A Study on University Students' Psychological Capital and Academic Performance: Autonomous Motivation as the Mediator

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Abstract

This research examined the relationship among Psychological Capital (Psy-Cap), Autonomous Motivation (AM) and Academic Performance (AP) in university settings. A sample of 225 college students (M_{age} = 21.34, 169 females) was collected from G University and data analysis showed that: 1) PsyCap as a whole composite can positively predict grade point average (GPA) and AM; 2) Only hope showed a significant association with GPA among the 4 individual constructs of PsyCap (hope, resilience, self-efficacy, optimism); 3) Hope and self-efficacy were positive predictors while resilience was a negative predictor of AM; 4) AM had a mediating role between PsyCap and GPA. Implications for possible educational intervention to improve college students' academic performance, especially the role of hope, were also discussed.

Subject Areas

Educational Psychology, Educational Technology, Higher Education

Keywords

Psychological Capital, Autonomous Motivation, Academic Performance, Grade Point Average (GPA), Self-Determination Theory (SDT)

1. Introduction

Excellence in academic achievement is considered as an important predictor of individuals' later career success (Fugate *et al.*, 2004) [1] and how to promote

students' academic performance (AP) has been a central issue in educational research. One of the most significant and widely investigated predictors of students' achievement is academic motivation. Self-Determination Theory (SDT, Deci & Ryan, 2000) [2] is a widely accepted motivational theory that regards competency, autonomy, and relatedness as human beings' basic psychological needs. From the perspective of SDT, students are more likely to succeed if they possessed a higher level of autonomous motivation (AM) (Deci & Ryan, 2015) [3]. This new motivational perspective quickly generated a bulk of research that confirmed the positive impact of AM on students' AP in the past decades.

Since Seligman and Csikszentmihalyi (2000) [4] helped catalyze the change in psychology, turning the focus from repairing damage to creating a more positive subjective experience, there was a research boon in the new area—Positive Psychology. Drawing from this new field of study, Luthans *et al.* (2006) [5] developed the idea of Psychological Capital which consisted of hope, self-efficacy, optimism and resilience. They picked up these four psychological resources based on the criteria of Positive Organizational Behaviour (state-like, valid measurement and performance impact). This new concept has been applied in the industrial-organizational background firstly and has been found to be related to many types of positive work performance. Given that school, to some extent, is also an organization, Luthans *et al.* (2012) [6] began examining its beneficial role in the context of university students, hence turning researchers' attention to the academic contexts. As they hypothesized, subsequent studies showed a positive association between PsyCap and students' academic achievement (Burhanuddin *et al.*, 2019) [7].

Motivation was a factor many researchers were concerned about and has been proved to be an important factor in predicting students' academic performance. However, consistent research pointed out that lacking motivation is becoming an increasingly common problem among university students in Chinese setting (Hou *et al.*, 2010 [8]; Zhan & Ju, 2013 [9]). By definition, the four individual constructs of PsyCap (hope, self-efficacy, optimism and resilience) can affect one's motivation whereas only a few studies examining the association between students' motivation and PsyCap (Siu *et al.*, 2014 [10]; Datu & Valdez, 2018 [11]). What's more, there is theoretical evidence to support the hypothesized model that PsyCap has a positive influence on students' AP by the mediation of AM (Datu & Valdez, 2018) [11]. Unfortunately, the studies that linked students' PsyCap with AP by motivation were scarce, not to mention that by AM.

The main goal of the present research is to testify the model that PsyCap can predict students' academic performance with the mediation of AM. Given that prior studies support the view that both PsyCap and AM are malleable (De Naeghel *et al.*, 2016) [12], it will be conducive to finding out implication for educators to help improve students' AP by intervening in their AM and PsyCap if the working mechanism among PsyCap, AM and AP of students can be well understood.

2. Literature Review

2.1. Psychological Capital and Academic Performance

Comprising of self-efficacy, resilience, hope and optimism, the PsyCap has gained researchers' attention in the educational contexts. Derived from Bandura's social cognitive theory (1997) [13], self-efficacy refers to the belief that an individual possesses toward given tasks, and it has been acknowledged as a robust predictor of students' academic achievement and motivation across different cultures. Hope is defined as a positive motivational state based on an interactively derived sense of successful (a) agency (goal-directed energy) and (b) pathways (planning to meet goals)' (Snyder *et al.*, 2002) [14]. It was believed to predict overall grade point averages of freshmen (Snyder *et al.*, 2002) [14]. Representing by a generalized positive outlook or an ability to maintain positive expectancies towards future (Solberg *et al.*, 2009 [15]; Valentine *et al.*, 2004 [16]), optimism was found to be able to predict better performance in academics (Chemers *et al.*, 2001) [17]. Resiliency refers to one's capability to bounce back from disadvantaged circumstances (Luthar *et al.*, 2000) [18], enabling students to sustain high academic performance despite unfavorable conditions (Leary & DeRosier, 2012) [19].

