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## How Psychological Capital Mediates Between Study-Related Positive Emotions and Academic Performance

--Manuscript Draft--

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<b>Abstract:</b>	<p>The present study, based on broaden-and-build theory, examines the relationship between study-related positive emotions and academic performance, and the mediating role of psychological capital in this relationship. A sample of 639 Chilean high school students between 14 and 17 years old was used. Through structural equation modelling (SEM), -as hypothesized- a statistically significant indirect effect was found between study-related positive emotions and academic performance via psychological capital. Students' study-related positive emotions were related to better academic performance through positive relationships with their levels of psychological capital (i.e., efficacy, hope, optimism, and resilience). Theoretical and practical implications of the results are discussed, limitations are mentioned, and future research directions are proposed.</p>

Running Head: POSITIVE EMOTIONS, PSYCHOLOGICAL CAPITAL AND ACADEMIC PERFORMANCE

**How Psychological Capital Mediates Between Study-Related Positive Emotions and Academic**

**Performance**

Abstract

The present study, based on broaden-and-build theory, examines the relationship between study-related positive emotions and academic performance, and the mediating role of psychological capital in this relationship. A sample of 639 Chilean high school students between 14 and 17 years old was used. Through structural equation modelling (SEM), –as hypothesized– a statistically significant indirect effect was found between study-related positive emotions and academic performance via psychological capital. Students' study-related positive emotions were related to better academic performance through positive relationships with their levels of psychological capital (i.e., efficacy, hope, optimism, and resilience). Theoretical and practical implications of the results are discussed, limitations are mentioned, and future research directions are proposed.

Keyword: positive emotions; psychological capital; academic performance

Running Head: POSITIVE EMOTIONS, PSYCHOLOGICAL CAPITAL AND ACADEMIC PERFORMANCE

1 The recent shift from a negative perspective focused on problems and deficits to a more positive  
2 perspective focused on strengths and personal resources has aroused considerable attention in educational  
3 research (Seligman, Ernst, Gilham, Reivich & Linkins, 2009; Stiglbauer, Gnambs, Gamsjäger & Batinic, 2013).  
4 In this context, psychological capital (PsyCap) has begun to be assessed in educational settings (Datu, King &  
5 Valdez, 2016; Luthans, Luthans & Jensen, 2012; Siu, Bakker & Jiang, 2014; You, 2016). However, previous  
6 studies focused only on academic outcomes, and not on their antecedents. The broaden-and-build theory (B&B;  
7 Fredrikson, 1998; 2001) offers a conceptual framework with which to understand how the experience of positive  
8 emotions may explain the presence of students' PsyCap (and other personal resources) and its direct and indirect  
9 impact on academic performance. However, we know very little about the interactions among these variables.  
10 The present study examines the mediator role of psychological capital between study-related positive emotions  
11 and academic performance in a sample of Chilean high school students.  
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### 22 **Positive Emotions and the B&B Theory**

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24 Positive emotions are brief, multisystem responses to some change in the way people interpret or  
25 appraise their current circumstances (Fredrikson, 2013). They arise when this multisystem registers good  
26 prospects or good fortune. B&B theory describes how positive emotions broaden awareness and helps to build  
27 (personal) resources (Fredrikson, 1998). The main assumption of B&B theory is that positive emotions expand  
28 the array of thoughts, actions, urges, and dispositions that spontaneously come to mind (Fredrikson, 1998;  
29 2001). That is, under the influence of positive emotions, people have greater perceptual access, wider semantic  
30 reach, more inclusive and connected social perceptions, and more relaxed and expansive bodily behaviour  
31 (Fredrikson, 2013). In addition, the function of the expansive form of positive emotions is to spur the  
32 development of personal resources, placing people on positive trajectories of growth (Fredrikson, 1998; 2001;  
33 2013). In other words, by experiencing positive emotions, people will enhance their personal resources, which  
34 in turn, may lead to a more enduring positive state of well-being and future positive outcomes (Fredrikson,  
35 2013; Fredrikson, Tugade, Waugh & Larkin, 2003; Lyubomirsky, King & Diener, 2005; Mauss et al., 2011).  
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48 The current study is based on this assumption of the B&B theory, which is referred to as the "build  
49 hypothesis". This hypothesis states that the role of positive emotions is to build personal resources and produce  
50 well-being. Previous research has confirmed the association between positive emotions and personal resources.  
51 For example, using a diary study with university professors, Ouweneel, Le Blanc, Schaufeli & van Wijhe (2012)  
52 found that positive emotions predicted hope, which, in turn, was related to work engagement. Salanova, Llorens  
53 & Schaufeli (2011), in two longitudinal studies with professors and students, reported that their beliefs of  
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efficacy and engagement influenced each other through experiencing positive emotions. Xanthopoulou, Bakker, Demerouti & Schaufeli (2012) carried out a diary study showing that work resources influence personal resources through positive emotions. Using an undergraduate sample, Rogaten & Moneta (2015) found a reciprocal relationship between positive emotions and creative cognition. Finally, Ouweneel, Le Blanc & Schaufeli (2011), in a longitudinal study with university students, showed that positive emotions predicted efficacy, hope and optimism, and these factors, in turn, predicted the components of academic engagement. Taken together, these empirical findings illustrate that the experience of positive emotions is important for understanding the emergence of personal resources.

