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RECEIVED 04 October 2024

ACCEPTED 27 November 2024

PUBLISHED 02 January 2025

CITATION

Ma Y and Ooi BK (2025) School factors and academic achievement of primary students in Dujiangyan, China: psychological capital as a mediator.

Front. Educ. 9:1493495.

doi: 10.3389/feduc.2024.1493495

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School factors and academic achievement of primary students in Dujiangyan, China: psychological capital as a mediator

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School factors represent a significant variable that exerts a profound influence on student academic achievement (AA). The construction and development of psychological capital (PsyCap) theory has led to the realization that PsyCap is an important factor influencing student AA. This study aimed to investigate the effect of non-physical school factors, namely school satisfaction (SS), teacher support (TS) and teacher-student relationship (TSR), on student AA through their PsyCap. Adopting a quantitative research methodology based on positivist research concepts, the study analyzed the data using SPSS 27 and Amos 27. The findings indicated that SS, TS, TSR, and PsyCap exerted a considerable positive influence on student AA. The effect sizes were as follows: $SE_{(SS \rightarrow AA)} = 0.258^{***}$, $SE_{(TS \rightarrow AA)} = 0.233^{***}$, $SE_{(TSR \rightarrow AA)} = 0.255^{***}$, and $SE_{(PsyCap \rightarrow AA)} = 0.427^{***}$. The results demonstrated a significant mediating effect of PsyCap on the effects of SS, TS, and TSR on student AA. The mediating effect accounted for 29.1, 41.2, and 37.2% of the total effect of each pathway, in that order. A noteworthy finding of this study is that the key influencers, person, exerts a more pronounced effect on students' PsyCap than other influencers. Furthermore, the impact of PsyCap on student AA is also more pronounced. The research model developed in this study on the influence of SS, TS and TSR on student AA through the mediation of PsyCap addresses a gap in the existing educational research literature and contributes to the evolving body of knowledge on PsyCap in the field of education, particularly in the context of primary education.

KEYWORDS

psychological capital, school factor, school satisfaction, student academic achievement, teacher support, teacher-student relationship

1 Introduction

The term “school factors” encompasses a multitude of elements pertaining to the school environment, including the quality of facilities, the educational qualifications of teaching staff, levels of satisfaction among students and teachers, and the nature of the TSR (Li and Xue, 2023). They are pivotal variables that exert a profound influence on student. The effects on students, including cognitive development, AA (Arifin et al., 2024), physical and mental health (Hawkins et al., 2023), and future development (Freeman et al., 2012), are widely acknowledged within the academic community. However, it is important to recognize that these effects may vary depending on national, cultural, and grade-level contexts. PsyCap, which encompasses four constructs (i.e., hope, self-efficacy, resilience, and optimism), represents an emerging, core

construct associated with a range of positive outcomes. It permits a favorable estimation of circumstances and probability of success, with effort and perseverance serving as motivating factors (Luthans et al., 2010). It is an important factor influencing employee performance that has been widely used and validated in the field of human resource management. It is often studied by researchers as a mediating variable (Luthans et al., 2008; Mahfud et al., 2020). In recent years, a small number of researchers have endeavored to incorporate PsyCap or an aspect of PsyCap into educational research, as evidenced by studies on high school and college students (Wu W. et al., 2023; Wu Y. et al., 2023; Huang and Wang, 2023). Nevertheless, there have been few instances where the overarching structure of PsyCap has been employed as a mediating variable to examine the impact of school-related factors on student AA, particularly in the context of primary school students. This represents a significant gap in the existing literature, which this study aims to address.

The objective of this study is to examine the mechanisms through which school-related factors influence student AA, in primary school. Accordingly, this study sought to examine the impact of non-physical school factors: school satisfaction (SS), teacher support (TS), and teacher-student relationship (TSR), on student (AA) through the psychological capital (PsyCap) of the students. Specifically:

1. To determine the influence of SS on student AA.
2. To determine the influence of TS on student AA.
3. To determine the influence of TSR on student AA.
4. To determine the influence of PsyCap on student AA.
5. To determine the mediating effects of PsyCap between the school factors and student AA.

2 Literature review and hypotheses development

School factors are pivotal variables that exert a profound influence on student AA. The experiences of children and adolescents in school have been shown to affect a number of important outcomes, including cognitive development, academic performance (Arifin et al., 2024), physical and mental health (Hawkins et al., 2023), and future educational decisions and opportunities (Freeman et al., 2012). This study concentrated on school factors in terms of SS, TS, and TSR. The promotion of SS has been demonstrated to act as a protective factor, fostering the adoption of healthy behaviors, promoting wellness, and enhancing life satisfaction among students (Samdal et al., 1998). The provision of emotional support (Wu W. et al., 2023) and social support from teachers has been demonstrated to be a principal predictor of academic competence (Torbergsen et al., 2023), particularly among children from less affluent families (Terrin and Triventi, 2023). The extant literature indicates that the relationships between teachers and students, whether direct or indirect, have a significant impact on learning outcomes (Gehlbach et al., 2023).