The results were not consistent when researchers examined the correlation between the individual elements of PsyCap and students' academic performance. As Feldman and Kubota (2014) [20] pointed out that general hope acted as a positive predictor of academic hope and academic self-efficacy of students, and they were both positively associated with academic performance directly, whereas there was no significant association between GPA and optimism.

There are also studies looking at relationship between individual construct of PsyCap and academic performance. The existing research demonstrated that hope played a more important role than both optimism and self-efficacy in the prediction of students' academic performance (Feldman & Kubota., 2015 [20]; Rand *et al.*, 2020 [21]). However, the effects of self-efficacy, optimism and resiliency (Kotzé & Kleynhans, 2013) [22] on students' performance of exams were not invariably significant statistically, and even contradictory results were found.

The idea of combining these four elements resulted in a surge of interest and PsyCap was widely investigated in working places. As expected, the bulk of research proved that PsyCap was positively related to performance of employees. Then considering that students' tasks in the school can somewhat be interpreted as work of employees, Luthans *et al.* (2012) [6] did the first exploratory study in the academic contexts and they reported the predictive role of PsyCap to GPA among business students. Subsequent studies confirmed the beneficial role of PsyCap in academic background. The extant literature suggested that PsyCap is highly related to positive outcomes of students in school such as GPA (Datu & Valdez, 2018 [11]; Luthans *et al.*, 2012 [6]; Martínez *et al.*, 2019 [23]), motivation (Datu & Valdez, 2018 [11]; Siu *et al.*, 2014 [10]), meaning-coping strategies

(Martínez *et al.*, 2019) [23], study-related positive emotions (Carmona–Halty *et al.*, 2018) [24], academic engagement (Datu *et al.*, 2016 [25]; Martínez *et al.*, 2019 [23]), grit (Luthans *et al.*, 2019) [6] and learning empowerment (You, 2016) [26].

Among these optimal outcomes, students' academic performance is one of the most frequent topics scholars paid attention to. A substantial number of studies recognized PsyCap as a positive predictor of students' academic performance which many researchers chose to use GPA as an indicator. Different models regarding how PsyCap predicted students' grades were proposed. Luthans *et al* (2012) [6] only simply tested the predictive role of PsyCap in the prediction of GPA. It was evidenced that autonomous motivation mediated the relationship between former PsyCap and later academic performance (Datu & Valdez, 2018) [11]. A recent study (Martinez *et al.*, 2019) [23] found students who engaged more in their study intended to show higher PsyCap, which later affected their performance. According to the existing research, PsyCap was usually operationalized as a mediator between some desirable academic outcomes and academic achievement.

Compared with the well-established relationship between PsyCap and academic performance inwesternbackground, the correlation was not fully investigated in China. Most studies involving PsyCap focused on the mechanism that how it works among employees. But it is also an emerging perspective to investigate the influence of PsyCap in Chinese academic setting. So far, Chinese scholars have built mechanisms among students' PsyCap, academic performance and other outcomes such as academic engagement (Zhou & Mao, 2021) [27], learning strategies (Zhang *et al.*, 2011) [28], achievement goal orientation (Wang *et al.*, 2011) [29] and learning burnout (Fu & Zhang, 2010) [30], albeit top articles regarding PsyCap in the context of schools remain scarce, particularly for that in higher education background.

What's more, when it comes to the analysis of PsyCap, the majority of scholars, be they western or eastern, analyzed the overall influence of PsyCap (Dawkins *et al.*, 2013) [31]. Luthans *et al.* (2006) [5] supposed that these four elements work synergistically. But few scholars explore how exactly the four elements work together to facilitate academic performance, except Rego *et al.* (2010) [32] discovered that only hope, resilience and optimism were significant in the regression analysis and the predictive effect was stronger if the four components were put individually compared with when the composite scores of PsyCap was put in.

2.2. Autonomous Motivation and Academic Performance

In the earlier studies, the researchers mostly investigated motivation by contrasting intrinsic motivation and extrinsic motivation. However, self-determination theory (Deci & Ryan, 2000) [2] categorized motivation based on the level of autonomy towards tasks. This is a continuum between intrinsic motivation at one end to amotivation at the other end. The traditional extrinsic motivation was

further divided into 4 types of motivation in terms of how much the motivation is internalized.

