsyCap), which, in turn, lead to academic well-being (i.e., academic
14 engagement); second, following the logic of our model, we have included an objective
15 measure of performance (i.e., GPA) as a consequence of academic engagement; and
16 third, the GPA was recorded when the semester ended, before the data were collected.
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26 However, there are some weaknesses that have to be acknowledged. First, this
27 cross-sectional study did not allow us to establish the causality of the phenomena
28 examined. In fact, for our model –with two mediators– we would need four
29 measurement points, coinciding with the temporal positioning of the constructs involved
30 in the proposed model. Despite this limitation, we proposed a theory-driven model
31 based on recent research with empirical support from cross-sectional, longitudinal, and
32 experimental studies (see Walsh et al., 2018). In addition, we tested an alternative
33 model, and the results did not support it. Second, the use of self-report psychological
34 measures may produce common method bias. Therefore, it would be necessary to
35 include different response formats (e.g., Likert scales and faces scales), media (e.g.,
36 computer and paper and pencil), and/or locations (e.g., different rooms or sites).
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53 However, we used Harman's single factor test and considered some procedural
54 remedies before data collection (see Podsakoff, Mackenzie, Lee, and Podsakoff, 2003).
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57 Thus, common method bias is unlikely.
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Finally, some avenues for future research can be mentioned. First, based on the substantial role played by interpersonal relationships in students' outcomes and experiences at school, positive emotions could be considered as a consequence of teacher–student relationships (see Cornelius–White, 2007; Roorda, Koomen Split, and Oort, 2011). Second, based on the crossover model (see Westman et al., 2009; 2013), teachers' own job–related positive emotions, PsyCap, and work engagement could be included in a comprehensive model by examining their role in the components of the proposed model. Third, because our results are consistent with previous research conducted in work settings, it is likely that we are dealing with a general psychological principle that is independent from the specific context. Thus, it would be interesting to examine our model in other settings, such as sports or voluntary work, in order to confirm its applicability. Fourth, these avenues could be examined from a longitudinal approach as a fruitful future line of research.

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Linking Positive Emotions and Academic Performance: The Mediated Role of Academic Psychological Capital and academic Engagement

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Richard Ferraro, PhD
Editor in Chief
Current Psychology

Dear Mr. Ferraro:

We want to thank reviewer # 2 for accepting our manuscript and reviewer # 3 for his/her stimulating comments. Based on these comments, we have prepared and uploaded a new version of our manuscript.

In this letter, we respond, point by point (*text in blue*), to all comments we received in the second round (*text in black*), indicating the changes we have made (use section/page/paragraph/line).

With these changes, we hope that we have adequately addressed all the reviewers' concerns.

1. Given that PsyCap is a more nuanced topic in school settings, providing a definition early on (perhaps in the opening paragraph) is recommended as well as a statement as to why examining this construct in earlier populations is necessary.

Authors' response: We have included a brief description of PsyCap (page 2, first paragraph).

2. Pg. 4 - It is important to note that not all theories suggest a positive relation between positive emotion and outcomes. Furthermore, several studies have also found no significant relations. Including contradictory or conflicting results would further strengthen Author's argument for the need to investigate emotions further.

Authors' response: Our study is based on B&B theory which has firmly established positive relationships between positive emotions and several positive outcomes, including academic performance (Fredrikson, 2013). Also, previous research has reported similar conclusions using cross-sectional, longitudinal, and experimental evidence (Lyubomirsky, King & Diener, 2005; Peñalver, Salanova, Martínez & Schaufeli, 2017; Walsh, Boehm & Lyubomirsky, 2018). We agree with the reviewer that some authors predict that low intensity positive emotions are positively related to achievement, and high intensity positive emotions are negatively associated with achievement (e.g., Valiente, Swanson & Eisenberg, 2012). However, the strength of our study is that it examines the direct/indirect effect between study-related positive emotions and performance via PsyCap and engagement, integrating B&B and COR theories. We think that including contradictory or conflicting results in relation to positive emotions distracts from our objective.

3. Pg 4 ln 17-24 - Please elaborate on this idea to clearly argue your point.

Authors' response: We have included an additional explanation in order to clarify our point (page 4, second paragraph).

4. Pg. 5 ln 1-3 - Please elaborate on the study mentioned. Which psychological outcomes? Are there more studies with the same/differing results?

Authors' response: We have included your suggestion by adding the specific outcomes. In addition, we mentioned that the cited study refers to a meta-analysis (page 5, first paragraph).

5. Pg 6 ln 1-7 - It is important to emphasize the significance here of studying this construct in a school setting as well as provide a justification for the particular age of interest.

