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PERCEIVED SOCIAL SUPPORT AND ITS DIMENSIONS IN RELATION TO ACADEMIC ACHIEVEMENT: A META-ANALYSIS AMONG UNDERGRADUATE STUDENTS

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Abstract

Undergraduate academic achievement serves as a vital measure of higher education standards. The impact of perceived social support on academic outcomes has gained considerable attention. Nevertheless, existing studies have shown varied results regarding its correlation with undergraduate achievement, and the moderating effects remain unclear. This research utilized a meta-analytic method to comprehensively assess the link between perceived social support, including its subtypes (teacher, peer, and parental support), and undergraduate academic achievement. It further explored how variables like gender, economic level, cultural background and academic achievement measurement type function as moderators. The analysis incorporated 27 studies, resulting in 41 distinct effect sizes across 31,019 undergraduate participants. The results indicated a positive but modest correlation between perceived social support and academic achievement, with teacher support having the strongest effect among subdimensions. Moreover, the moderating effects of contextual and demographic factors on the support-achievement relationship exhibited variations across different subdimensions of perceived social support. This study provides essential empirical evidence about the complex mechanisms linking perceived social support with academic outcomes, offering theoretical and practical guidance for educational policy and future research.

Keywords: *academic achievement, academic achievement measurement type, cultural background, economic level, meta-analysis, perceived social support*

Introduction

Academic achievement (AA) is widely recognized as a crucial indicator of students' learning cognition and outcomes. Strong AA not only supports personal development but also contributes to breaking the cycle of poverty across generations (Wang & Zhao, 2022). Undergraduates, as the largest student group in higher education, are seen to have their academic success recognized as a core measure of the quality of higher education (Lü et al., 2022). Thus, exploring the factors that influence undergraduate AA holds both theoretical and practical importance.

External support is essential for undergraduates striving to achieve AA (Kapo et al., 2024). Social support is considered one of the most influential external factors impacting AA (Rabgay, 2015), as it meets students' social interaction needs, fosters a supportive learning environment (Wu et al., 2023), and reduces negative emotions caused by academic stress, thereby enhancing

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motivation and promoting academic success (Kiuru et al., 2020). Conversely, students lacking social support may experience isolation and helplessness when facing academic challenges, potentially affecting their mental health, social relationships, and academic outcomes (García-Martín et al., 2016; Kaya, 2021). Research has shown that perceived social support (PSS) – which reflects an individual's personal evaluation of the support they believe is available–often serves as a stronger predictor of behavioral outcomes and long-term development than actual received support, making it highly relevant to understanding AA (Robbins et al., 2004).

Research Problem

Prior studies commonly show that PSS has a beneficial effect on AA, yet findings remain inconsistent. As an example, one study suggests that reduced social support could enhance AA, particularly among female students, where limited support serves as a motivational factor (Mulhem et al., 2023). Another study even reports no significant correlation between the two (Crawley, 2014).

Furthermore, both local and international researchers have examined different sources of PSS, such as perceived teacher support (PTS), parental support (PPS), and peer support (PPrS), but findings are still mixed. Some research has identified teacher support as the most impactful factor for academic success (Ruzek et al., 2016), while others have argued that peer or parental support plays a more substantial role (Chen et al., 2013; Tayfur&Ulupinar, 2016). Overall, while extensive research has explored the relationship between PSS and AA, the strength and specific impact of this relationship remain ambiguous, and there is ongoing debate over whether a consistent positive correlation exists. This uncertainty limits a more refined understanding of the model underlying this relationship. Consequently, a more systematic and comprehensive analysis is needed to address this research gap and clarify how PSS influences AA.

Research Focus

Given the substantial inconsistencies in current studies regarding the link between PSS and AA, this study intends to carry out a meta-analysis to systematically integrate findings and offer a broader perspective on the association of PSS, its subtypes (PTS, PPS, and PPrS), and AA. Meta-analysis not only addresses the inconsistencies across individual studies but also enhances statistical power by aggregating effect sizes, allowing for more robust and generalizable conclusions (Nordmann et al., 2012). This approach offers a reliable tool for exploring potential underlying mechanisms between variables, laying a solid empirical foundation for understanding the impact of PSS on undergraduate AA.