In fact, autonomous motivation refers to the impetus for behaviors one acts out of personal choice. Integrated regulation, a type of fully internalized extrinsic motivation, involves a full sense of volition. Being less internalized, identified regulation happened when individual accept the value of the behaviour. Although extrinsic, these two kinds of motivation are volitional, having internal locus of causality (Deci & Ryan, 2015) [3]. The most autonomous type of motivation, intrinsic motivation is evidenced when one was enacted by the internal pleasure and satisfaction of the behavior. Deci and Ryan (2015) [3] postulated that students with higher level of autonomy are more likely to experience desirable academic outcomes. Indeed, the significant role of Autonomous Motivation (AM) played in fostering academic performance in the educational context has been acknowledged by empirical research across cultures and different level of education (Deci *et al.*, 1991 [33]; Jeno *et al.*, 2018 [34]; Taylor *et al.*, 2014 [35]). However, controlled motivation (CM), consisting of introjected regulation (caused by guilt, ego or self-esteem), external regulation (caused by extrinsic contingencies like rewards), takes place when behavior is performed when motivated by rewards or external pressure.

The investigation of relation between AM and AP is an emerging perspective in educational literature. Researchers provided consistent evidence for the positive predictive role of AM across different levels of education. Siu *et al.* (2014) [10] examined the mediating effect of intrinsic motivation between PsyCap and engagement which was proved to facilitate students' AP in subsequent works. Datu and Valdez (2018) [11] verified the impact of different motivational orientations towards AP, revealing the positive role of AM and negative role of controlled motivation and amotivation. In a meta-analysis study (Taylor *et al* 2014) [35], both intrinsic motivation and identified regulation were found to be robust antecedents of students' school achievement throughout 18 studies assessing the relationship between motivation and school achievement.

In the context of Chinese schools, similar results can be observed. Liang *et al* (2020) [36] lead to similar conclusion that intrinsic motivation demonstrated its significant role in predicting students' study engagement. The direct effect between academic motivation and the exam results was statically significant (Qin *et al.*, 2013) [37]. It is also an increasingly popular perspective to examine students' performance in school from the perspective of SDT. Li *et al.* (2020) [38] uncovered that the relative autonomy index (the autonomy level of students' motivation) of students was a powerful predictor of their average exam marks among nursing university students. When the targeted sample turned to middle school students, the same result also occurred (Dong & Liu, 2016) [39]. But as what was found, both studies correlated AM with academic performance, and those talking about AP from the perspective of self-determination theory against Chinese education background, are still limited.

2.3. Relationship between PsyCap and AM

Luthans *et al.* (2006) [5] posited that PsyCap is a motivational construct when they proposed the concept. People with high self-efficacy and hope are easily to be motivated to work hard because they tend to believe their effort will be paid, and resilience makes people regain the motivation in adversity, and optimism encourages them to expect good results in any circumstances. Indeed, the subsequent studies corroborated with this statement. Intrinsic motivation was proved to be a mediator between PsyCap and study engagement (Siu *et al.*, 2014) [10]. Datu and Valdez (2016) [25] developed the model and found PsyCap emerge as a positive predictor of AM and a negative one of amotivation. But the number of studies trying to explore this reciprocal relationship between motivation and PsyCap is scarce. Although believed as a motivational capacity, PsyCap was seldom related to motivation among the existing educational research, l*et al*one AM.

Even though few studies explored the model that students' PsyCap exerts an influence on students' AP, there is still theoretical evidence for the mediating role of AM between PsyCap and students' AP. Siu *et al.* (2014) [10] first linked intrinsic motivation between students' PsyCap and academic engagement. Inspired by them, Datu *et al.* (2018) [11] decided to add academic performance to the model and replaced the intrinsic motivation with AM, verifying the mediating role of AM between PsyCap and AM.

3. Research Hypotheses

There are several goals to achieve in this study. The first is to examine the relationship between PsyCap and academic performance to see whether the results can be converged with that has been established in the western culture, thus contributing to the Chinese literature regarding the effect of PsyCap in the context of education. Based on the studies reviewed above, the present study has the following hypotheses:

Hypothesis 1: Students' PsyCa is a positive predictor of students' academic performance. (H1)

There are not enough statistics supporting the optimal prediction of PsyCap with AM, albeit PsyCap was considered as a motivational state at the very beginning (Luthans *et al.*, 2006) [5]. Thus, the following is hypothesized:

Hypothesis 2: Students' PsyCap is a positive predictor of students' autonomous motivation. (H2)

Inconsistent results from research concerning the impact of autonomous motivation upon students' academic performance from a SDT perspective indicates that more studies need to be done to confirm the generalizability of the established theory. Thus, the following is hypothesized:

Hypothesis 3: Students' autonomous motivation is a positive predictor of students' academic performance. (H3)

In the light of findings of prior studies involving the 3 variables studied in this

research (Datu *et al.*, 2018 [11]; Siu *et al.*, 2014 [10]), the mechanism linking PsyCap and academic performance with autonomous motivation as a mediator has theoretical support. So the following is hypothesized.

