

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

Marcos Carmona-Halty<sup>1,2</sup> · Marisa Salanova<sup>3</sup> · Susana Llorens<sup>3</sup> · Wilmar B. Schaufeli<sup>4,5</sup>

© Springer Science+Business Media B.V., part of Springer Nature 2018

**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.

**Keywords** Positive emotions · Psychological capital · Academic performance

---

✉ Marcos Carmona-Halty  
mcarmonah@uta.cl

Marisa Salanova  
salanova@uji.es

Susana Llorens  
llorgum@uji.es

Wilmar B. Schaufeli  
w.schaufeli@uu.nl

<sup>1</sup> Escuela de Psicología y Filosofía, Universidad de Tarapacá, Avda. 18 de Septiembre # 2222, Arica, Chile

<sup>2</sup> Centro de Investigación para la Educación Inclusiva (CIEI), Viña del Mar, Chile

<sup>3</sup> WANT Research Team, Universitat Jaume I, Castellón de la Plana, Spain

<sup>4</sup> Research Unit Occupational and Organizational Psychology and Professional Learning, KU Leuven, Louvain, Belgium

<sup>5</sup> Department of Psychology, Utrecht University, Utrecht, The Netherlands

## 1 Introduction

The recent shift from a negative perspective focused on problems and deficits to a more positive perspective focused on strengths and personal resources has aroused considerable attention in educational research (Seligman et al. 2009; Stiglbauer et al. 2013). In this context, psychological capital (PsyCap) has begun to be assessed in educational settings (Datu et al. 2016; Luthans et al. 2012; Siu et al. 2014; You 2016). However, previous studies focused only on academic outcomes, and not on their antecedents. The broaden-and-build theory (B&B; Fredrikson 1998, 2001) offers a conceptual framework with which to understand how the experience of positive emotions may explain the presence of students' PsyCap (and other personal resources) and its direct and indirect impact on academic performance. However, we know very little about the interactions among these variables. The present study examines the mediator role of psychological capital between study-related positive emotions and academic performance in a sample of Chilean high school students.

### 1.1 Positive Emotions and the B&B Theory

Positive emotions are brief, multisystem responses to some change in the way people interpret or appraise their current circumstances (Fredrikson 2013). They arise when this multisystem registers good prospects or good fortune. B&B theory describes how positive emotions broaden awareness and helps to build (personal) resources (Fredrikson 1998). The main assumption of B&B theory is that positive emotions expand the array of thoughts, actions, urges, and dispositions that spontaneously come to mind (Fredrikson 1998, 2001). That is, under the influence of positive emotions, people have greater perceptual access, wider semantic reach, more inclusive and connected social perceptions, and more relaxed and expansive bodily behaviour (Fredrikson 2013). In addition, the function of the expansive form of positive emotions is to spur the development of personal resources, placing people on positive trajectories of growth (Fredrikson 1998, 2001, 2013). In other words, by experiencing positive emotions, people will enhance their personal resources, which in turn, may lead to a more enduring positive state of well-being and future positive outcomes (Fredrikson 2013; Fredrikson et al. 2003; Lyubomirsky et al. 2005; Mauss et al. 2011).

The current study is based on this assumption of the B&B theory, which is referred to as the "build hypothesis". This hypothesis states that the role of positive emotions is to build personal resources and produce well-being. Previous research has confirmed the association between positive emotions and personal resources. For example, using a diary study with university professors, Ouwenel et al. (2012) found that positive emotions predicted hope, which, in turn, was related to work engagement. Salanova et al. (2011), in two longitudinal studies with professors and students, reported that their beliefs of efficacy and engagement influenced each other through experiencing positive emotions. Xanthopoulou et al. (2012) carried out a diary study showing that work resources influence personal resources through positive emotions. Using an undergraduate sample, Rogaten and Moneta (2015) found a reciprocal relationship between positive emotions and creative cognition. Finally, Ouwenel et al. (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.