In international studies, meta-analyses on PSS have often taken a fragmented approach, focusing on one specific subtype and its relationship with AA, with many studies emphasizing autonomy support (Vasquez et al., 2016). Domestically, a meta-analysis has investigated the link between PSS and AA (Chu et al., 2010), and identified a weak correlation. However, this study primarily focused on student well-being, with AA included as only one of the measured variables. Furthermore, Wang and Zhao (2022) conducted a meta-analysis focused solely on PTS and AA. However, a comprehensive meta-analysis examining PSS and its three main subtypes (PTS, PPS, and PPrS) in relation to AA, particularly among undergraduates, remains lacking.

Research has also indicated that the association between PSS and AA may vary by context and individual characteristics. For example, Hagger (2009) has noted cultural differences in the strength of this association, as variations in social, economic, and cultural capital between Eastern and Western countries lead to unequal resource distribution within social networks, which in turn shapes students' AA. In addition, Tennant et al. (2015) have revealed that PSS

correlates significantly with different types of academic measures, suggesting that the method of measuring AA may act as a moderator. Other factors, such as gender and socioeconomic status, may also play important moderating roles in the relationship between PSS and AA. However, these moderating effects have not been systematically and comprehensively explored in existing literature.

Research Aim and Research Questions

To bridge the gaps in prior studies and overcome the shortcomings of existing meta-analyses, this study draws upon Bronfenbrenner's (1986) ecological systems theory, categorizing sources of PSS as microsystem factors with the most direct impact on student development, specifically PPS, PTS, and PPrS. In light of observed inconsistencies in previous research findings, the primary objective of this study is to evaluate the overall impact of PSS on undergraduate AA through meta-analysis, to explore the differential effects of various sources of PSS, and to identify relevant moderating factors.

These specific objectives contribute to the broader research goal of examining and comparing the effects of various sources of PSS on undergraduate AA. This study seeks to determine which type of social support has the strongest influence on academic success and to clarify the role that moderating factors play within these relationships. The findings are intended to provide evidence-based guidance for educational interventions, enabling educators to develop targeted strategies that maximize the positive impact of PSS on AA.

At a macro level, this study aims to offer a new theoretical perspective on the mechanisms linking social resources with student development. It seeks to provide a scientific foundation for the design and optimization of future educational policies, ultimately helping educators to allocate social support resources more effectively to foster both academic progress and holistic growth in students.

Based on this research objective, the study aims to address the following specific questions:

1. Is there a significant overall correlation between PSS and undergraduate AA?
2. Do PPS, PTS, and PPrS each independently have an effect on undergraduate AA?
3. Do variables such as gender, economic level, cultural background, and academic achievement measurement type significantly moderate the relationship between PSS and AA?

Research Methodology

Search Strategy and Inclusion Criteria

This study employed a systematic literature search strategy across both Chinese and English databases to ensure comprehensive data collection. Chinese search terms included "本科生"(undergraduates), "大學生"(college students), "社會支持"(social support), "教師支持"(teacher support),"同伴支持" (peer support), "父母支持"(parental support), and"學業成就" (academic achievement), with databases such as CNKI, Wanfang, VIP, and Baidu Scholar being utilized. For English sources, searches were conducted in Web of Science, Scopus, ProQuest, ScienceDirect, SpringerLink, PsycINFO, and JSTOR using terms like "perceived social support", "teacher support", "peer support", "parental support", "academic achievement", "academic performance", "academic success", "learning outcome" and "learning gains". Keywords such as "university students" OR "undergraduates" covered studies from January 2000 to September 2024 to capture both early and recent trends.

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The inclusion criteria were as follows:

1. Study Type: Eligible studies had to be published in empirical research. Exclusions included case studies, review articles, theoretical discussions, and theses or dissertations (master's/doctoral). Studies using quasi-experimental designs were also excluded.
2. Research Content: Selected studies needed to examine the link between PSS and its various subdimensions (e.g., teacher, parental [family], and peer [friend] support) in relation to academic achievement.
3. Statistical Data: Studies were required to report sample size and correlation coefficient (r), or other statistics that could be converted into a correlation coefficient (e.g., t-values, standard deviation, F-values, β-coefficients).
4. Sample Characteristics: Studies had to involve undergraduate students as the sample population, excluding research on graduate, vocational, or other student types.
5. Duplicate Studies: For duplicate publications, preference was given to studies with more comprehensive content or those published in authoritative journals.
6. Actual Social Support: Studies that measured actual social support (e.g., using SSRS) were excluded; only studies measuring PSS were considered.