2.1 School satisfaction (SS) on student academic achievement (AA)

SS is defined as the cognitive and affective appraisals of the quality of a student's experiences within the school context (Furlong et al.,

2009). It is significant predictors of the happiness of secondary school students (Telef, 2021). As a significant aspect of adolescent well-being, SS is believed to contribute to school engagement (Salameh et al., 2024), with positive and significant effects observed on AA (Habib and Hossain, 2018). SS is conceptualized as a crucial factor influencing children's happiness and consequent healthy functioning in multiple developmental areas (Gómez-Baya et al., 2021). Adolescents who demonstrate positive attitudes toward school tend to exhibit a higher level of AA (Limna et al., 2022). Moreover, research has demonstrated that SS is positively correlated with school adjustment and negatively correlated with behavioral and adjustment problems (Jiang et al., 2019; Llorent-Bedmar et al., 2023). Additionally, the risk of dropping out of school can be directly or indirectly reduced by increasing SS (Magnano et al., 2020). Based on these arguments, the first hypothesis was developed:

H1: There is a significant effect of school satisfaction (SS) on student academic achievement (AA).

2.2 Teacher support (TS) on student academic achievement (AA)

The perception of support from teachers serves as a significant protective factor against the general declines in school engagement that are commonly observed during the secondary school years. The majority of adolescents continue to be significantly influenced by their teachers (Tran et al., 2023) with regard to school engagement, despite the potential for peer pressure to engage in misbehavior outside of the classroom (Smetana et al., 2006). Perceived autonomy-support by a teacher is significantly directly and indirectly (mediated) associated with students' perceived learning outcomes and indirectly associated with study effort (Torbergsen et al., 2023). While numerous factors within each setting may contribute to the development of school participation, the degree of kinship or support a child receives within these settings may be of particular significance (Shuttleworth, 2023). Teachers should strive to offer social support to students as a means of strengthening perceived academic self-efficacy and school engagement (Fernández Lasarte et al., 2020). The available evidence suggests that social support from teachers exerts an influence on student engagement and academic success (Lane et al., 2023). The role of emotional support from teachers as a key predictor of academic ability (Hettinger et al., 2023) and achievement (Affuso et al., 2023) has been well documented in the literature. TS has been demonstrated to exert a profound influence on enhancing Chinese students' academic engagement (Pan and Yao, 2023). Therefore, the second hypothesis was formulated:

H2: There is a significant effect of teacher support (TS) on student academic achievement (AA).

2.3 Teacher-student relationship (TSR) on student academic achievement (AA)

The topic of social relations in educational settings is a significant area of concern. The establishment of mutual respect between teachers and students, coupled with teachers' high expectations for student

success, has been demonstrated to contribute to improved AA, social, and behavioral success (Poling et al., 2022). A substantial body of research has demonstrated a correlation between positive TSR and a range of favorable student outcomes. Including a concurrent reduction in problematic behaviors and adjustment problems in adolescents over time (Keane et al., 2023), an increase in AA (Robinson, 2022), an increase in school engagement (Poling et al., 2022), and an increase in observed positive classroom behaviors (Jiang et al., 2022). The cultivation of intimate and constructive TSR may facilitate enhanced classroom interaction quality (Doyle et al., 2022) and exert a significant influence on the level of academic engagement observed among Chinese students (Pan and Yao, 2023). The TSR has been demonstrated to have a direct or indirect effect on learning outcomes (Gehlbach et al., 2023). In this context, the hypothesis suggests a significant effect of TSR on student AA:

H3: There is a significant effect of teacher-student relationship (TSR) on student academic achievement (AA).

2.4 Psychological capital (PsyCap) on student academic achievement (AA)

Theoretical studies have typically identified four key capabilities associated with PsyCap: self-efficacy, optimism, hope, and resilience (Geremias et al., 2020). PsyCap plays a pivotal role in academic outcomes, including academic performance, engagement, burnout, adjustment, stress, and intrinsic motivation. The role of PsyCap in the academic setting is significant, and thus further research is required to examine its relationship with student AA (Li et al., 2023). Academic self-efficacy is a significant predictor of student AA (Yudiani et al., 2023). The positive psychological quality of primary school students has been found to have a significant positive correlation with Chinese, mathematics, English achievement, and the total average achievement (Lavrijsen et al., 2022). Individual differences in school PsyCap were identified as significant predictors of achievement emotions (Kang and Wu, 2022). The PsyCap of students has been demonstrated to exert a direct negative influence on the phenomenon of academic procrastination (Saman and Wirawan, 2021). In light of these considerations, this study hypothesizes that:

H4: There is a significant effect of psychological capital (PsyCap) on student academic achievement (AA).