## 1.2 Psychological Capital

Based on B&B theory (Fredrikson 1998) and Conservation of Resources (COR) theory (Hobfoll 2002), Luthans and 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 et al. 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 and 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 and Liu 2016; Vanno et al. 2014), intrinsic motivation (Siu et al. 2014), learning empowerment (Liao and Liu 2016; You 2016), study engagement (Datu and Valdez 2016; Datu et al. 2016; Luthans et al. 2012; Siu et al. 2014; You 2016), and student well–being (Datu and Valdez 2016).

## 1.3 The Mediating Role of PsyCap Between Study-Related Positive Emotions and Academic Performance

Previous research has shown that study–related emotions influence students’ learning and achievement (Villavicencio and Bernardo 2012, 2013). As B&B theory predicts, the effect of positive emotions on academic performance is mediated by cognitive–motivational variables (Pekrun 1992; Pekrun et al. 2002). Based on B&B theory, we propose that PsyCap (a cognitive–motivational variable) is fostered by study–related positive emotions. This conjecture is supported, as mentioned above, by research that has demonstrated the relevance of positive emotions in the prediction of different personal resources (Ouweneel et al. 2011, 2012; Salanova et al. 2011; Rogaten and Moneta 2015; Xanthopoulou et al. 2012) and research that identifies PsyCap as a predictor of academic performance (Datu et al. 2016; Liao and Liu 2016; Vanno et al. 2014). According to COR theory (Hobfoll 1989), these results can be explained by the accumulation of psychological resources, which may promote positive outcomes such as higher academic performance. In addition, some research about individual components of PsyCap conducted in academic settings showed

their relevance in a variety of school-related variables (Bong 2001; Gallagher et al. 2016; Hoy et al. 2006; Jiang et al. 2014; Rand et al. 2011; Snyder et al. 2002).

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

## 1.4 Present Study

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

## 2 Method

### 2.1 Sample and Procedure

The sample comprised 639 high school students attending three private educational institutions in Chile (each of them hosts approximately 700 students). Participants ranged in age from 14 to 17 years, and 51% of the sample were female. Of the 639 students, 30% were 14 years old, 18% were 15 years old, 30% were 16 years old, and 22% were 17 years old at the time of data collection.

Permission to conduct the study was granted by the school principals, the students, and the students’ parents. The data collection was carried out in a group session (25 students each time) through an electronic procedure. Each student had a computer where the questionnaires were uploaded on a website especially designed for the research. Students took around 25 min to answer the questionnaire, and the data compilation took 2 weeks.

### 2.2 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 et al. 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 et al. 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 6 h per week. For the objective of this study, the GPA was registered at the end of the semester before the data collection.

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

## 3 Results

### 3.1 Preliminary Analysis

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

The results of Harman’s single factor test (see Table 2, M1) obtained a fit index under the recommended fit standards (Schreiber et al. 2006; Schweizer 2010), which means that this bias is not likely to affect the research data. Therefore, the variance in

**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>a</sup>	5.13	.90	–	.20*	.13*	.24*	.26*	.15*	.32*	.25*	.15*	–	
10. Performance 2 <sup>b</sup>	5.82	.52	–	.24*	.17*	.27*	.23*	.13*	.29*	.24*	.09*	.72*	–

\* $p < .001$ <sup>a</sup>Mathematics subject<sup>b</sup>Language/communication subject**Table 2** Results from SEM analysis (n = 639)