Authors' response: We have included your suggestion (page 6, second paragraph).

6. Pg 6 - Fredricks' school engagement model has been commonly used. Please expand upon this newer definition of engagement and its better fit in your study.

Authors' response: We have included your suggestion by expanding the academic engagement definition based on Schaufeli and colleagues' definition (page 6, third paragraph).

7. Authors should note age/population when discussing studies to verify the lack of empirical studies of these constructs in earlier populations.

Authors' response: We have added some information clarifying that the cited studies were conducted in high school populations (page 7, second paragraph).

8. Pg 7 ln 9-17 - I am confused by this statement made here as earlier on you state that "Siu, Bakker, and Jiang (2014) established a reciprocal relationship between academic PsyCap and academic engagement. In a school setting, Datu et al. (2016) reported that academic PsyCap improves motivation, academic engagement, and achievement in a sample of students from the Philippines. Finally, also in a Philippine sample, Datu and Valdez (2016) reported that academic PsyCap predicts academic engagement, flourishing, interdependent happiness, and positive affect." Please clarify.

Authors' response: We agree with the reviewer that the idea could be confusing. So, we modified the text in order to clarify it (page 7, third paragraph). More specifically, the detailed explanation is the following: Siu, Bakker, & Jiang (2014) established a reciprocal relationship between academic PsyCap and academic engagement following Schaufeli and colleagues' approach (i.e., vigor, dedication, and absorption) in an undergraduate university student sample. In addition, Datu, King, & Valdez (2016) and Datu & Valdez (2016) found positive relationships between PsyCap and engagement following Fredrick's engagement approach (i.e., affective and cognitive engagement). Thus,

we affirm that Schaufeli and colleagues' approach to engagement has not previously been related to PsyCap in high school student samples.

9. Pg 7 ln 19-27 - Authors are encouraged to further build and support their argument by discussing theory or the mechanism in which PsyCap is related longitudinal changes in work engagement and how that may translate to academic engagement.

Authors' response: We have included your suggestion, supporting our argument with previous research that reports direct relationships between personal resources and academic engagement in school settings (page 7, third paragraph).

10. Authors are asked to also include measures known psychometric properties. Please elaborate on what is meant by "adapted to the academic context" and provide example. What do Authors mean by "and included at least three partial evaluations"?

Authors' response: We provide Cronbach's alpha and McDonald's omega reliability indexes (table 1). We also provide examples for each scale used (measures section), and we describe –for the SPANE– that the academic adaptation included a specific reference to academic contexts. In addition, we provide evidence for both the measurement and structural models (page 11, third paragraph), following previous recommendations (Schweizer, 2010). Moreover, we add the reference (author, 2018) for each scale administered. Finally, we agree with the reviewer that the idea “included at least three partial evaluations” is confusing, and so we have eliminated it.

11. Were results similar when absorption was included in the model. Was absorption highly correlated with the two other engagement variables? How did the study cited justify its exclusion?

Authors' response: The exclusion of the absorption dimension was conducted before the data collection because there was strong pressure to administer a short questionnaire. Therefore, we cannot include it when examining our model. The justification for excluding this dimension was based on previous evidence suggesting that absorption plays a slightly different role and might be considered a consequence of core engagement (i.e., vigor + dedication) rather than a constitutive component (Bresó, Schaufeli, & Salanova, 2011; Salanova, Llorens, Cifre, Martinez, & Schaufeli, 2003). Despite this explanation –looking back– it would have been interesting to consider all three dimensions of engagement in order to provide more empirical evidence about the aforementioned reasoning.

12. My main concern is that there was no discussion of ICCs and the potential of clustering by class. Did Authors find low ICCs for key study variables (no evidence of clustering)? Did I miss this? If not, multilevel analyses may be more appropriate in this scenario.

Authors' response: We agree with the reviewer. It would have been interesting to perform a multilevel analysis. However, this is far from the objective of our research and was not considered at the time of data collection.

13. Additionally, were there any significant gender or grade level differences among study's key variables? Did Authors control for sex, age, or other important variables in their model? Why/Why not?

Authors' response: In the present study, we did not find any statistically significant differences between groups. Thus, we do not examine our model by controlling for gender, age, or grades. We included a related sentence (page 11, second paragraph).

14. Pg 16 ln 9 -32 - I found Authors development of crossover a little hard to follow. Please clarify.

Authors' response: We have clarified it (page 16, second paragraph).