2.5 The mediating effects of psychological capital (PsyCap) between the school factors affecting student academic achievement (AA)

In the two decades since the emergence of PsyCap research, the role of PsyCap has been widely utilized and validated in the field of human resource management. In certain instances, PsyCap has been utilized as a mediating variable, both within the domain of human resource management and in the nascent field of research examining the application of PsyCap in education. For example, Luthans et al. (2008) propose that the fundamental structure of PsyCap (comprising hope, resilience, optimism, and self-efficacy) functions as a mediating

variable between a supportive organizational climate and employee outcomes. The findings indicated that PsyCap exerts a positive partial mediation effect on the relationship between entrepreneurial attitude orientation and entrepreneurial intention. Additionally, the results demonstrated that it fully mediates the impact of social capital on entrepreneurial intention (Mahfud et al., 2020). The construct of PsyCap serves as a mediator between the TSR and academic engagement. The TSR was found to predict school PsyCap, which in turn predicted English as a Foreign Language learners' academic engagement (Wu Y. et al., 2023). Furthermore, academic self-efficacy was identified as a mediator of the effects of TS on student AA (Huang and Wang, 2023). In light of the aforementioned discussion, the following hypothesis was formulated:

H5: There is a significant the mediating effects of psychological capital (PsyCap) between the school factors affecting student academic achievement (AA).

H5a: There is a significant the mediating effects of psychological capital (PsyCap) between the school satisfaction (SS) affecting student academic achievement (AA).

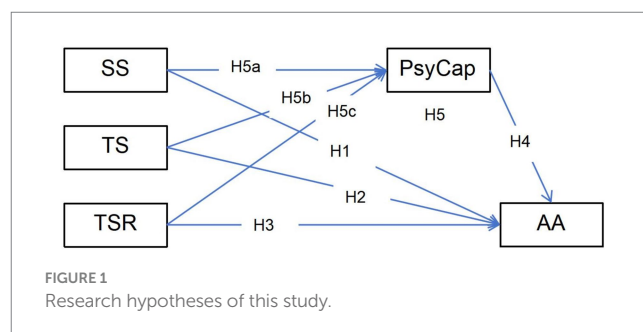
H5b: There is a significant the mediating effects of psychological capital (PsyCap) between the teacher support (TS) affecting student academic achievement (AA).

H5c: There is a significant the mediating effects of psychological capital (PsyCap) between the teacher-student relationship (TSR) affecting student academic achievement (AA).

Figure 1 provides an outline of the research hypotheses that were investigated in this study.

3 Methodology

The positivist research philosophy was chosen as the basis for this study, and a quantitative research method was used. The positivist research philosophy believes that factual knowledge can only be obtained through the senses and measurement. Positivist research usually adopts a deductive research approach where hypotheses are formulated and tested during the course of the study (Crowther and Lancaster, 2008). In research, they require statistical analyses which rely on quantifiable observations, which necessitates the use of quantitative research methods to achieve the research objectives. Quantitative research involves the use of statistical analysis to analyze



data, where the researcher makes every effort to avoid personal thoughts, biases, attitudes or images from influencing the results of the study. This study used statistical software such as SPSS and AMOS to analyze the data.

3.1 Measurement

There were two parts of data sources, that comprises of data from questionnaire and academic results. The questionnaire comprises the independent variables (SS, TS, TSR), the mediator variable (PsyCap), and demographic data, which were collected through students' self-completion of a questionnaire. The academic results were derived from the citywide standardized Chinese, Mathematics and English scores of the 6th grade final exam, which served as the dependent variable of this study, student AA. Subsequently, the two sets of data were matched based on students' uniform numbers.

Survey research was conducted, and four previously established measurement scales were used to collect the first part of the data. In all cases, the original meaning (stem) of the scale items was retained, while the wording of the scale items was modified to relate them to the context of this study. For example, the scale from [Löfstedt et al. \(2020\)](#) was used to measure SS. The scale consisted of only one question, based on which I expanded it with two questions, resulting in a three-question scale (e.g., "I like my school very much at present"). The four-item scale from [Wang and Eccles \(2012\)](#) was used to measure TS. Before using the questionnaire, I adapted the questionnaire based on the target population of this study, changing the responses from the teacher's perspective to the student's perspective (e.g., "My teachers always help me out when I have a personal or social problem at school"). TSR was assessed using a three-item scale adapted from [Yang and Zhao \(2020\)](#). The original scales were used to collect data on students' relationships with their Chinese, math, and English teachers, respectively, and in the same questionnaire, subjects were asked to provide three responses to each question by subject, which was only required to be answered once for the entire group of teachers in this study (e.g., "My teachers always pays attention to me"). PsyCap was measured using the Positive PsyCap Questionnaire (PPQ) compiled by [Kuo et al. \(2010\)](#), which consists of 26 items (e.g., 'Many people appreciate my talents') covering four dimensions: hope (6 items), optimism (6 items), self-efficacy (7 items), and resilience (7 items). The entire questionnaire included a set of demographics, 3 questions on SS, 4 questions to identify TS, 3 questions on TSR, and 26 questions to identify PsyCap. The participants were asked to rate the items on a 5-point Likert scale, with 1 indicating strongly disagree and 5 indicating strongly agree with the statements describing how they think about themselves.