Hypothesis 4: Autonomous Motivation is a mediator between PsyCap and academic performance. (H4)

Considering that the extant considerable literature concerning PsyCap mainly emphasized on overall effect on students' academic outcomes and few further analyzed how much variance each construct accounts for the overall prediction and the interplay of the 4 subcomponents during the prediction, this study is going to compare the effect of each component in the prediction of academic performance and autonomous motivation. Given the results found in prior studies, the current study gives the following hypothesis:

Hypothesis 5: self-efficacy, hope, resilience and optimism are positive predictors of students' academic performance. (H5)

4. Method

4.1. Sample and Procedure

286 questionnaires were collected through online platform, all of which were only targeted for students from a comprehensive university in Guangzhou, the capital city of Guangdong Province. A total of 225 questionnaires were left to analyze after discarding incomplete or unreliable questionnaires. The participants included 56 men and 169 women. There were 59 sophomores, 79 seniors and 87 juniors. Freshmen were not included because they just entered into college and no GPA could be reported.

4.2. Instruments

4.2.1. Measurement of Psychological Capital

The research adopted Positive PsyCap Questionnaire which were developed by Zhang and his colleagues (2010) [28] based on that by Luthans *et al.* (2006) [5]. The questionnaire comprises of seven items measuring self-efficacy (Cronbach α = 0.86) and resilience (Cronbach α = 0.75), six items for hope (Cronbach α = 0.84) and optimism (Cronbach α = 0.83), rated on 7-point Likert scale.

4.2.2. Measurement of Autonomous Motivation and Controlled Motivation

These two types of motivation were assessed using the revised version of the Academic Motivation Scale by Chen (2007) [40]. The questionnaire (Cronbach α = 0.84) is scored from 1 to 5 points, consisting of 28 questions in 7 dimensions: intrinsic motivation (to know, toward accomplishment and to experience stimulation), extrinsic motivation (identified regulation, introjected regulation and external regulation) and amotivation. The integrated motivation was not included in this scale because the pilot study indicated that integrated regulation did not show statistical difference with identified regulation (Vallerand *et al.*, 1992) [41].

4.2.3. Indicator of Academic Performance

Given that many researchers used students' GPA as an indicator of their academic performance, the current study also adopted the same procedure. Participants were asked to report their overall GPA in the electronic questionnaire based on their knowledge of the purpose of the research and their willingness to report.

4.3. Data analytic Approach

All data were analyzed by IBM SPSS 24. Cronbach's alpha was calculated for reliability analysis of each scale. Correlational analysis was conducted to examine the established relationship among the three variables: PsyCap, autonomous motivation and GPA. The hierarchical multiple regression was conducted to test the role of overall PsyCap and individual construct in predicting the GPA and autonomous motivation. The mediation model by which PsyCap correlates with GPA was tested using the procedure *Process*.

5. Results

5.1. Preliminary Analysis

Descriptive analysis and bivariate correlation between all variables involved in this study were shown in Table 1 and Table 2. The means and standard error of each study variables were reported (Table 1). As expected, students' PsyCap was positively related to GPA ($r = 0.20$, $p < 0.01$) autonomous motivation ($r = 0.53$, $p < 0.01$). AM was strongly related to students' GPA ($r = 0.29$, $p < 0.01$). Although positive, CM evinced a less strong relation with GPA and PsyCap. And amotivation was negatively associated with PsyCap ($r = -0.47$, $p < 0.01$) and GPA ($r = -0.261$, $p < 0.01$).

The correlation between subcomponents of PsyCap (hope, self-efficacy, optimism, and resilience) and Academic Motivation were shown in Table 2. Hope, self-efficacy and optimism were found to be related to students' GPA, while resilience showed no statistical significant correlation with GPA.

A one-way ANOVA and independent T-test were conducted to examine whether there was a difference in those major variables across different grades

Table 1. Correlations among major variables.