### **Psychological Capital**

Based on B&B theory (Fredrikson, 1998) and Conservation of Resources (COR) theory (Hobfoll, 2002), Luthans & Youssef–Morgan (2017) refer to PsyCap as a positive personal resource. PsyCap is defined as an “individual’s positive psychological state of development characterized by: (1) having confidence (efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (2) making a positive attribution (optimism) about succeeding now and in the future; (3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and (4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resilience) to attain success” (Luthans, Youssef–Morgan & Avolio, 2015, p. 2). Although efficacy, optimism, hope, and resilience are conceptually distinct, these four components share common variance and are part of a synergistic set of resources consistent with the notion of *resource caravans* (Hobfoll, 2002). That is, these four components of PsyCap may “travel together” and interact synergistically to produce differentiated manifestations over time and across contexts (Luthans & Youssef–Morgan, 2017).

Although considerable research about PsyCap has been carried out in industrial–organizational settings, some scholars argue that there are strong theoretical reasons to propose that PsyCap could also play a key role in the educational context (Datu et al., 2016; Siu et al., 2014). In addition, it has been proposed that previous research about its individual components (i.e., efficacy, optimism, hope, and resilience) may differ from research on a higher–order construct such as PsyCap (Datu et al., 2016). In this regard, recent research has assessed PsyCap at pre–professional levels (i.e., high school and undergraduate university students), finding direct associations with academic performance (Datu et al., 2016; Liao & Liu, 2016; Vanno, Kaemkate & Wongwanich, 2014), intrinsic motivation (Siu et al., 2014), learning empowerment (Liao & Liu, 2016; You, 2016), study engagement (Datu & Valdez, 2016; Datu et al., 2016; Luthans et al., 2012; Siu et al., 2014; You, 2016), and student well–being (Datu & Valdez, 2016).

### **The Mediating Role of PsyCap Between Study-related Positive Emotions and Academic Performance**

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2 Previous research has shown that study-related emotions influence students' learning and achievement  
3 (Villavicencio & Bernardo, 2012; 2013). As B&B theory predicts, the effect of positive emotions on academic  
4 performance is mediated by cognitive-motivational variables (Pekrun, 1992; Pekrun, Goetz, Titz & Perry,  
5 2002). Based on B&B theory, we propose that PsyCap (a cognitive-motivational variable) is fostered by study-  
6 related positive emotions. This conjecture is supported, as mentioned above, by research that has demonstrated  
7 the relevance of positive emotions in the prediction of different personal resources (Ouweneel et al., 2011;  
8 Ouweneel et al., 2012; Salanova et al., 2011; Rogaten & Moneta, 2015; Xanthopoulou et al., 2012) and research  
9 that identifies PsyCap as a predictor of academic performance (Datu et al., 2016; Liao & Liu, 2016; Vanno et  
10 al., 2014). According to COR theory (Hobfoll, 1989), these results can be explained by the accumulation of  
11 psychological resources, which may promote positive outcomes such as higher academic performance. In  
12 addition, some research about individual components of PsyCap conducted in academic settings showed their  
13 relevance in a variety of school-related variables (Bong, 2011; Gallagher, Marques & Lopez, 2016; Hoy, Tarter  
14 & Hoy, 2006; Jiang, Song, Lee & Bong, 2014; Rand, Martin & Shea, 2011; Snyder et al., 2002).