Literature Coding

Following the literature search and screening, each eligible study was coded. To minimize bias, two independent researchers conducted the literature screening and data extraction. When disagreements arose regarding study inclusion or exclusion, a third researcher provided the final decision to maintain coding consistency. Cohen's Kappa coefficient was calculated to assess inter-coder reliability, yielding a value of .818, indicating a high level of agreement (a Kappa value above .70 is generally considered to indicate strong consistency). Table 1 presents the details of the coded variables and coding standards.

For coding effect sizes, the following procedures were applied: First, if a study reported multiple academic achievement measures within the same category (e.g., different subjects), the mean effect size was calculated for analysis. Second, for longitudinal studies with multiple time points, effect sizes at each time point were weighted by the corresponding sample size. Lastly, if a study reported multiple dimensions of social support, each dimension's effect size was recorded separately to enable independent analysis of its relationship with AA.

Table 1
Coded Variables and Standards for Eligible Literature Screening and Extraction

Coding Variable	Coding Standard
Literature Information	Author, publication year
Sample Size	Total number of participants
Gender Distribution	Percentage of male and female participants
Economic Level	Developed or developing nations (World Bank, 2009)
Cultural Background	Eastern or Western cultures (Gupta et al.,2002; Hofstede, 1984)
Variable Relationship	PSS(including PTS,PPS,PPrS)) + AA
Type of Academic achievement	Objective measures (including GPA, CGPA, Course Pass Rate, Course Grades, Class Grades, and Performance Coefficient) and Self-reported measures (Likert-scale based self-assessments).

Note. PSS = Perceived Social Support; PTS = Perceived Teacher Support; PPS = Perceived Parental Support; PPrS = Perceived Peer Support; AA = Academic Achievement.

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Meta-Analysis Procedure and Methods

To ensure the accuracy of effect sizes, heterogeneity and publication bias tests were conducted prior to analysis, in order to remove invalid data and identify commonalities and differences between studies. Initially, heterogeneity was assessed through the *Q*-value and the I^2 statistic. A *Q*-value with $p < .05$ suggests heterogeneity among the studies, while I^2 values of 25%, 50%, and 75% indicate low, moderate, and high levels of heterogeneity, respectively (Higgins et al., 2003). Furthermore, τ^2 was employed to estimate the variance of true effects, with significant values indicating substantial heterogeneity among effect sizes (Borenstein et al., 2009). A random-effects model was applied to combine effect sizes, as significant heterogeneity was detected among the studies.

The effect size in this study was represented by the Pearson correlation coefficient (*r*). For studies that did not report *r* values directly but provided *T*-values or β-coefficients, these values were converted into corresponding correlation coefficients using established formulas to ensure comparability. Fisher's *z*-transformation was applied to standardize effect sizes, converting correlation coefficients into *z* scores, which were subsequently back-transformed to *r* values for further interpretation. Effect sizes were classified according to Cohen's (1992) criteria as small ($r \leq .10$), small to medium ($.10 < r \leq .25$), medium ($.25 < r \leq .40$), and large ($r > .40$).

To assess potential publication bias, funnel plots were generated, and Egger's linear regression test was conducted. Additionally, the Fail-safe *N* statistic quantified the extent of bias present. To analyze the impact of moderating factors on the relationship between PSS, its subdimensions and AA, both subgroup analysis and meta-regression were utilized. Data processing and analysis were carried out using version 3.3 of Comprehensive Meta-Analysis (CMA) software. By synthesizing findings across multiple studies, this meta-analysis provides a comprehensive overview and addresses inconsistencies in prior research on the role of PSS.

Research Results

Literature Search

This study conducted a systematic literature search and screening process in accordance with the PRISMA (2020) guidelines, which was completed in two stages: First, a comprehensive search was conducted in both Chinese and English databases, yielding a total of 4,442 relevant studies. During the initial screening stage, 307 duplicate studies were removed, and 3,585 studies unrelated to the research topic were excluded based on titles and abstracts. As a result, 550 studies proceeded to the secondary screening stage. In the secondary screening, full texts were further reviewed, and studies were excluded based on the following criteria: full text unavailable (n = 21), non-undergraduate samples (n = 223), studies not related to PSS (n = 8), studies not in English or Chinese (n = 67), studies without *r*-values or convertible effect sizes (n = 14), and studies with incompatible research designs (n = 190). Ultimately, 27 studies were included in the meta-analysis, comprising 5 in Chinese and 22 in English. The combined sample size of the selected studies reached 31,019, with the largest sample size being 13,749 participants and the smallest 100 participants. An overview of the studies included in the meta-analysis is presented in Table 2, while Figure 1 outlines the PRISMA flowchart that details the study screening process.