	Cronbach's α	M	SD	r 1	r 2	r 3	r 4
1 GPA	-	3.67	0.19	1			
2 PsyCap	0.91	120.11	17.96	0.20**	1		
3 AM	0.92	31.33	4.15	0.29**	0.53**	1	
4 CM	0.70	30.60	3.79	0.14*	0.18**	0.49**	1
5 Amotivation	0.82	8.93	3.44	−0.261**	−0.471**	−0.501**	−0.125

Note: AM = Autonomous Motivation, CM = Controlled Motivation; *significant at $p < 0.05$; **significant at $p < 0.01$.

Table 2. Correlations between study variables.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1 GPA	3.67	0.19	1											
2 PsyCap_ self-efficacy	32.16	5.43	0.158*	1										
3 PsyCap_resilience	27.97	5.96	0.088	0.497**	1									
4 PsyCap_hope	30.03	5.19	0.251**	0.619**	0.452**	1								
5 PsyCap_optimism	29.96	5.17	0.170*	0.664**	0.526**	0.728**	1							
6 IM_to know	15.53	2.66	0.302**	0.451**	0.190**	0.617**	0.530**	1						
7 IM_toward accomplishment	14.40	2.87	0.269**	0.464**	0.138*	0.491**	0.483**	0.769**	1					
8 IM_to experience stimulation	13.88	3.06	0.157*	0.424**	0.146*	0.419**	0.352**	0.662**	0.673**	1				
9 EM_identified regulation	16.73	2.07	0.268**	0.318**	0.083	0.549**	0.386**	0.698**	0.503**	0.441**	1			
10 EM_introjected regulation	13.60	2.58	0.113	0.279**	0.073	0.224**	0.276**	0.401**	0.573**	0.356**	0.335**	1		
11 EM_external regulation	17.01	2.18	0.105	0.047	0.097	0.209**	0.115	0.281**	0.144*	0.022	0.594**	0.265**	1	
12 amotivation	8.93	3.44	−0.261**	−0.267**	−0.317**	−0.573**	−0.413**	−0.506**	−0.358**	−0.281**	−0.485**	0.084	−0.118	1

and origins. No significance was found, so grades and origins served as control variables in subsequent analysis.

5.2. Regression Analysis

To test whether PsyCap is a prospective predictor of academic performance and AM and whether AM can predict students' academic performance, the regression analysis was employed.

As indicated in Table 3, PsyCap was put as a composite firstly and it was shown to be a significant predictor of students' Amotivation, CM and AM. After controlling the origins and grades, the overall PsyCap explained about 25.8% (p < 0.01) variance of AM, which supported H2. Although serving as a positive predictor, the predictive effect of PsyCap on CM was marginal ($R^2 = 0.02$). Psy-Cap was shown to be a robust negative predictor of students' amotivation, explaining 21.2% variance of amotivation. Then overall scores PsyCap was divided into the four subcomponents and entered the model to investigate the individual effect on AM. In this case, the overall model can explain around 42.2% of the variance. Hope and self-efficacy were positive predictors while resilience was negative predictors of AM. And optimism did not show statistical significance in this model.

Consistent with H1, PsyCap as a composite played a positive role in the prediction of GPA, increasing 3.4% of variance of the overall model (see Table 4). However, inconsistent with H5, only hope was statistically significant in predicting the dependent variable (p < 0.01) and other three constructs were

Table 3. Multiple regression analysis with PsyCap as a prospective predictor of Amotivation, CM, AM.

	Predictors	Amotivation	CM	AM
Step 1	grades	0.053	−0.069	−0.134
	origins	−0.109	0.2*	0.109
Step 2	PsyCap	−0.466***	0.165*	0.512***
Change in R^2 step1		0.004	0.031*	0.016
Change in R^2 step2		0.212***	0.022*	0.258***
Step 1	grades	0.053	−0.049	−0.123*
	origins	−.109	0.152*	0.024
Step 2	self-efficacy	0.211	0.108	0.161*
	resilience	−0.128	−0.365***	−0.236***
	hope	−0.619**	0.197*	0.534***
	optimism	−0.03	0.219*	0.13
change in R^2 step1		0.004	0.031	0.016
change in R^2 step2		0.339	0.148	0.422

Note: AM = Autonomous Motivation, CM = Controlled Motivation; *significant at p < 0.05; **significant at p < 0.01; ***significant at p < 0.001.

Table 4. Multiple regression analysis with PsyCap, AM, CM and amotivation as prospective predictors of students' GPA.