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28 In sum, the proposed mediation occurs because study-related positive emotions may facilitate the  
29 building of PsyCap, and in turn, these "resource caravans" would foster academic performance.

#### **Present Study**

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34 The objective of this study is to investigate possible antecedents of PsyCap in an academic setting, and  
35 to provide empirical evidence on its role as a mediator between study-related positive emotions and academic  
36 performance. Based on the line of reasoning presented in the preceding paragraphs, the following hypothesis is  
37 formulated: PsyCap mediates the relationship between study-related positive emotions and academic  
38 performance.  
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#### **Method**

##### **Sample and Procedure**

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48 The sample comprised 639 high school students attending three private educational institutions in Chile  
49 (each of them hosts approximately 700 students). Participants ranged in age from 14 to 17 years, and 51% of the  
50 sample were female. Of the 639 students, 30% were 14 years old, 18% were 15 years old, 30% were 16 years  
51 old, and 22% were 17 years old at the time of data collection.  
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procedure. Each student had a computer where the questionnaires were uploaded on a website especially designed for the research. Students took around 25 minutes to answer the questionnaire, and the data compilation took two weeks.

## Measures

*Study-related positive emotions* were measured using six items corresponding to two scales of positive emotions, 3 items on low-activation and 3 items on high-activation, from the *Job-related Affective Well-being Scale* (Van Katwyk, Fox, Spector & Kelloway, 2000), adapted to the academic context. Students answered using a Likert-type scale with scores from 1 (*never*) to 5 (*always*), reflecting how they feel about their studies. The adaptation of the items from the labour context to the academic context consisted of rewording the original reference to the job context (for example, “my job makes me feel at ease”) to refer to the academic context (for example “my studies make me feel at ease”).

*Psychological capital* was measured using an adaptation of the *Psychological Capital Questionnaire* (Avey, Avolio & Luthans, 2011) to the academic context. This questionnaire has 12 items that measure the four dimensions of the PsyCap construct on a Likert-type scale with scores from 1 (*totally disagree*) to 6 (*totally agree*): (1) three items correspond to the efficacy dimension (e.g. “I feel sure when sharing information about my studies with other people”); (2) two items correspond to the optimism dimension (e.g. “Concerning my studies, I’m optimistic about what the future offers me”); (3) four items correspond to the hope dimension (e.g. “Right now I see myself as being pretty successful in my studies”); and (4) three items correspond to the resilience dimension (e.g. “I usually take the stressful aspects of my studies in stride”).

*Academic performance* was measured using the grade point average (GPA) provided by the educational institutions in two mandatory subjects in the Chilean education curriculum: maths and language/communication. The former includes content structured on four axes of evaluation: numbers, algebra, geometry, and data and probability. The latter includes contents structured on three axes of evaluation: oral communication, reading, and writing. According to the Chilean grading system, GPAs ranged from 1 (*poor*) to 7 (*excellent*). Both subjects are offered by semesters (March–June and July–November), with a total of six hours per week. For the objective of this study, the GPA was registered at the end of the semester before the data collection.

## Data Analysis

Preliminary analysis included means, standard deviations, and bivariate correlations conducted by IBM SPSS Statistics 21.0 and the omega index (McDonald, 1999) by MPLUS 7.1. The subsequent analysis was performed with AMOS 21.0. First, to examine the common method variance bias, Harman’s single factor test

1 was used (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Second, a SEM analysis was conducted to find out  
2 the structural relations in the hypothesized model (i.e., positive emotions → PsyCap → academic performance).  
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4 We used maximum likelihood estimation methods, and the input for each analysis was the covariance matrix of  
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6 the items. The goodness-of-fit of the model was evaluated using absolute and relative indexes: chi-square ( $\chi^2$ )  
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8 and normed  $\chi^2$ , Root-Mean-Squared Error of Approximation (RMSEA) with a confidence interval (90%),  
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10 Incremental Fit Index (IFI), Comparative Fit Index (CFI), Standardized Root Mean Residual (SRMR), and  
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12 Akaike Information Criterion (AIC). To help evaluate the cut-off and determine model fit, we followed the  
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14 guidelines published by the European Journal of Psychological Assessment (EJPA; Schweizer, 2010) and  
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16 previous recommendations (Schreiber, Nora, Stage, Barlow & King, 2006). Third, we tested the statistical  
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18 significance of the indirect effects by computing the bias-corrected and accelerated method (BCa) around the  
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20 indirect effect obtained from a bootstrapping analysis. Finally, additional analysis was performed taking into  
21  
22 account gender and age as control variables and an alternative direction of the flow model (i.e., PsyCap →  
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24 positive emotions → academic performance); in addition, the mediating role of the PsyCap components takes  
25  
26 into account high and low activation of the study-related positive emotions.