This data set was subjected to rigorous scrutiny with the objective of identifying potential shortcomings that required attention, while simultaneously ensuring the internal consistency of each multi-item scale. Each scale yielded an alpha coefficient that surpassed the 0.7 threshold, which is a prerequisite for this type of research ([Nunnally, 1978](#)).

The students' performance was evaluated based on their final scores in Chinese, mathematics, and English. Subsequently, the dependent variable, AA, was quantified by calculating the mean scores in Chinese, Mathematics, and English. The scores utilized in this analysis originate from an annual citywide standardized sixth-grade

examination, which ensures uniformity of measurement tools and standards.

3.2 Sampling, data collection and analysis

If the sampling frame is large, and a listing of the elements is conveniently available in one place (e.g., telephone directories, company payrolls, student lists, etc.), then a systematic sampling procedure will offer the advantages of ease and quickness in developing the sample ([Sekaran, 2016](#)). The systematic sampling design involves drawing every *n*th element in the population starting with a randomly chosen element between 1 and *n*. The present study utilized a sample of eight primary schools within the Dujiangyan city area as the subject population. The Dujiangyan City Education Bureau administers an annual, city-wide unified examination for sixth-grade students. To ensure the collection of consistent, standardized, and comparable data on student AA, a systematic sampling was conducted, the list of all Grade 6 students in the sampled schools was accurately registered and numbered, with 50 students from each school, resulting in a total of 400 distributed questionnaires. All questionnaires were returned, with 9 incomplete questionnaires and 5 randomly completed questionnaires excluded, resulting in 386 valid questionnaires. Among them, 48.7% of the respondents were female and 51.3% were male. Additionally, 40.4% of the respondents were the only child in their family, while 59.6% were not.

Prior to administering the survey, the researcher obtained the requisite consent from the principal, the school administration, and the sixth-grade classroom teachers. The survey was conducted via a face-to-face distribution of the questionnaires. In each school, the sampled students were assembled in a designated meeting room, where the instructions for completing the questionnaire were elucidated. Subsequently, the questionnaires were distributed simultaneously, and the students completed them concurrently. Once the questionnaires were returned, the results were entered into a computerized database and compared with the scores based on the student's specific number to form the final data set.

4 Results

Finally, data from 386 questionnaires were entered in the initial data sheet before the data screening. An inspection of the skewness and kurtosis coefficients for each of the dimensions of the key variables proved normal (skewness coefficients ranged from -0.022 to -0.887 and kurtosis coefficients from -1.021 to 0.445). The construct validity of the questionnaire was assessed by confirmatory factor analysis (CFA) in Amos 27, and internal consistency was calculated by Cronbach's alpha in SPSS 27.

4.1 Validity and reliability measures

4.1.1 Convergent validity

Convergent validity was assessed by examining factor loadings, average variance extracted (AVE), and composite reliability (CR). As per [Table 1](#), all measurement items obtained significant loadings

TABLE 1 Convergent validity and reliability measures of variables.

Construct			Items	Standard loadings	<i>p</i>	AVE	CR	Cronbach's alpha
Independent variables	SS		SS1	0.821	***	0.587	0.810	0.806
			SS2	0.722	***			
			SS3	0.753	***			
	TS		TS1	0.711	***	0.614	0.864	0.861
			TS2	0.788	***			
			TS3	0.848	***			
			TS4	0.78	***			
	TSR		TSR1	0.866	***	0.685	0.867	0.865
			TSR2	0.758	***			
		TSR3	0.855	***				
Mediator	PsyCap	O	O1	0.743	***	0.565	0.886	0.943
			O2	0.773	***			
			O3	0.781	***			
			O4	0.733	***			
			O5	0.689	***			
			O6	0.787	***			
		R	R1	0.713	***	0.538	0.89	
			R2	0.733	***			
			R3	0.757	***			
			R4	0.713	***			
			R5	0.842	***			
			R6	0.666	***			
			R7	0.695	***			
		H	H1	0.78	***	0.612	0.904	
			H2	0.874	***			
			H3	0.835	***			
			H4	0.759	***			
			H5	0.703	***			
			H6	0.729	***			
		E	E1	0.771	***	0.56	0.899	
			E2	0.786	***			
			E3	0.726	***			
			E4	0.792	***			
			E5	0.753	***			
			E6	0.652	***			
			E7	0.749	***			

SS, school satisfaction; TS, teacher support; TSR, teacher–student relationship; O, optimism; R, resilience; H, hope; E, self-efficacy, *** significant at the 0.001 level (two-tailed).