	$\chi^2$	Df	$\chi^2/df$	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

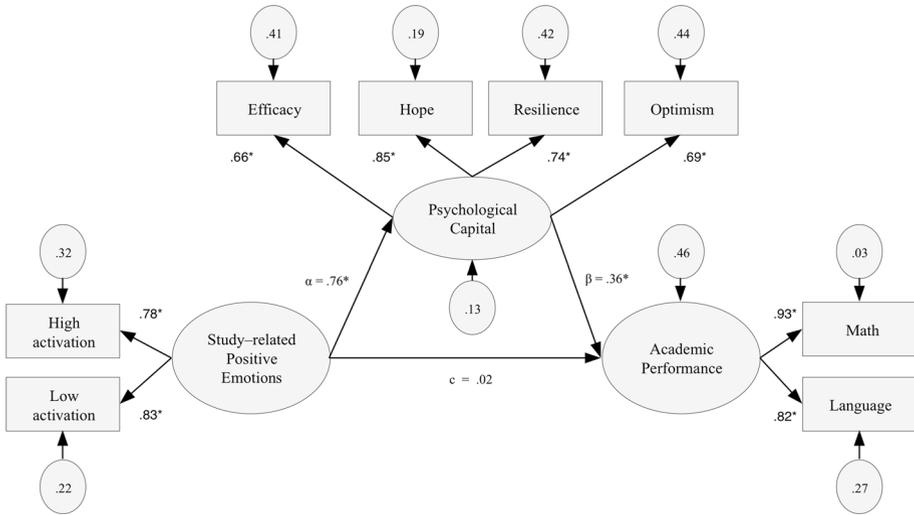
$\chi^2$  Chi square; *df* degree of freedom; *IFI* incremental fit index; *CFI* comparative fit index *RMSEA* root mean square error of approximation; *CI* confidence interval; *SRMR* standardized root mean square residual; *AIC* akaike information criterion

\* $p < .001$ 

the variables may be due to the psychosocial constructs being evaluated and not to the evaluation method.

### 3.2 Structural Equation Modelling

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



**Fig. 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\*

### 3.3 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  $\rightarrow$  PsyCap  $\rightarrow$  academic performance), we implemented the bootstrapping procedure, one of the most valid and powerful methods for testing intervening variable effects (Williams and 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.

### 3.4 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  $\rightarrow$  study-related positive emotions  $\rightarrow$  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]).

## 4 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.

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

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

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

## 4.2 Practical Implications

First, based on the role of positive emotions, teachers could generate a climate in their classroom that promotes this experience. For example, among other alternatives, planning the path to success can be addressed. It is possible to promote internal attributions about the achieved performance (Salanova et al. 2012); or training activities can be carried out, oriented toward continuous learning and avoiding failure, with an appropriate attitude, and persevering when failure is present. Also, teachers can encourage students and provide 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 and 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 and Youssef-Morgan 2017). Thus, a PsyCap

intervention (PCI) training model (Luthans et al. 2006) has shown the possibility of developing PsyCap in working adults (Luthans et al. 2008) and undergraduate university students (Luthans et al. 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.

### 4.3 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  $\rightarrow$  positive emotions  $\rightarrow$  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 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 and Oerlemans 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.

**Acknowledgements** The authors would like to thank two anonymous reviewers and Daniel Pérez-Zapata for their useful comments on an earlier draft of this article.