Due to variations in reporting, with some studies providing both an overall PSS effect size and effect sizes for its sub-dimensions, while others providing effect sizes for a single sub-dimension only, 41 independent effect sizes were extracted for analysis. Specifically, 14 studies reported the overall effect size for PSS, 10 for PPS, 6 for PTS, and 11 for PPrS. This approach ensured that each dimension of PSS could be independently analyzed, laying the foundation for subsequent subgroup analyses.

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Figure 1
PRISMA Diagram for Study Selection

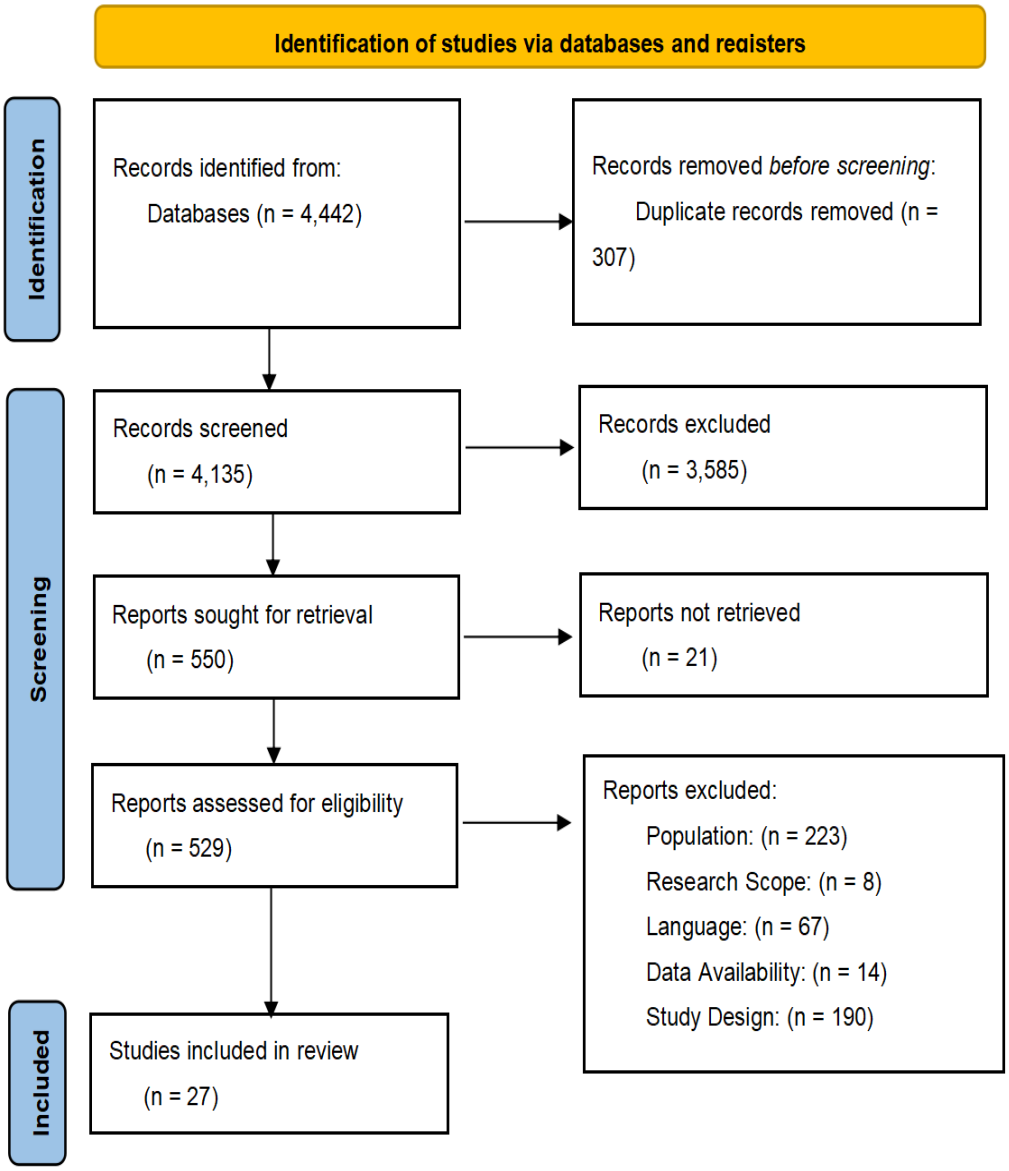

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Table 2
Summary of Included Studies in Meta-Analysis