(*p* < 0.001), varying between 0.652 and 0.874. The AVE values in this study were all greater than 0.5 and the AVE values were within the acceptable range (Hair et al., 2013). Reliability is assessed by measuring Cronbach's (1951) alpha and CR. The Cronbach's alpha and CR values for all four latent variables in this study were in the moderate range, exceeding 0.7, and easily meeting the Hair (2009) criteria for ensuring internal consistency and acceptable survey

inter-item reliability. Table 1 provides evidence of convergent validity and reliability.

4.1.2 Discriminant validity

Discriminant validity (DCV) refers to a construct that is truly distinct from other constructs. The DCV indicate the amount of variance of a variable from another variable, and the DCV is achieved

by the absence of so-called multicollinearity, in other words, there is no significant correlation or similarity between the variables and also the differentiation is achieved when the square root of the AVE is higher than the correlations between all dimensions, indicating that the latent variables investigated were different from one another (Hair et al., 2006). Table 2 provides evidence of discriminant validity, shows that the square root of the AVE for each variable in this study is higher than the correlation between all dimensions, therefore there is no multicollinearity between the variables in this study.

4.2 Confirmatory factor analysis

The results of the confirmatory factor analysis (CFA) for the mediator variable yielded an adequate four-dimensional model ($\chi^2/df = 1.368$; goodness-of-fit index = 0.981; comparative fit index = 0.927; root mean square error of approximation = 0.031), while the CFA results for the independent variable produced an adequate three-factor model ($\chi^2/df = 1.355$; goodness-of-fit index = 0.996; comparative fit index = 0.981; root mean square error of approximation = 0.024) that conformed to all standard conventions (Hair, 2009).

4.3 Hypotheses testing

Subsequently, Structural Equation Modelling (SEM) was developed in Amos for the purpose of testing the aforementioned hypotheses. Figure 2 illustrates the path diagram of the SEM, with the straight lines representing the significant paths, the arrows indicating the direction of influence, and the coefficients located next to the lines representing the SE coefficients.

Table 3 displays this model with a standardized regression coefficient and gives the statistics of the Main Hypothesis. The significant direct path coefficients were: (1) SS positively predicted AA (SE = 0.258, C.R. = 6.695, $p < 0.001$), confirming H1, (2) TS positively predicted AA (SE = 0.233, C.R. = 5.975, $p < 0.001$), confirming H2, (3) TSR positively predicted AA (SE = 0.255, C.R. = 6.73, $p < 0.001$), confirming H3, (4) PsyCap positively predicted AA (SE = 0.427, C.R. = 8.049, $p < 0.001$), confirming H4.

Mediating effects were verified using bootstrap resampling (5,000 draws and 95% confidence interval [CI]). Table 4 illustrates the

examination of indirect relationships, reveal that PsyCap plays significant mediating roles in the relationships between SS and AA (indirect SE = 0.106, 95% bootstrap CI = 0.057–0.164, direct SE = 0.258, 95% bootstrap CI = 0.169–0.343), between TS and AA (indirect SE = 0.163, 95% bootstrap CI = 0.107–0.235, direct SE = 0.233, 95% bootstrap CI = 0.145–0.309), and between TSR and AA (indirect SE = 0.151, 95% bootstrap CI = 0.095–0.217, direct SE = 0.255, 95% bootstrap CI = 0.181–0.325), thereby supporting H5a, H5b and H5c. The calculated indirect effect sizes for each pathway were, in order, 0.106/0.364, or 0.291 of the total effect size for the pathway, 0.163/0.396, or 0.412 of the total effect size for the pathway, and 0.151/0.406, or 0.372 of the total effect size for the pathway.

Considering the veracity of all sub-hypotheses, it can be stated that H5 is wholly supported. The findings indicate that PsyCap exerts a substantial mediating influence between the school-related factors that impact student AA.

In consideration of the results, it can be concluded that all five hypotheses proposed in this study were supported. Figure 2 depicts the standardized effect sizes yielded by the present study.

5 Discussion

This study examines the influence of school factors (SS, TS, and TSR) on primary school student AA in a sample population in Dujiangyan City. Additionally, it explores the mediating role of students' PsyCap.

Firstly, it can be demonstrated that SS has a significant impact on student AA. A positive correlation has been identified between high levels of SS and AA (Danielsen et al., 2010). Adolescents who express positive attitudes toward school tend to demonstrate higher levels of AA (Suldo et al., 2022) than those who exhibit negative attitudes (Simões et al., 2010). Our findings indicate that SS has a significant positive effect on AA (SE = 0.258***, C.R. \pm S.E. = 6.695 \pm 0.691). This suggests that a 1-unit change in SS is associated with a 0.258 standardized coefficient change in student AA.