## 27 28 **Results**

### 29 30 **Preliminary Analysis**

31  
32 Table 1 shows means, standard deviations, the omega index, and correlational coefficients among the  
33  
34 variables. The internal consistencies obtained for the scales used was good, and the pattern of correlations  
35  
36 revealed significant direct relationships for all measures in this sample.  
37

38  
39 The results of Harman's single factor test (see Table 2, M1) obtained a fit index under the  
40  
41 recommended fit standards (Schreiber et al., 2006; Schweizer, 2010), which means that this bias is not likely to  
42  
43 affect the research data. Therefore, the variance in the variables may be due to the psychosocial constructs being  
44  
45 evaluated and not to the evaluation method.

46  
47 INSERT TABLE 1 OVER HERE

### 48 49 **Structural Equation Modelling**

50  
51 Study-related positive emotions, PsyCap, and academic performance are represented as latent variables  
52  
53 in the structural model (Figure 1). Specifically, study-related positive emotions have two indicators, i.e., high-  
54  
55 activation and low-activation; PsyCap has four indicators, i.e., efficacy, optimism, hope and resilience; and  
56  
57 academic performance has two indicators, i.e., maths performance and language/communication performance.  
58  
59 The goodness of fit indices for our represented model (see Table 2 M2) reached the recommended standard  
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(Schreiber et al., 2006; Schweizer, 2010), explaining 57.2% of the PsyCap variance and 13.0% of the academic performance variance.

INSERT TABLE 2 OVER HERE

### Mediation Analysis

Mediation involves a relationship in which an independent variable (X) impacts on a mediator (M), which, in turn, impacts on a dependent variable (Y). One can say that a relationship is mediated if: X is significantly related to M (testing for a); M is significantly related to Y after controlling for X (testing for b); and the indirect effect is statistically significant (testing for ab; MacKinnon, 2008). In addition, full mediation occurs when the introduction of the mediator M reduces the direct effect of X on Y to zero (i.e., non-significant direct effect), and partial mediation occurs when the introduction of the mediator M does not completely reduce the direct effect of X on Y (i.e., significant direct effect).

To examine the mediating role of PsyCap in our model (i.e., study-related positive emotions → PsyCap → academic performance), we implemented the bootstrapping procedure, one of the most valid and powerful methods for testing intervening variable effects (Williams & MacKinnon, 2008). By following Hayes' (2009) recommendations, 5000 new samples were taken from our sample, and indirect effects were calculated. The results of this analysis led us to conclude that: study-related positive emotions are significantly related to PsyCap;  $a = .75$ ;  $SE = .03$ ; 95% BCa CI [.69, .81]; PsyCap is significantly related to academic performance after controlling for study-related positive emotions:  $b = .34$ ;  $SE = .11$ ; 95% BCa CI [.08, .52]; study-related positive emotions are not significantly related to academic performance:  $c = .02$ ;  $SE = .12$ ; 95% BCa CI [-.21, .28]; and the indirect effect between study-related positive emotions and academic performance, via PsyCap, is statistically significant:  $ab = .25$ ;  $SE = .08$ ; 95% BCa CI [.06, .40]. Therefore, we can conclude that PsyCap fully mediates the relationship between study-related positive emotions and academic performance.

INSERT FIGURE 1 OVER HERE

### Additional Analysis

As gender and age were significantly associated with study-related positive emotions and PsyCap, the analysis was performed again with these two control variables (see Table 2, M3). This did not alter the results, with minimal changes in parameter estimates and explained variance in academic performance, and indirect significant effect was confirmed ( $ab = .28$ ;  $SE = .04$ ; 95% BCa CI [.21, .36]).

In order to assess the plausibility of the reverse order (i.e., PsyCap → study-related positive emotions → academic performance), an alternative model was run in which PsyCap acted as the predictor of academic



performance, and study-related positive emotions were specified as the mediator. Results did not support this alternative model, as the indirect effect of PsyCap on academic performance through study-related positive emotions was not statistically significant ( $ab = .01$ ;  $SE = .09$ ; 95% BCa CI  $[-.16, .21]$ ).