	Predictors	β	95% CI	P-value	change in R^2
Step 1	Grade	−0.119	[−0.060, 0.002]	0.08	
	Origin	0.05	[−0.043, 0.060]	0.46	0.006
Model 1	PsyCap	0.198	[0.001, 0.003]	0.003**	0.034**
Model 2	self-efficacy	0.015	[−0.006, 0.007]	0.873	
	resilience	−0.024	[−0.006, 0.004]	0.766	
	hope	0.275	[0.003, 0.017]	0.006**	
	optimism	−0.029	[−0.009, 0.007]	0.782	0.047**
Model 3	AM	0.288	[0.007, 0.019]	0.000***	0.077***
Model 4	CM	0.129	[0.000, 0.013]	0.058	0.011
Model 5	Amotivation	−0.255	[−0.021, −0.007]	0.000***	0.06***

Note: AM = Autonomous Motivation, CM = Controlled Motivation; *significant at $p < 0.05$; **significant at $p < 0.01$; ***significant at $p < 0.001$.

excluded, with the final model explained 4.7% of the variance. AM, as hypothesised (H2), was a prospective predictor of GPA in this study, explaining 7.7% of the variance. Given CM and amotivation were shown to be significantly related to GPA, the present study intended to examine the predictive effect of them. In Model 4, CM was added to the analysis whereas it did not demonstrate significant influence on the dependent variable ($p > 0.05$). After controlling the grades and origins, in Model 5, amotivation entered the model and was found to be a negative robust predictor of students' GPA, increasing the effect size of the overall Model by 6.0%.

5.3. Mediation Analysis

Considering the results by previous scholars, the AM was operated as the mediator between PsyCap and GPA. The current study examined indirect effects of the model using Process by Preacher Hayes' in SPSS 24 and bootstrap was used to calculate bias corrected standard errors. Again, grade and origins of students were controlled. As indicated in Table 5 and Table 6, the indirect effect of the model is significant because the 95% confidence interval estimates did not contain the value of zero.

However, when PsyCap was found to be statistically significant in predicting students' GPA in regression analysis, its direct effect on GPA was not significant here. But both indirect effect and total effect indicated significant path. According to the Preacher and Hayes (2008) [42], although the direct effect is not significant, it would be more appropriate to call it a partial mediator rather than a full mediator. Therefore, in this study, AM mediated the relationship between the PsyCap and Academic Performance of university students, which is consistent with H4.

Table 5. The results for analysis of Mediation Model.

	GPA		GPA		AM	
	t	p	t	p	t	p
Grade	−1.2983	0.1955	−1.8	0.0732	−2.3502	0.0196*
Origin	0.2325	0.8164	0.434	0.6644	0.9433	0.3466
PsyCap	0.9218	0.3576	3.011	0.0029**	10.0148	0.0000**
AM	3.3307	0.001**				
R²	0.0987		0.0533		0.2836	
F	6.0256		4.147		29.1577	

Note: AM = Autonomous Motivation; *significant at p < 0.05; **significant at p < 0.01.

Table 6. The results for analysis of Mediation Model.

	Effect	BootSE	BootLLCI	BootULCI	%
indirect effect	0.0014	0.0005	0.0004	0.0022	67%
direct effect	0.0007	0.0008	−0.0008	0.0023	33%
total effect	0.0021	0.001	0.001	0.004	

6. Discussion

6.1. Theoretical contributions

The purpose of this study is to investigate the relationship among PsyCap, autonomous motivation and academic performance of university students. Overall, the current study supported most hypotheses and helped acknowledge the positive function of PsyCap and AM in triggering academic achievement in the current Chinese university setting.

Firstly, corroborated with prior research findings, the results revealed that PsyCap was a prospective predictor of AM (Datu *et al.*, 2016 [25]; Siu *et al.*, 2014 [10]) and students' GPA. The ability to yield optimal academic outcomes (AM and academic performance) of PsyCap also contributed to the COR (conservation of resources) theory which suggested that psychosocial resources of an individual can work synergistically in attaining other desirable ends (Hobfall, 2002) [43].

As PsyCap is defined as "who you are" and "what are you becoming" (Luthans *et al.*, 2006) [5], students with higher PsyCap are more inclined to be intrinsically motivated. In other words, a higher PsyCap usually entailed a higher internalization of tasks, which indicated a higher level of autonomy. This found evidence for results in the study of Siu *et al.* (2014) [10] that students with higher PsyCap capacity were more likely to espouse intrinsic motivation, the prototype of autonomous motivation.