Secondly, the level of TS available to students has a significant impact on their AA. While numerous elements within each setting may contribute to the development of school engagement, the affection or support that children receive in these settings may be of paramount importance (Shuttleworth, 2023). The provision of emotional support by teachers has been demonstrated to be a significant predictor of learning ability (Hettinger et al., 2023). The present study also served to corroborate the positive and significant predictive power of TS on student AA (SE = 0.233***, C.R. \pm S.E. = 5.975 \pm 0.632). This indicates that a 1-unit change in TS is associated with a 0.233-unit change in student AA, as measured by the standardized coefficient.

Third, the TSR has been demonstrated to exert a considerable influence on student AA. The relationship between teachers and students has been demonstrated to have a direct and indirect effect on learning outcomes (Gehlbach et al., 2023). The data in this study also strongly support this assertion (SE = 0.255***, C.R. \pm S.E. = 6.73 \pm 0.599). This indicates that a 1-unit change in the TSR is associated with a 0.255-unit change in student AA.

Fourth, PsyCap plays a pivotal role in facilitating personal growth and performance enhancement, and is a pervasive concept in human

TABLE 2 Discriminant validity (DCV) measures of variables.

	SS	TS	TSR	E	H	R	O
SS	0.766						
TS	0.255	0.782					
TSR	0.261	0.186	0.828				
E	0.378	0.431	0.351	0.748			
H	0.357	0.334	0.382	0.541	0.782		
R	0.344	0.439	0.418	0.653	0.6	0.733	
O	0.26	0.375	0.36	0.606	0.613	0.61	0.752
AVE	0.587	0.614	0.685	0.56	0.612	0.538	0.565

SS, school satisfaction; TS, teacher support; TSR, teacher–student relationship; O, optimism; R, resilience; H, hope; E, self-efficacy.

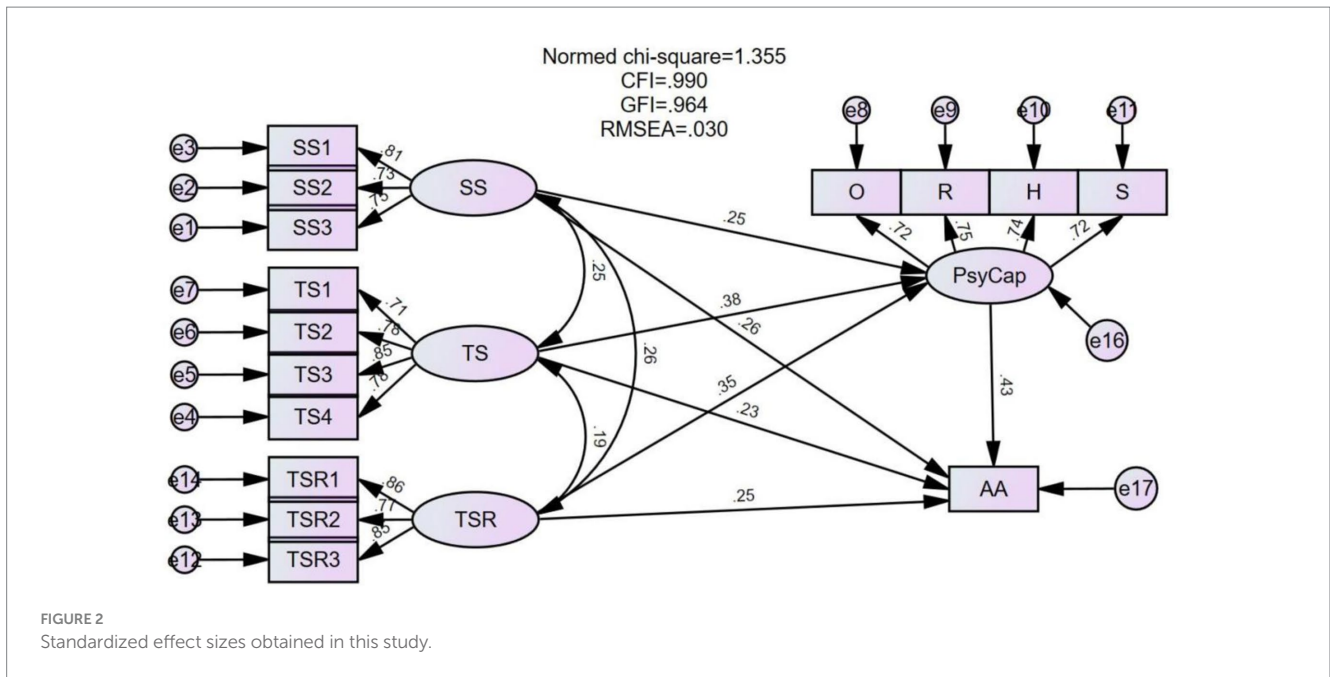


FIGURE 2 Standardized effect sizes obtained in this study.

TABLE 3 Examination of main hypothesis N = 386.