Subscale analysis of the study-related positive emotions revealed a significant indirect effect between high activation ( $ab = .22$ ;  $SE = .03$ ; 95% BCa CI  $[.16, .28]$ ) and low activation ( $ab = .28$ ;  $SE = .03$ ; 95% BCa CI  $[.21, .36]$ ) study-related positive emotions and academic performance via PsyCap. In addition, this significant indirect effect was found via each component of PsyCap: efficacy ( $ab = .15$ ;  $SE = .03$ ; 95% BCa CI  $[.08, .23]$ ), optimism ( $ab = .13$ ;  $SE = .04$ ; 95% BCa CI  $[.06, .22]$ ), hope ( $ab = .33$ ;  $SE = .03$ ; 95% BCa CI  $[.28, .40]$ ), and resilience ( $ab = .21$ ;  $SE = .03$ ; 95% BCa CI  $[.14, .28]$ ).

### Discussion

The objective of this study is to study the mediating role of PsyCap in the relationship between study-related positive emotions and academic performance. This study makes an innovative contribution due to the scarce research about the antecedents of PsyCap in academic settings and the lack of previous reports related to the interactions among study-related positive emotions, PsyCap, and objective academic performance, as assessed by student's GPA.

#### Theoretical Contributions

First, we found that study-related positive emotions are directly associated with PsyCap. This means that students who experience a higher frequency of positive emotions in their studies, whether of high or low activation, are more likely to report high levels of PsyCap. This result is coherent with the B&B theory, which emphasizes the role of experiencing positive emotions in generating the development of new psychological resources (in our case, PsyCap), and the derived effects of experiencing positive emotions emerge regardless of their level of arousal (Fredrikson, 2003). In sum, our finding confirms that positive emotions are one of the key mechanisms through which PsyCap operates (Luthans & Youssef-Morgan, 2017).

Second, we found that PsyCap is directly associated with academic performance. This means that students who report higher levels of PsyCap are more likely to obtain high levels of academic performance (i.e. GPA). This result agrees with previous research in academic settings emphasizing the role of PsyCap in academic engagement, academic motivation, and academic performance (Datu et al., 2016; Liao & Liu, 2016; Vanno et al., 2014). In addition, subscale analysis showed that the PsyCap component that had the greatest effect on academic performance was hope. This result is consistent with previous studies that reported direct associations between hope and academic performance (Gallagher et al., 2016; Rand et al., 2011), and it might be

1 explained by the fact that high-hope students are attuned to their own goals, in control of how they will pursue  
2 them, and intrinsically motivated (Conti, 2000; Snyder et al., 2002).

3  
4 Third, we found that study-related positive emotions are indirectly associated with academic  
5 performance via PsyCap. This result suggests that experiencing positive emotions (study-related in our  
6 research) expands thinking and action tendencies, favouring the later building of personal resources (PsyCap in  
7 our research) that would be used to face challenging or difficult situations in the academic context. Although  
8 some authors have proposed that positive emotions mediate between academic performance and cognitive-  
9 motivational variables (Pekrun, Elliot & Maier, 2009; Villavicencio, 2011; Villavicencio & Bernardo, 2012;  
10 2013), our results did not support this alternative direction because the indirect effect of PsyCap on academic  
11 performance via study-related positive emotions was not statistically significant. However, this alternative  
12 direction has been explained by the B&B theory as the positivity-triggered upward spiral process. That is, initial  
13 levels of positive emotions predicted later levels of positive emotions, partly through changes in personal  
14 resources; likewise, initial levels of personal resources predicted later levels of personal resources, partly  
15 through changes in positive emotions (Fredrikson, 2013; Fredrikson & Joiner, 2002; Salanova, Bakker &  
16 Llorens, 2006).

17  
18 Fourth, our results may also be explained by referring to the concept of mental capital (Kirkwood,  
19 Bond, May, McKeith & The, 2008). This construct refers to the totality of a person's cognitive and emotional  
20 resources. That is, mental capital reflects people's basic endowment and experiences that take place throughout  
21 life. From this point of view, our results suggest that, in the formative years of mental capital, positive emotions  
22 play an important role in building it up. More specifically, study-related positive emotions may serve to build  
23 up certain behaviours included in the mental capital construct, such as flexibility and efficiency in learning, and  
24 resilience or perseverance when faced with stress and failure. This is a significant result that complements the  
25 current literature on possible ways to enhance mental capital, for example, by including the promotion of  
26 emotional experiences in educational or positive youth development programmes (see Kirkwood et al., 2008).