Additionally, the current research also examined the relationship between PsyCap and other two motivational orientations (amotivation and controlled motivation). In the current study, amotivation presented a negative relationship

with PsyCap while CM presented a positive one in collectivist background (Caleon *et al.*, 2015 [44]; Datu *et al.*, 2016 [25]). Also, it was converged with studies under western background that showed a negative role of PsyCap in predicting students' CM, which was explained by the idea that people living in collectivist countries were less aware of the significant disparity between self and others (Markus & Kitayama, 1991) [45]. But CM was unable to predict the GPA of students, albeit it was found to be associated with positive adaptive outcomes in the previous studies conducted in collectivist countries.

The direct effect of PsyCap on students' GPA shown in this study agrees with empirical studies in academic contexts. There are many mechanisms testified by researchers on how PsyCap affects AP. Students who were high in PsyCap can capitalize on better meaning-focused strategies and experience more satisfaction, both directly predicting the school-reported GPA of students (Ortega-Maldonado & Salanova, 2017) [46]. PsyCap was also able to trigger positive outcomes such as study engagement (You, 2016) [26], well-being and academic adjustment (Hazan Liran & Miller, 2019) [47], all of which were proved to be associated with students' AP in previous studies.

Secondly, the current study contributed to building the mechanism linking PsyCap with GPA through the function of autonomous motivation, which has been only focused on by a small number of scholars (Datu & Valdez, 2018) [11], extending the generalizability of this model by doing research among Chinese samples.

The results of current study provided evidence that AM was a prospective predictor of students' overall GPA was corroborated with the findings of previous scholars. Ryan and Deci (2017) [3] claimed that people with higher autonomous motivation tend to pursue something that satisfies them so that they are more likely to put more effort in, which is of importance to help students sustain high academic performance. The profound research demonstrated several pathways whereby how AM affected students' academic performance through the mediating role of other positive academic outcomes such as cognitive ability (Gareau & Gaudreau, 2017) [48], study engagement (Siu *et al.*, 2014) [10], study strategies (Kusurkar *et al.*, 2012) [49]. Most importantly, it helped confirm the beneficial role of AM in predicting students' grades in Chinese background, which was also found in previous studies. Self-determination motivation could directly predict academic performance of both university students (Li *et al.*, 2020) [38] and secondary school students (Zhu, 2014) [10] in Chinese education context. That can be attributed to that students with higher self-determination motivation focused more on improving their abilities for internal improvement (Dong & Liu, 2016) [39] and were less prone to test anxiety (Tian *et al.*, 2012) [50].

Inspired by reviews of research conducted in the past decades (Luthans *et al.*, 2017; Dawkins *et al.*, 2013 [30]), the current research examined the individual effect of the four constructs of PsyCap in the prediction. The results led to simi-

lar conclusion results with that of Rego *et al.* (2009) [31], showing that when PsyCap entered the model in the form of 4 different subcomponents, the effect size was larger than that caused by PsyCap as a composite score. Similarly, self-efficacy was also not significant in the prediction in the two studies. But different from what Rego *et al* found (2009) [32], only hope served as a prospective predictor among the four in this study. However, Carmona-Halty *et al.* (2018) [24] verified the statistical significance of all 4 individual constructs in the prediction of students' academic performance.

The findings also concurred with what Feldman and Kubota (2014) [20] revealed that there was no significant path between optimism, self-efficacy and GPA. Their study provided one possible explanation that self-efficacy was originally defined as context-specific, which also may serve as a possible cause for the statistical insignificance between students' GPA and their self-efficacy in this study where a general scale was applied to assess students' self-efficacy.

In fact, it was not quite unexpected that the correlation between general optimism and students' academic performance was non-significant in this study. Even if many researchers proved the positive relationship, a large body of literature in optimism field indicated that optimism may be a risk factor when students were highly optimistic (Helweg-Larsen & Shepperd, 2001) [51]. Because they may aim unrealistically and undermine the possible obstacles, which would be problematic. Moreover, a recent study (Icekson *et al.*, 2020) reported the active interaction of optimism with gender and conscientiousness. Therefore, many factors should be controlled when examining the effect of optimism on academic performance whereas the current study failed to do.

The failure to link resilience with academic performance in the present research actually is also not surprising because similar results were demonstrated by some scholars (Meneghel *et al.*, 2019) [52]. In their study, it seemed that higher academic resilience was only linked to higher performance via the mediator of academic satisfaction. It may be a possible explanation here that resilience may impact academic performance throughout other academic outcomes such as academic engagement (Siu *et al.*, 2014) [10].