	Path	SE	S.E.	C.R.	p	
SS	→	AA	0.258	0.691	6.695	***
TS	→	AA	0.233	0.632	5.975	***
TSR	→	AA	0.255	0.599	6.73	***
PsyCap	→	AA	0.427	1.178	8.049	***

***P<0.001 two-tailed.

TABLE 4 Examination of indirect relationships N = 386.

Path	Effects	SE	p	95%CI		Hypothesis assessment
				LB	UB	
TSR → PsyCap → AA	Total	0.406	***	0.321	0.484	Accepted
	Direct	0.255	***	0.181	0.325	
	Indirect	0.151	***	0.095	0.217	
TS → PsyCap → AA	Total	0.396	***	0.319	0.482	Accepted
	Direct	0.233	***	0.145	0.309	
	Indirect	0.163	***	0.107	0.235	
SS → PsyCap → AA	Total	0.364	***	0.266	0.355	Accepted
	Direct	0.258	***	0.169	0.343	
	Indirect	0.106	***	0.057	0.164	
PsyCap → AA	Direct	0.427	***	0.320	0.532	Accepted

***P < 0.001 two-tailed.

resource management research (Basinska and Rozkwitalska, 2022). As defined by Luthans et al. (2007), PsyCap can contribute to the enhancement of individual performance, which in the student population is reflected in the enhancement of academic performance (Xu, 2020). The present study yielded a similar conclusion, indicating that PsyCap plays a comparable role to that of human resource management in influencing AA (SE = 0.427***, C.R. ±

S.E. = 8.049 ± 1.178). This indicates that a 1-unit change in PsyCap is associated with a 0.427-unit change in student AA.

Fifth, PsyCap serves as a mediator between school factors and student outcomes. The core structure of positive PsyCap, which comprises hope, resilience, optimism, and efficacy, serves as a mediator between a supportive organizational climate and employee outcomes (Luthans et al., 2008). In recent years, research findings in

the field of education have also corroborated the hypothesis that PsyCap, as a mediating variable, affects student AA. A study by Shen (2019) demonstrated that PsyCap plays an important mediating role in the process of parenting practices affecting children AA and plays a partially mediating role between social support and academic burnout (Xu, 2020). The PsyCap of high school students plays a significant mediating role between school connectedness and AA (Cao, 2019). The findings of this study lend support to the hypothesis that PsyCap exerts a similar mediating influence in the context of educational research. The indirect effect of SS on student AA through PsyCap is represented by the coefficient $SE = 0.106^{***}$. The indirect effect of SS on student AA is $0.106/0.364$, which is equal to 0.291 , suggesting that 29.1% of the effect of SS on student AA is mediated by PsyCap. The coefficient of indirect effect of TS on student AA through PsyCap is $SE = 0.163^{***}$. The indirect effect of TS on student AA is $0.163/0.396$, which represents a total of 0.412 . This figure indicates that 41.2% of the effect of TS on student AA is mediated by PsyCap. The coefficient of indirect effect of the TSR on student AA through PsyCap is $SE = 0.151^{***}$. The indirect effect of TSR on student AA is $0.151/0.406 = 0.372$, indicating that 37.2% of the effect of TSR on student AA is mediated by PsyCap.

The above results clearly demonstrate that compared to the direct effect of SS on student AA (0.258) which is slightly higher than the direct effect of TS on student AA (0.233) and the direct effect of TSR on student AA (0.255), there is a significant reversal through the mediation of PsyCap, with the TS affecting student AA and TSR affecting student AA showing stronger performance through the mediation of PsyCap. TS and TSR describe the level of quality of the key influences that a student receives directly from his key influencers, teacher, in school and their related relationships, and SS is a subjective cognitive evaluation of the student's experience in school in relation to the overall quality of life.

In summary, a new finding of this study is that PsyCap plays a particularly significant role in mediating the influence of key influencers, person, on student AA, and it can be argued that key influencers, person, have a more significant impact on students' PsyCap, and therefore on student AA, than other influences. This is similar to the conclusions reached in human resources management research. Leader (key influencer) PsyCap has a significant positive effect on follower PsyCap (Telef, 2020), and a leader's (key influencer's) PsyCap explains about 50% of a follower's PsyCap (Gojny-Zbierowska, 2024). This finding also tells us that more attention should be paid to the influence of key person when focusing on the improvement of student AA.

This study addresses two key research questions: firstly, how school factors affect AA, and secondly, whether PsyCap can act as a mediator in this relationship. Building on existing research, the study introduced PsyCap as a mediating variable to be tested within the research framework. The results demonstrated that PsyCap significantly and positively mediated the effects of school factors on student AA.