### 27 **Practical Implications**

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29 First, based on the role of positive emotions, teachers could generate a climate in their classroom that  
30 promotes this experience. For example, among other alternatives, planning the path to success can be addressed.  
31 It is possible to promote internal attributions about the achieved performance (Salanova, Martínez & Llorens,  
32 2012); or training activities can be carried out, oriented toward continuous learning and avoiding failure, with an  
33 appropriate attitude, and persevering when failure is present. Also, teachers can encourage students and provide  
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them with positive feedback, thereby stimulating positive emotions. This may, increase their personal resources, which promotes their well-being right away, and play a role in behavioral reinforcement. In addition, according to Deci & Ryan (2002), on seeing the effort from students in performing specific tasks or in learning, teachers could encourage them by satisfying their basic needs for autonomy, competence, and relatedness, which is likely to enhance the experience of study-related positive emotions and positive outcomes.

Second, a key feature of PsyCap is that it is state-like and open to development through instructional programs (Luthans & Youssef-Morgan, 2017). Thus, a PsyCap intervention (PCI) training model (Luthans, Avey, Avolio, Norman & Combs, 2006) has shown the possibility of developing PsyCap in working adults (Luthans, Avey & Patera, 2008) and undergraduate university students (Luthans, Avey, Avolio & Peterson, 2010). The PCI focuses on developing the four psychological resources of PsyCap using four groups of different techniques: a) acquiring and modifying self-efficacy beliefs; b) developing realistic, constructive, and accurate beliefs; c) designing goals, pathway generation, and strategies for overcoming obstacles; and d) asset factors, risk factors, and influence processes. Each of these four groups can be adapted for the development of students' PsyCap, which is likely to favour high levels of academic performance.

### **Limitations and Future Research**

There are two major limitations in this research. First, this is a cross-sectional study, which keeps us from establishing the causality of the observed phenomenon. It is possible that students with higher levels of PsyCap would, at the same time, also experience study-related positive emotions more often; in the same way, having high academic performance can be the origin of the later emergence of PsyCap in students. However, we tested an alternative direction model (i.e., PsyCap → positive emotions → academic performance), and this possibility is unlikely in our sample. Additionally, our results agree with B&B theory (Fredrikson, 1998; 2001), specifically with the build hypothesis, which has been confirmed through longitudinal designs (Salanova et al., 2011; Ouweneel et al., 2011) and diary studies (Ouweneel et al., 2012; Xanthopoulou et al., 2012), suggesting causality. Second, we used self-report measures for emotions and PsyCap, which could have produced common method bias variance. However, to eliminate this possibility, we used Harman's single factor test. Results show that there is no single factor that explains the variance in the data. In addition, as an outcome variable, we included an objective measure of academic performance in our model, so that the menace of common method bias is unlikely.

The aforementioned limitations could be considered fruitful research lines in the future. First, the proposed model could be examined from a longitudinal approach. Furthermore, it would be important to add

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other meaningful constructs such as school engagement and academic satisfaction. Along these lines, taking into account the circumplex model of emotions (Russel, 1980; Warr, 1994), school engagement and academic satisfaction can be directly associated with high-activation and low-activation positive emotions, respectively (Bakker & Oerlemands, 2011). Future research could add these constructs to PsyCap and examine their mediating role between study-related positive emotions and academic performance. Second, in addition to including objective measures of academic performance, it would be interesting to incorporate the teacher's perception of the students' positive emotions, personal resources, school engagement, and academic satisfaction. Moreover, teachers' own personal resources or engagement levels could be included in the model by examining their role in the positive emotions and personal resources of their students.