Author and Year	Sample Size	Male (%)	Female (%)	Economic Level	Cultural Background	Variable Relationship	Type of Academic Achievement
Cai et al., 2016	957	48.4	51.6	Developing	Eastern (China)	PSS&AA	Self-assessment questionnaire
You et al., 2024	1681	Not specified		Developing	Eastern (China)	PSS & PPS & PPrS & AA	Self-assessment questionnaire
Zeng et al., 2021	391	37.1	62.9	Developing	Eastern (China)	PSS&AA	Self-assessment questionnaire
Huang & Wang, 2023	651	30.1	69.9	Developing	Eastern (China)	PTS&AA	Self-assessment questionnaire
Du et al., 2024	202	50.5	49.5	Developing	Eastern (China)	PSS&PPrS&PTS & AA	Self-assessment questionnaire
Dennis et al.,2005	100	30	70	Developing	Eastern (Latino/ China/Vietnam)	PPS&PPrS&AA	GPA
Mulhem et al., 2023	131	0	100	Developing	Eastern (KSA)	PSS&AA	Class grades
Rodríguez et al.,2017	300	34	66	Developed	Western (Spain)	PPS&PPrS&AA	Class grades
Abdullah et al., 2014	250	28.4	71.6	Developing	Eastern (Malaysia)	PSS&AA	GPA
Tinajero et al.,2020	219	32	68	Developed	Western (Spain)	PSS & PPS & PPrS & AA	GPA
de la Iglesia et al.,2014	565	0	100	Developing	Western (Argentina)	PPS&PTS&PPrS&AA	Course Pass Rate
Hassan et al.,2023	373	35.93	63.08	Developing	Eastern (Pakistan)	PSS&AA	CGPA
Khulbe et al.,2024	385	45.7	54.3	Developing	Eastern (India)	PSS&AA	Class grades
Rayle et al., 2006	527	0	100	Developed	Western (America)	PPS&PPrS&AA	Self-assessment questionnaire
Li et al.,2022	820	46.8	53.2	Developed	Western (America)	PPS&AA	4-year cumulative GPA
Leite et al.,2021	200	Not specified		Developing	Western (Brazil)	PSS&AA	Performance Coefficient
Wu et al.,2016	149	Not specified		Developing	Eastern (China)	PSS&AA	GPA
Yu et al.,2023	309	53	47	Developing	Eastern (China)	PPrS&AA	self-reported grades
Li et al.,2018	262	41.2	58.8	Developing	Eastern (China)	PSS&AA	GPA
Cheng et al.,2012	240	25.8	74.2	Developed	Western (America)	PPS&AA	CGPA
Román et al.,2008	553	40	60	Developed	Western (Spain)	PPS&AA	Class grades
Chen et al.,2015	1406	44.2	55.8	Developing	Eastern (China)	PSS&AA	Self-assessment questionnaire
Shao et al., 2024	3514	47.8	52.2	Developing	Eastern (China)	PTS&AA	Self-assessment questionnaire

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Author and Year	Sample Size	Male (%)	Female (%)	Economic Level	Cultural Background	Variable Relationship	Type of Academic Achievement
Qin et al.,2023	13749	37.2	62.8	Developing	Eastern (China)	PPS&PPrS&AA	Grades+Self-assessment questionnaire
Morales Navarro et al., 2019	155	43	57	Developing	Western (Chile)	PPS&PPrS&AA	Self-assessment questionnaire
Zhao et al.,2021	1800	27.8	72.2	Developing	Eastern (China)	PTS&PPrS&AA	Self-assessment questionnaire
Xu et al.,2022	1130	35.9	64.1	Developing	Eastern (China)	PTS&AA	Course Grades

Note. PSS = Perceived Social Support; PTS = Perceived Teacher Support; PPS = Perceived Parental Support; PPrS = Perceived Peer Support; AA = Academic Achievement. Gender distribution (Male % and Female %) is provided for descriptive purposes. For the moderation analysis, gender is represented as the proportion of female participants in each study.

Heterogeneity Test

Table 3 indicates significant heterogeneity in effect sizes across PSS and its subdimensions in relation to AA, as evidenced by large Q values (all p <.001) and high I^2 values (all exceeding 98%). This substantial heterogeneity suggests that the observed differences in effect sizes primarily reflect true variations among studies rather than sampling error. The τ^2 values (ranging from .079 to .253) further underscore variability in true effect sizes across dimensions, indicating the potential influence of moderating variables.