6 Conclusion

Previous research has identified the direct and indirect impact of PsyCap on work output. This study builds on Luthans et al.'s (2008) findings that "Core construct of positive PsyCap (consisting of hope, resilience, optimism, and self-efficacy) plays a role in mediating the effects of a supportive organizational climate with employee

outcomes," and combines the research findings of Cao (2019), and Wang (2020) in relation to the influence of PsyCap on student AA with the research results, a model of PsyCap mediating school factors affecting student AA was constructed. This is the innovation of this study and the contribution of this study to the use of PsyCap in educational research. The research model of SS, TS, and TSR on student AA through the mediation of PsyCap is structured in this study, which fills the gap in this area of PsyCap applied to education research and enriches the research on PsyCap in the field of education, especially in primary education.

The results of the study showed that SS, TS, and TSR have a significant direct positive effect on student AA and a significant indirect effect on student AA through PsyCap. This study reaffirms previous research that there is a positive and significant relationship between SS and AA (Wilson et al., 2020), and that TS affects student engagement (Lane et al., 2023) and is a significant predictor of learning ability (Hettinger et al., 2023) and AA (Affuso et al., 2023), and the quality of TSR has also been demonstrated to exert a considerable influence on levels of academic engagement (Pan and Yao, 2023), with TSR exerting a direct or indirect influence on learning outcomes (Kasperski and Blau, 2023). Our findings are similar to those of Luthans et al. (2008) in the area of human resource management. That is, PsyCap is significantly and positively related to student AA and positively mediates the effects of SS, TS, and TSR on student AA.

This study suggests that PsyCap is an important factor influencing student AA, and even more so, an important mediator of the influence of school factors (SS, TS, and TSR) on AA. This finding is a great contribution to further in-depth exploration of the factors and mechanisms that influence student AA.

7 The theoretical and practical implications

Academically, as PsyCap is rarely used in the study of student AA, this study introduces PsyCap as a mediating variable into the research framework, which provides more first-hand information for the study of the effect of PsyCap on student AA. It provides a basis for research into the impact of PsyCap on student AA in the context of primary schooling, and will help to identify other research gaps for further study. Also, this study provides a new framework for future researchers to study the effects of school factors on student AA, in which PsyCap is a mediating variable. The results of the study will contribute to a proven concept that can be put into practice.

Practically, the results of this study reaffirm that school satisfaction, teacher support, and teacher-student relationships are important factors that influence student achievement, and it also reveals that psychological capital plays a very important mediating role in the relationship between school factors influencing student achievement, especially in the influence of key influencers (people) on student AA. This result gives us an important insight: in education, students' experience of the teaching and learning process and environment, the relationship between the two subjects of teaching and learning (teacher-student) and the social support they receive therein, have a very strong influence on students' academic performance. Therefore, educational authorities and school leaders should pay attention to students' satisfaction with school in school

management, create a school climate suitable for students' development, guide the formation of harmonious teacher-student relationships, optimize the organization of activities for the enhancement of teachers' and students' PsyCap. Teachers should focus on consciously enhancing students' PsyCap in their teaching and promoting student learning through the formation of high quality PsyCap. Being able to clearly recognize the impact of key influencers (person) on students, establishing good TSR, actively encouraging and supporting students, and providing students with positive and effective emotional support, as the impact of these key influencers (person) on student AA through the mediation of PsyCap will be more significant.

8 Limitations

Of course, there are bound to be limitations in this study. The effects of PsyCap mediating SS, TS, and TSR on student AA are also influenced by many other factors, such as geography, ethnicity, country, and religious beliefs, varies across countries and regions, our study also has such limitations. The sampling area was limited to Dujiangyan City, and the findings may only be applicable to similar areas. Cultural differences due to these factors should also be a focus of future research, as emphasized by [Luthans and Youssef-Morgan \(2017\)](#), not only as a control variable but also as an important boundary condition. More in-depth exploration in this area is crucial for understanding the impact of PsyCap on student learning in different cultural contexts, which is essential for the development of effective talent development mechanisms and educational strategies in the context of globalization.

The concept of PsyCap has been proposed as an emerging paradigm for just over 20 years. While it has been widely validated in the field of human capital, the research results applied to the field of education are extremely limited. Consequently, there is less information and fewer conclusions available for this study. The elementary and middle school years are periods of rapid psychological growth and development, and it is therefore to be expected that the results of research conducted at different grade levels will vary ([Saman and Wirawan, 2024](#)). The present study was conducted with a sample of sixth graders, and thus the findings may not be generalizable to other grade levels. The dearth of information regarding the utilization of PsyCap research in the field of education, coupled with the fact that the subjects of this study are undergoing a period of rapid physical and psychological development, renders the conclusions of this study applicable only to a limited extent. Nevertheless, the findings of this study will serve as a valuable source of information on the application of PsyCap theory to the field of education, and there is considerable scope for further research.

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Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by MSU University Ethics Committee Management and Science University. The studies were conducted in accordance with the local legislation and institutional requirements. The ethics committee/institutional review board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because prior to administering the survey, the researcher obtained the requisite consent from the principal, the school administration, and the sixth-grade classroom teachers.

Author contributions

YM: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. BO: Project administration, Supervision, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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