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## Running Head: POSITIVE EMOTIONS, PSYCHOLOGICAL CAPITAL AND ACADEMIC PERFORMANCE

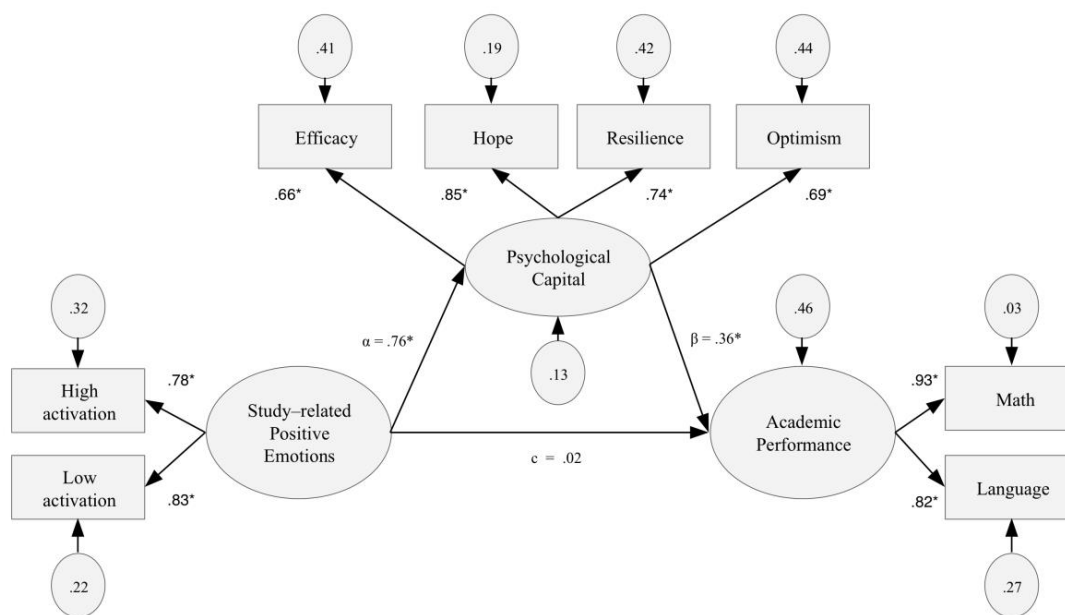


Figure 1

Simple mediation model showing the effect of study-related positive emotions on academic performance through psychological capital. Standardized coefficients are presented. \* =  $p < .001$ . Indirect effect ( $ab$ ) = .25\*.

Running Head: POSITIVE EMOTIONS, PSYCHOLOGICAL CAPITAL AND ACADEMIC PERFORMANCE

Table 1

Means, Standard Deviation, Omega Index and Correlations for the study variables (n = 639)

	M	SD	$\Omega$	1	2	3	4	5	6	7	8	9	10
1. Positive emotions	3.08	.79	.84	-									
2. High activation	3.05	.90	.83	.91*	-								
3. Low activation	3.11	.84	.69	.90*	.64*	-							
4. Psychological capital	3.65	.72	.87	.60*	.53*	.56*	-						
5. Efficacy	3.73	.85	.71	.45*	.40*	.41*	.76*	-					
6. Hope	3.57	.83	.77	.57*	.50*	.54*	.83*	.55*	-				
7. Resilience	3.52	.90	.67	.42*	.35*	.41*	.80*	.46*	.58*	-			
8. Optimism	3.79	.98	.73	.50*	.46*	.45*	.83*	.50*	.61*	.55*	-		
9. Performance 1 <sup>1</sup>	5.13	.90	-	.20*	.13*	.24*	.26*	.15*	.32*	.25*	.15*	-	
10. Performance 2 <sup>2</sup>	5.82	.52	-	.24*	.17*	.27*	.23*	.13*	.29*	.24*	.09*	.72*	-

Notes: \* =  $p < .001$ ; <sup>1</sup> = mathematics subject; <sup>2</sup> = language/communication subject.

Table 2  
Results from SEM analysis (n = 639)

	$\chi^2$	<i>df</i>	$\chi^2/df$	IFI	CFI	RMSEA	90% CI RMSEA	SRMR	AIC
M1 Harman's single factor test	248.51*	20	12.42	.86	.86	.13	[.11, .14]	.07	280.51
M2 Proposed model	93.23*	17	5.48	.96	.96	.08	[.06, .10]	.04	147.23
M3 Gender and age controlled	173.42*	29	5.98	.94	.94	.08	[.07, .10]	.05	249.19

Notes: \* =  $p < .001$ ;  $\chi^2$  = Chi-square; *df* = degree of freedom; IFI = Incremental Fit Index; CFI = Comparative Fit Index  
RMSEA = Root Mean Square Error of Approximation; CI: confidence interval; SRMR = Standardized Root Mean Square Residual; AIC = Akaike Information Criterion.