Table 1
Mean (M), Standard Deviation (SD), Skewness, Kurtosis, Omega (Ω) and Alpha (α) Indexes, and Correlations for the Study Variables

	M	SD	Skewness	Kurtosis	Ω	α	1	2	3	4
1. Study-related positive emotions	3.66	.88	-.51	-.19	.82	.92	–			
2. Academic PsyCap	3.50	.70	-.43	-.01	.85	.85	.53**	–		
3. Academic engagement	3.01	.82	-.14	-.29	.82	.83	.42**	.59**	–	
4. Academic performance	5.83	.44	-.24	-.52	na	na	.16**	.22**	.17**	–

Note: ** = $p < .001$; na = not applicable.

Table 3 Results from SEM analysis

	χ^2	<i>df</i>	χ^2/df	CFI	RMSEA	90% CI RMSEA	SRMR
M1 Harman's single factor test	1302.32	80	16.91	.68	.17	[.17, .18]	.120
M2 Structural model	277.45	71	3.90	.94	.07	[.06, .08]	.049
M3 Proposed model	277.45	71	3.90	.95	.07	[.06, .08]	.050

Notes: * = $p < .001$; χ^2 = Chi-square; *df* = degree of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; CI: confidence interval; SRMR = Standardized Root Mean Square Residual.

Table 2
Standardized factor loadings and correlations from the measurement model

Indicators	Factor A Study-related Positive Emotions	Factor B Academic PsyCap	Factor C Academic Engagement	Factor D Academic Performance
1-positive	.79**			
2-good	.80**			
3-pleasant	.79**			
4-happy	.86**			
5-joyful	.83**			
6-contented	.83**			
7-efficacy		.61**		
8-hope		.79**		
9-optimism		.60**		
10-resilience		.71**		
11-vigor			.70**	
12-dedication			.94**	
13-Math				.95**
14-Language				.80**
Factor correlations				
Factor A	—			
Factor B	.63**	—		
Factor C	.46**	.74**	—	
Factor D	.17**	.25**	.27**	—

Note: ** = $p < .001$.