Main Effect Test

As shown in Table 3, PSS and its subdimensions are positively associated with AA, with effect sizes ranging from .199 to .451. Based on Cohen's (1992) classification thresholds, PTS exhibits the largest effect size, indicating a medium effect, followed by PPrS and overall PSS, both of which are also classified within the medium effect range. Conversely, PPS displays the smallest effect size, categorized as a small effect.

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Table 3
Results of Heterogeneity and Main Effect Analysis

Variable Relationship	*K*	*r*	95% CI for *r*		*Z*	*p* (Heterogeneity)	*Q*	*df* (*Q*)	*p* (Main Effect)	I^2 (%)	τ^2
			LL	*UL*							
PSS&AA	14	.229	.026	.413	2.209	.027	911.553	13	<.001	98.574	0.152
PPS&AA	10	.199	.024	.363	2.230	.026	653.720	9	<.001	98.623	0.079
PTS&AA	6	.451	.082	.713	2.358	.018	1421.179	5	<.001	99.648	0.253
PPrS&AA	11	.318	.134	.481	3.314	.001	1019.035	10	<.001	99.019	0.105
Overall	41	.262	.160	.359	4.925	<.001	4651.496	40	<.001	99.140	0.102

Note. *K* = number of studies; *r* = effect size (correlation coefficient); CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *Z* = *Z*-value; *p* (Heterogeneity) = probability value for heterogeneity test; *Q* = *Q* statistic for heterogeneity; *df* = degrees of freedom associated with *Q*; *p* (Main Effect) = probability value for main effect test; I^2 = percentage of variation across studies due to heterogeneity; τ^2 = between-study variance estimate. PSS = Perceived Social Support; PTS = Perceived Teacher Support; PPS = Perceived Parental Support; PPrS = Perceived Peer Support; AA = Academic Achievement; Statistical significance is indicated by $p < .05$, $p < .01$, and $p < .001$.

Publication Bias Testing Results

The following funnel plots (Figures 2, 3, 4, and 5) provide a visual assessment of publication bias for PSS and its subdimensions–PPS, PTS, and PPrS–in relation to AA. The plots show mostly symmetrical distributions, indicating a low overall risk of publication bias. While minor deviations appear in some subdimensions, the general symmetry across the plots supports the reliability of the findings.

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Figure 2
Funnel Scatter Plot for Perceived Social Support (PSS)

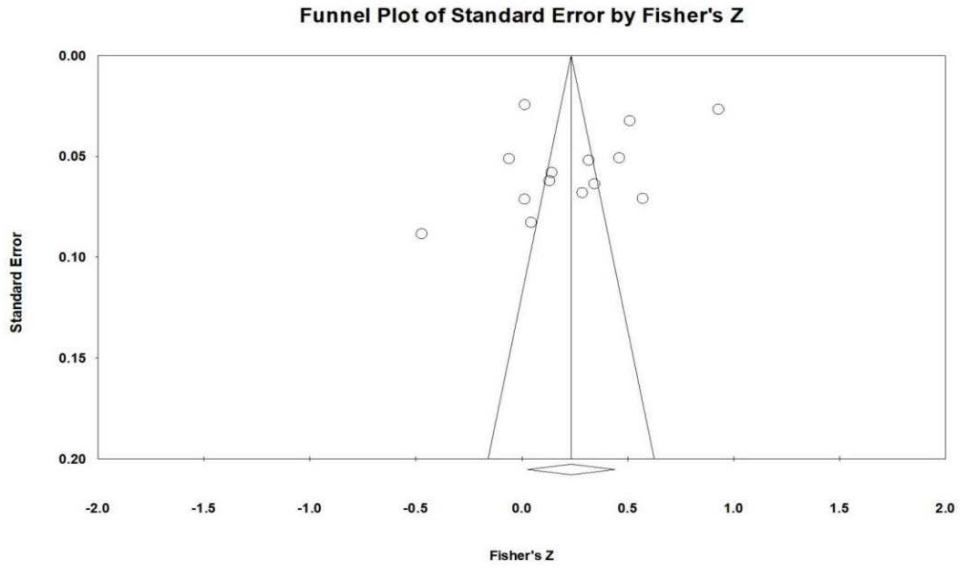
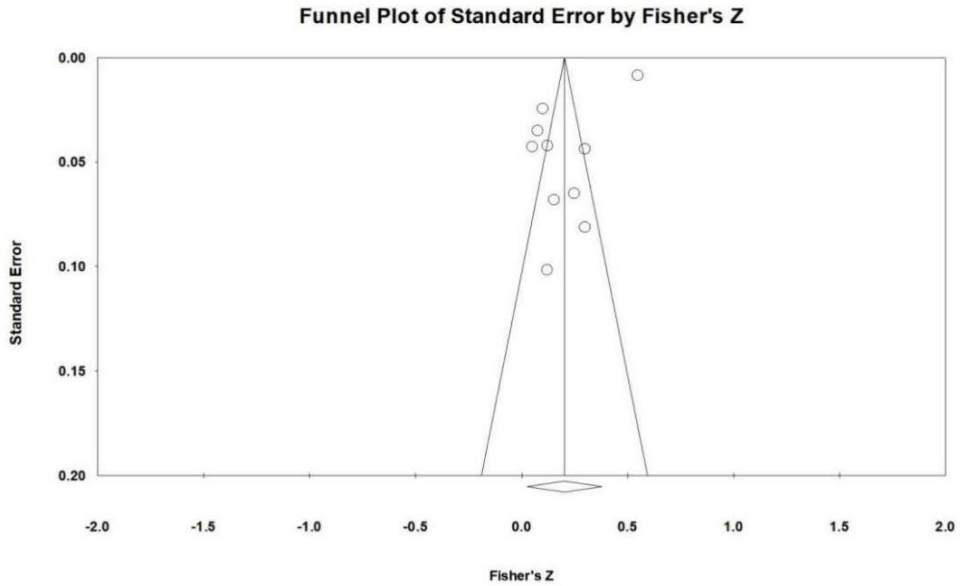