**Compliance with Ethical Standards**

**Conflict of interest** The authors declare that they have no conflicts of interest.

## References

- Avey, J. B., Avolio, B. J., & Luthans, F. (2011). Experimentally analyzing the impact of leader positivity on follower positivity and performance. *The Leader Quarterly*, 22, 282–294. <https://doi.org/10.1016/j.leaqua.2011.02.004>.
- Bakker, A. B., & Oerlemans, W. (2011). Subjective well-being in organization. In K. S. Cameron & G. M. Spreitzer (eds), *The oxford handbook of positive organizational scholarship* (pp. 178–189). New York: Oxford University press. <https://doi.org/10.1093/oxfordhpb/9780199734610.013.0014>.
- Bong, M. (2001). Role of self-efficacy and task-value in predicting college students' course performance and future enrolment intentions. *Contemporary Educational Psychology*, 26, 553–570. <http://doi.org/10.1006/ceps.2000.1048>.
- Conti, R. (2000). College goals: Do self-determined and carefully considered goals predict intrinsic motivation, academic performance, and adjustment during the first semester? *Social Psychology of Education*, 4, 189–211. <https://doi.org/10.1023/A:1009607907509>.
- Datu, J. A. D., King, R. B., & Valdez, J. P. (2016). Psychological capital bolsters motivation, engagement, and achievement: Cross-sectional and longitudinal studies. *The Journal of Positive Psychology*. <https://doi.org/10.1080/17439760.2016.1257056>.
- Datu, J. A. D., & Valdez, J. P. M. (2016). Psychological capital predicts academic engagement and well-being in Filipino high school students. *The Asia-Pacific Education Researcher*, 25(3), 399–405. <https://doi.org/10.1007/s40299-015-0254-1>.
- Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research*. Rochester, NY: The University of Rochester Press.
- Fredrikson, B. L. (1998). What good are positive emotions? *Review of General Psychology*, 2(3), 300–319. <https://doi.org/10.1037/1089-2680.2.3.300>.
- Fredrikson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218–226. <https://doi.org/10.1037/0003-066X.56.3.218>.
- Fredrikson, B. L. (2003). Positive emotions and upward spirals in organization. In K. Cameron, J. Dutton, & R. Quinn (Eds.), *Positive organizational scholarship* (pp. 163–175). San Francisco, CA: Berrett-Koehler.
- Fredrikson, B. L. (2013). Positive emotions broaden and build. *Advances in Experimental Social Psychology*, 47, 1–53. <https://doi.org/10.1016/B978-0-12-407236-7.00001-2>.
- Fredrikson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Journal of Personality and Social Psychology*, 65, 45–55. <https://doi.org/10.1111/1467-9280.00431>.
- Fredrikson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crises? A prospective study on resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, 84, 365–376. <https://doi.org/10.1037/0022-3514.84.2.365>.
- Gallagher, M. W., Marques, S. C., & Lopez, S. J. (2016). Hope and the academic trajectory of college students. *Journal of Happiness Studies*. <https://doi.org/10.1007/s10902-016-9727-z>.
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76(4), 408–420. <https://doi.org/10.1080/03637750903310360>.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44, 513–524. <https://doi.org/10.1037/0003-066X.44.3.513>.
- Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology*, 6(4), 307–324. <https://doi.org/10.1037/1089-2680.6.4.307>.
- Hoy, A. W., Tarter, C. J., & Hoy, W. K. (2006). Academic optimism of schools: A force student achievement. *American Education Research Journal*, 43, 425–446. <https://doi.org/10.1016/j.sbspro.2010.12.261>.
- Jiang, Y., Song, J., Lee, M., & Bong, M. (2014). Self-efficacy and achievement goals as motivational links between perceived contexts and achievement. *Educational Psychology*, 34, 92–117. <https://doi.org/10.1080/01443410.2013.863831>.
- Kirkwood, T., Bond, J., May, C., McKeith, I., & The, M. (2008). *Foresight mental capital wellbeing project. Mental capital through life: Future challenges*. London: The Government Office for Science.
- Liao, R., & Liu, Y. (2016). The impact of structural empowerment and psychological capital on competence among Chinese baccalaureate nursing students: A questionnaire survey. *Nurse Education Today*, 36, 31–36. <https://doi.org/10.1016/j.nedt.2015.07.003>.