Next, as expected, the correlation between PsyCap and autonomous motivation was highly positive, but what was out of expectation was that only hope and self-efficacy showed statistical significance in the model. According to the definition of PsyCap hope (Luthans *et al.*, 2006) [5], hopeful people are more likely to make internal attributions in interpreting the results, which leads them to develop a high level of autonomy to wage the willpower to change. And students with high efficacy know they can do well and achieve, which in turn motivates them to work hard (Schunk, 1995) [53] and attain their goals for self-fulfillment. However, resilience was reported to be a negative predictor and optimism did not show any statistical significance in the present study. The uncommon predictive function shown in resiliency and optimism in this study possibly can be explained by the inability to control the demographic variables like colleges and

gender. Because both resiliency and optimism were reported to interact with gender (Helweg-Larsen & Shepperd, 2001 [50]; Icekson *et al.*, 2020). Combined with that there is a difference among GPA of students in different colleges, having some error in the data is possible.

6.2. Limitation and Implication

Despite the contributions above, the present study was under some limitations.

The first one concerns the sample, which limited the generalizability of the results. The researcher failed to collect enough male samples and make the number of questionnaires from three schools in balance, so the impact of gender and colleges on students' GPA cannot be analysed. However, previous studies suggested that variables like optimism (Icekson *et al.*, 2020) and resilience (Ferreira *et al.*, 2019) [54] may vary based on gender. Moreover, there may exist a difference in the GPA of students in different colleges. Teachers in different schools probably have different criteria for giving marks, which would be an important factor affecting students' GPA. Also, GPA may differ due to the difficulties of the subject, such as students of art may have a higher GPA than those majoring in subjects involving maths and other science courses. Lastly, the samples all come from the same university also limited its generalizability and triggered some underlying errors.

Another limitation concerns the self-reported data. It is unavoidable on one hand for the nature that due to the fact that only self-reported statistics can be the most accurate for these items assessed. On the other hand, the researcher could not get GPA of participants. Therefore, the underlying error caused by social desirability bias and common method bias may hinder the generalization of the study.

Lastly, given the natural state like PsyCap, PsyCap is easy to change throughout time. However, the current study collected all the data simultaneously. To achieve data with higher accuracy, a longitudinal study should be applied to test the relationship between previous PsyCap and subsequent outcomes.

For future research, the current study provided several implications.

The insignificant relationship found between the individual components of PsyCap and students' academic performance and autonomous motivation provided important research directions for future studies regarding PsyCap.

Firstly, it indicated that a nuanced Psychological Capital questionnaire categorizing the conceptualization of each component more accurately is needed (Luthans & Youssef-Morgan, 2017) [23].

Secondly, more research should focus on the interplay between the subcomponents of PsyCap and report the individual effect of each element in the prediction. Many scholars (Datus & Valdez, 2018 [11]; Ortega-Maldonado & Salanova, 2018 [46]) used Broaden and Build theory and Conservation of Resources to explain the effect of PsyCap, believing that hope, self-efficacy, optimism and resilience exert accumulative effect to bolster positive consequences. Luthans *et*

al. (2006) [5] mentioned that these four elements play synergistically. But to date, the current study did not find valid evidence in the educational literature for the thought. Together with suggestions from previous studies (Dawkins *et al.*, 2013 [31]; Luthans & Youssef-Morgan, 2017 [23]), this study also implies that more sophisticated analysis is needed to interpret how the 4 core constructs interact with each other.

Moreover, PsyCap only explained about 4% of the variance, only a half of what Luthans *et al.* (2012) [6] reported in their study, albeit a significant path was shown in regression analysis. Combining with the result of model test demonstrating that the direct effect is not significant, more studies should be done to test the predictive relationship between the PsyCap and university students' GPA in Chinese context to confirm the positive function of PsyCap.

Apart from the implication for researchers, there are some potential implications for educators. Combined with existing research, the value of hope was again highlighted in this study, showing that hope is a consistently strong predictor of students' GPA across cultures and different conditions. The prior study has proved that hope can be promoted through intervention, and students increased their academic performance after taking part in the intervention (Davidson *et al.*, 2012) [55]. Therefore, it is reasonable to believe that possible interventions aiming to improve students' hope could be beneficial to students' academic performance in Chinese educational background.

The acknowledgement of the positive impact of autonomous motivation on students in this study calls for more attention to building students' AM, especially in Chinese background. Considering that in Chinese setting where the academic environment is highly competitive and more and more students are with school weary emotions (Li, 2017) [56], it would be conducive to help them get away from the negative emotion toward study. Because increasing AM can help them internalize their motivation, accept the value of the tasks and be more intrinsically motivated.

Altogether, the current study calls for more studies to investigate PsyCap and AM in Chinese background and consideration of putting them into application in the education domain.

Acknowledgements

Conflicts of Interest

The authors declare no conflicts of interest.

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