Figure 2 illustrates the funnel plot for PSS, where the data points are symmetrically distributed around the centerline, primarily clustered in the upper-middle region. This pattern indicates a low risk of publication bias in the overall dimension of PSS.

Figure 3
Funnel Scatter Plot for Perceived Parental Support (PPS)



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For PPS, the funnel plot in Figure 3 reveals a largely symmetrical pattern. However, some data points deviate slightly from the centerline, suggesting a mild indication of publication bias within this subdimension. Despite these deviations, the overall symmetry reduces major concerns about significant bias.

Figure 4
Funnel Scatter Plot for Perceived Teacher Support (PTS)

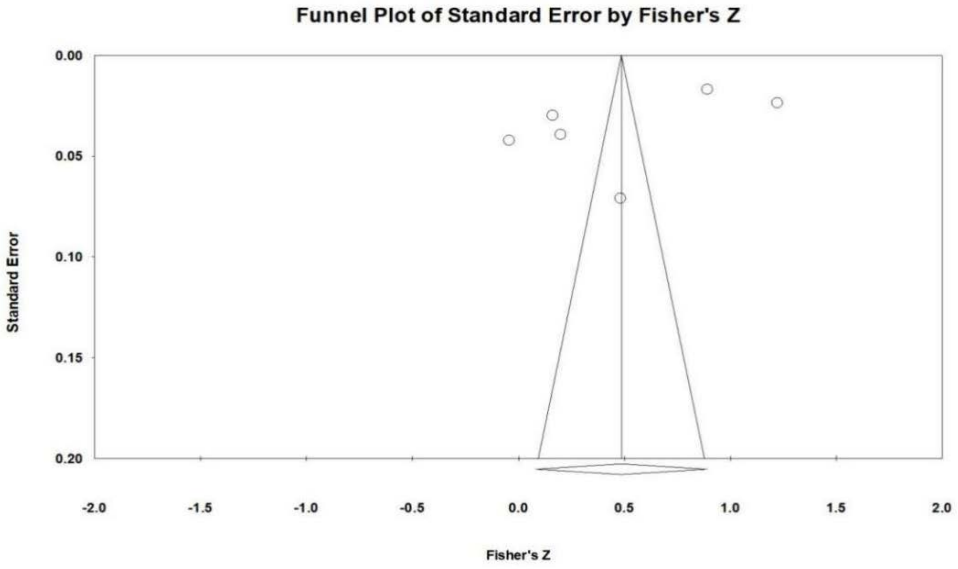

Figure 4 presents the funnel plot for PTS. Data points here also exhibit a symmetrical distribution, centered primarily around the upper-middle region, with minor deviations. These slight deviations suggest minimal publication bias for PTS, and the general symmetry supports its reliability.