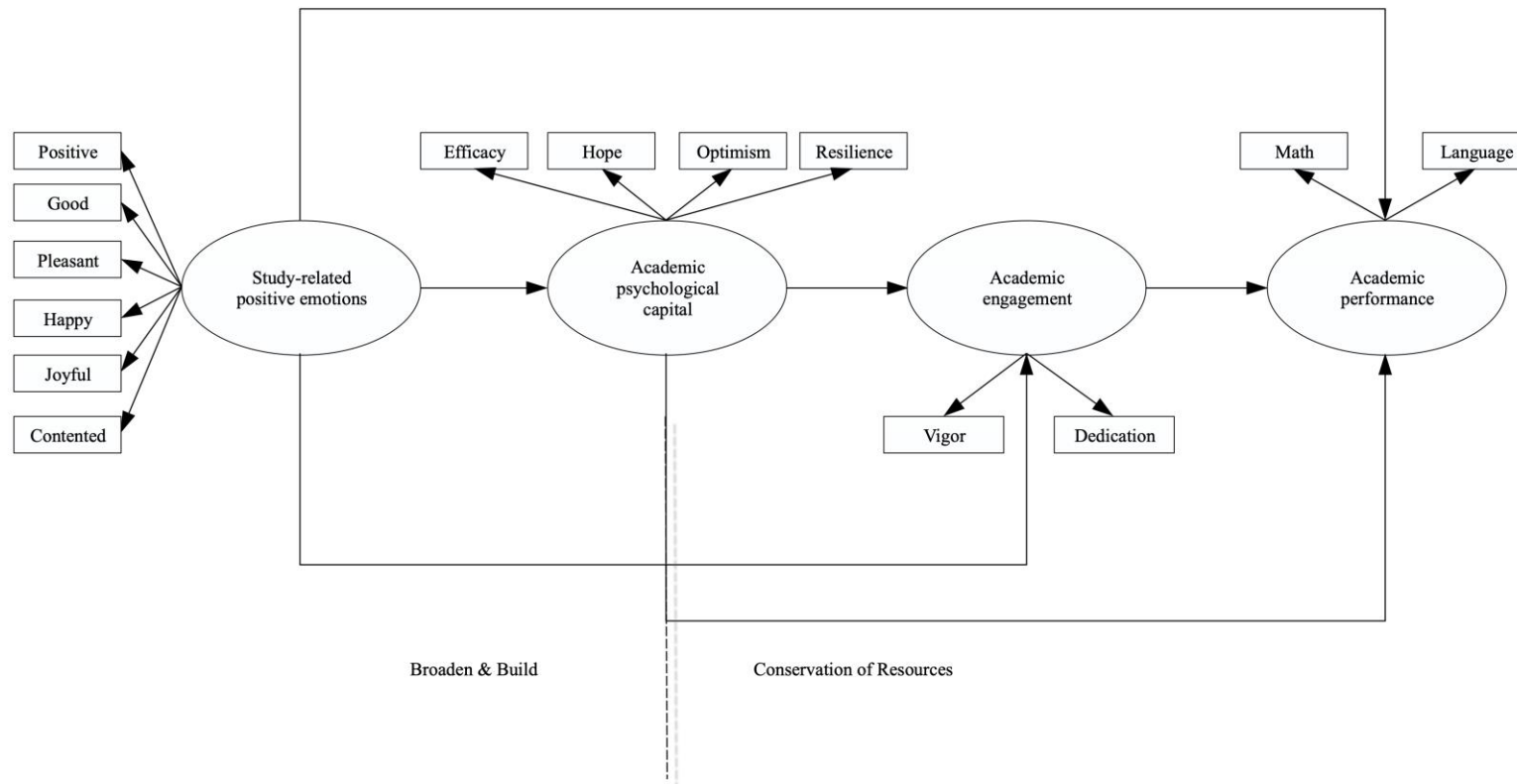


Figure 1. Theory-driven proposed model.

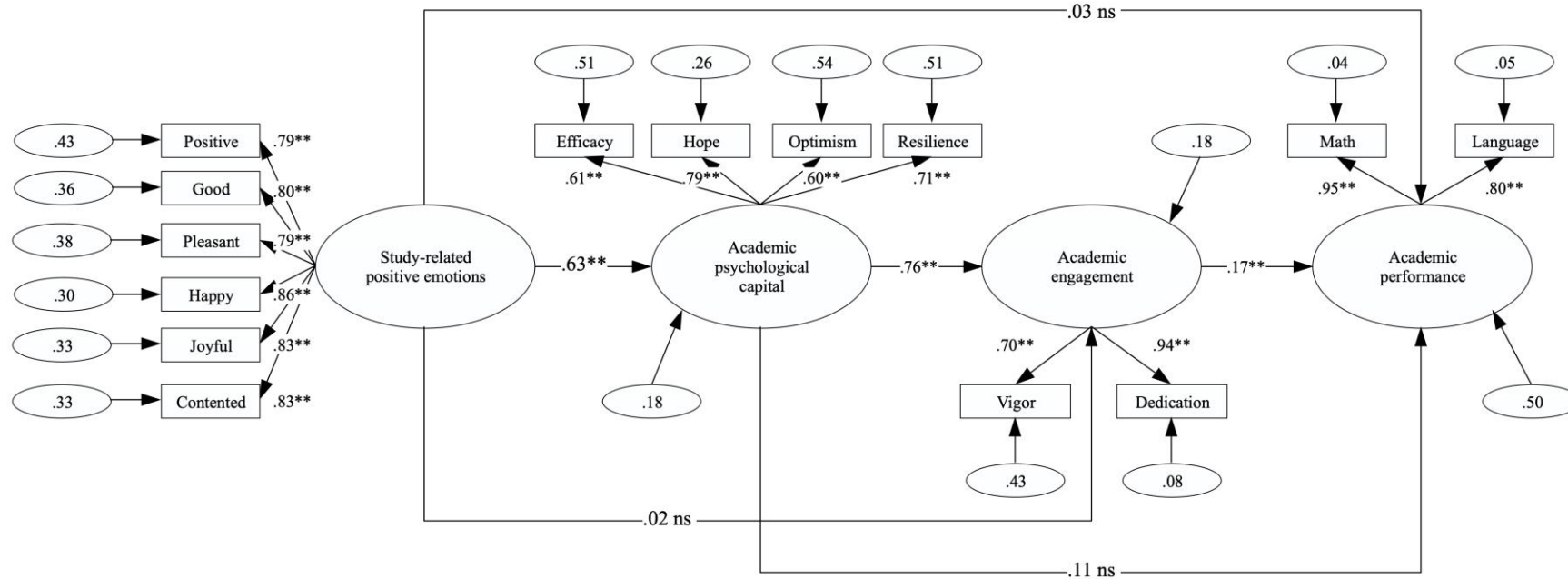


Figure 2. Results for SEM analysis. Numbers next to the arrows represent the standardized direct effects of all the latent variables in the model. ** = $p < .001$. Numbers inside circles represent the estimated error of each variable. ns = $p > .05$.