- Luthans, F., Avey, J. B., Avolio, B. J., Norman, S. M., & Combs, G. M. (2006). Psychological capital development: Toward a micro-intervention. *Journal of Organizational Behaviour*, 27, 387–393. <https://doi.org/10.1002/job.373>.
- Luthans, F., Avey, J. B., Avolio, B. J., & Peterson, S. (2010). The development and resulting performance impact of positive psychological capital. *Human Resources Development Quarterly*, 21, 41–66. <https://doi.org/10.1002/hrdq.20034>.
- Luthans, F., Avey, J. B., & Patera, J. L. (2008). Experimental analysis of a web-based training intervention to develop positive psychological capital. *Academy of Management Learning & Education*, 7(2), 209–221. <https://doi.org/10.5465/AMLE.2008.32712618>.
- Luthans, B. C., Luthans, K. W., & Jensen, S. M. (2012). The impact of business school students' psychological capital on academic performance. *Journal of Education for Business*, 87, 253–259. <https://doi.org/10.1080/08832323.2011.609844>.
- Luthans, F., & Youssef-Morgan, C. M. (2017). Psychological capital: An evidence-based positive approach. *Annual Review of Organizational Psychology and Organizational Behaviour*. <https://doi.org/10.1146/annurev-orgpsych-032516-113324>.
- Luthans, F., Youssef-Morgan, C. M., & Avolio, B. (2015). *Psychological capital and beyond*. New York: Oxford University Press.
- Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, 131(6), 803–855. <https://doi.org/10.1037/0033-2909.131.6.803>.
- Mauss, I. B., Shallcross, A. J., Troy, J., John, O., Ferrer, E., Wilhelm, F., et al. (2011). Don't hide your happiness! Positive emotion dissociation, social connectedness, and psychological functioning. *Journal of Personality and Social Psychology*, 100(4), 738–748. <https://doi.org/10.1037/a0022410>.
- McDonald, R. P. (1999). *Test theory: A unified treatment*. Mahwah, NJ: Erlbaum.
- Ouweneel, E., Le Blanc, P. M., & Schaufeli, W. B. (2011). Flourishing students: A longitudinal study on positive emotions, personal resources and study engagement. *The Journal of Positive Psychology*, 6(2), 142–153. <https://doi.org/10.1080/17439760.2011.558847>.
- Ouweneel, E., Le Blanc, P. M., Schaufeli, W. B., & van Wijhe, C. I. (2012). Good morning, good day: A diary study on positive emotions, hope and work engagement. *Human Relations*, 65(9), 1129–1154. <https://doi.org/10.1177/0018726711429382>.
- Pekrun, R. (1992). The impact of emotions on learning and achievement: Towards a theory of cognitive/motivational mediators. *Applied Psychology: An International Review*, 41(4), 359–376. <https://doi.org/10.1111/j.1464-0597.1992.tb00712.x>.
- Pekrun, R., Elliot, A. J., & Maier, M. A. (2009). Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. *Journal of Educational Psychology*, 101, 115–135. <https://doi.org/10.1037/a0013383>.
- Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist*, 37(2), 91–105. [https://doi.org/10.1207/s15326985ep3702\\_4](https://doi.org/10.1207/s15326985ep3702_4).
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>.
- Rand, K. L., Martin, A. D., & Shea, A. M. (2011). Hope, but not optimism, predicts academic performance of law students beyond previous academic achievement. *Journal of Research in Personality*, 45, 683–686. <https://doi.org/10.1016/j.jrp.2011.08.004>.
- Rogaten, J., & Moneta, G. B. (2015). Use of creative cognition and positive affect in studying: Evidence of a reciprocal relationship. *Creativity Research Journal*, 27(2), 225–231. <https://doi.org/10.1080/10400419.2015.1030312>.
- Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39, 1161–1178. <https://doi.org/10.1037/h0077714>.
- Salanova, M., Bakker, A. B., & Llorens, S. (2006). Flow at work: Evidence for an upward spiral of personal and organizational resources. *Journal of Happiness Studies*, 7, 1–22. <https://doi.org/10.1007/s10902-005-8854-8>.
- Salanova, M., Llorens, S., & Schaufeli, W. B. (2011). “Yes, I can, I feel good, and I just do it!” On gain cycles and spirals of efficacy beliefs, affect and engagement. *Applied Psychology: An International Review*, 60(2), 255–285. <https://doi.org/10.1111/j.1464-0597.2010.00435.x>.
- Salanova, M., Martínez, I., & Llorens, S. (2012). Success breeds success, especially when self-efficacy is related with an internal attribution of causality. *Studies In Psychology*, 33(2), 151–165. <https://doi.org/10.1174/021093912800676420>.

- Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, 99(6), 323–338. <https://doi.org/10.3200/JOER.99.6.323-338>.
- Schweizer, K. (2010). Some guidelines concerning the modelling of traits and abilities in test construction. *European Journal of Psychological Assessment*, 26, 1–2. <https://doi.org/10.1027/1015-5759/a000001>.
- Seligman, M. E. P., Ernst, R. M., Gillham, J., Reivich, K., & Linkins, M. (2009). Positive psychology and classroom interventions. *Oxford Review of Education*, 35(3), 293–311. <https://doi.org/10.1080/03054980902934563>.
- Siu, O. L., Bakker, A. B., & Jiang, X. (2014). Psychological capital among university students: Relationship with study engagement and intrinsic motivation. *Journal of Happiness Studies*, 15, 979–994. <https://doi.org/10.1007/s10902-013-9459-2>.
- Snyder, C. R., Shorey, H. S., Cheavens, J., Pulvers, K. M., Adams, V. H., & Wiklund, C. (2002). Hope and academic success in college. *Journal of Educational Psychology*, 94(4), 820–826. <https://doi.org/10.1037/0022-0663.94.4.820>.
- Stiglbauer, B., Gnams, T., Gamsjäger, M., & Batinic, B. (2013). The upward spiral of adolescents' positive school experiences and happiness: Investigating reciprocal effects over time. *Journal of School Psychology*, 51(2), 231–242. <https://doi.org/10.1016/j.jsp.2012.12.002>.
- Van Katwyk, P. T., Fox, S., Spector, P. E., & Kelloway, E. K. (2000). Using the job-related affective well-being scale (JAWS) to investigate affective responses to work stressors. *Journal of Occupational Health Psychology*, 5(2), 219–230. <https://doi.org/10.1037/1076-8998.5.2.219>.
- Vanno, V., Kaemkate, W., & Wongwanich, S. (2014). Relationships between academic performance, perceived group psychological capital and positive psychological capital of Thai undergraduate students. *Social and Behavioral Sciences*, 116, 3226–3230. <https://doi.org/10.1016/j.sbspro.2014.01.739>.
- Villavicencio, F. T. (2011). Critical thinking, negative academic emotions and achievement: A mediational analysis. *The Asia-Pacific Education Researcher*, 20, 118–126.
- Villavicencio, F. T., & Bernardo, A. B. I. (2012). Positive academic emotions moderate the relationship between self-regulation and academic achievement. *British Journal of Educational Psychology*, 83, 329–340. <https://doi.org/10.1111/j.2044-8279.2012.02064.x>.
- Villavicencio, F. T., & Bernardo, A. B. I. (2013). Negative emotions moderate the relationship between self-efficacy and achievement of Filipino students. *Psychological Studies*, 58(3), 225–232. <https://doi.org/10.1007/s12646-013-0193-y>.
- Warr, P. (1994). A conceptual framework for the study of work and mental health. *Work & Stress*, 8, 84–97. <https://doi.org/10.1080/02678379408259982>.
- Williams, J., & MacKinnon, D. P. (2008). Resampling and distribution of the product methods for testing indirect effects in complex models. *Structural Equation Modeling*, 15, 23–51. <https://doi.org/10.1080/10705510701758166>.
- Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2012). A diary study on the happy worker: How job resources relate to positive emotions and personal resources. *European Journal of Work and Organizational Psychology*, 21(4), 489–517. <https://doi.org/10.1080/1359432X.2011.584386>.
- You, J. (2016). The relationship among college student's psychological capital, learning empowerment, and engagement. *Learning and Individual Differences*, 49, 17–24. <https://doi.org/10.1016/j.lindif.2016.05.001>.