Figure 5
Funnel Scatter Plot for Perceived Peer Support (PPrS)

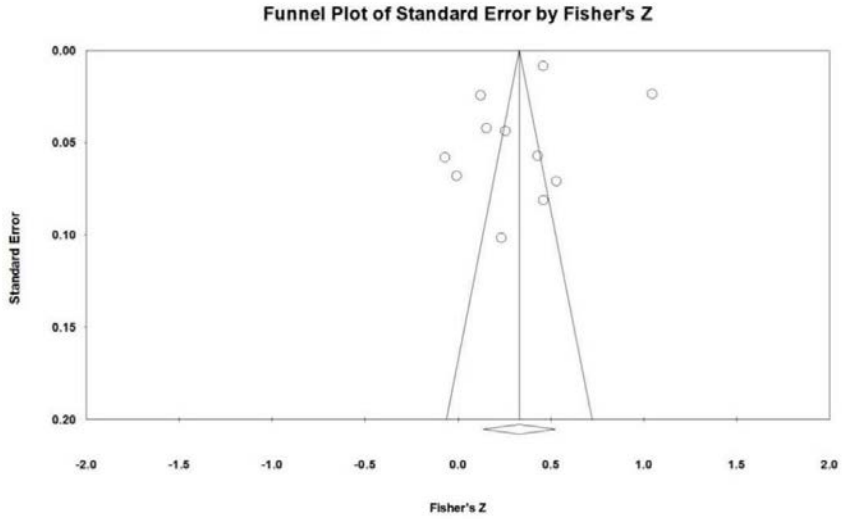

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Figure 5 presents the funnel plot for PPrS. The data points show a generally symmetrical distribution around the centerline, with most points clustered in the upper-middle region. This symmetry suggests a low risk of publication bias for the PPrS dimension, though a few minor deviations from the centerline are present. Overall, the plot supports the reliability of findings related to PPrS in relation to AA.

To further validate the results, Egger's regression analysis and Fail-safe *N* calculations were conducted. Egger's regression results showed *p*-values above .05 for PSS (intercept = -6.49, p = .25), PPrS (intercept = -3.26, p = .48), and PTS (intercept = -24.11, p = .18), indicating no statistically significant publication bias in these dimensions. However, PPS displayed a significant *p*-value (intercept = -8.95, p = .009), suggesting some potential for bias in this subdimension.

Fail-safe *N* results further supported the robustness of the findings. The Classic Fail-safe *N* values for PSS, PPS, PTS, and PPrS were 1764, 2209, 3793, and 4677, respectively, all well above the respective thresholds (80, 60, 40, and 65). These high values imply that the statistical significance of the observed effects (α = .05) would persist even with the addition of a substantial number of unpublished studies.

Subgroup Analysis of Moderating Effects

Heterogeneity tests reveal substantial variability in effect sizes, indicating the necessity for deeper exploration of its sources. In response, we explored three potential moderating factors: economic level, cultural background, and the measurement methods of academic achievement.

Moderating Role of Economic Level

As illustrated in Table 4, economic level exhibits a significant moderating effect in the dimension of PPrS, with the largest effect size observed in developing countries. In contrast, no significant effect is evident in developed countries. Economic level does not significantly moderate PSS or PPS. Since all six studies on PTS were conducted in developing countries, a subgroup analysis could not be performed for this dimension.

Table 4
Meta-Analysis Results of the Moderating Role of Economic Level

Dimension	Group	*K*	*r*	95% CI for *r*		Two-tailed Test		Heterogeneity Test Results			
				LL	*UL*	*Z*	*p*	τ^2	I^2 (%)	*Q*-Btw (RE)	*p*
PSS	Developed	2	.206	.067	.337	2.894	.004	0.08	61.749	0.038	.846
	Developing	12	.232	.003	.437	1.986	.047	0.407	98.774		
PPS	Developed	5	.160	.058	.259	3.072	.002	0.106	83.213	0.289	.591
	Developing	5	.235	-.027	.467	1.763	.078	0.298	98.989		
PPrS	Developed	3	.063	-.154	.273	0.566	.572	0.184	91.549	5.174	.023
	Developing	8	.406	.198	.579	3.664	<.001	0.327	99.189		

Note. *K* = number of studies; *r* = effect size (correlation coefficient); CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *Z* = *Z*-value from two-tailed test; *p* = probability value for the two-tailed test; τ^2 = between-study variance estimate; I^2 = percentage of variation across studies due to heterogeneity; *Q*-Btw (RE) = *Q* statistic for heterogeneity between groups (based on random effects model). PSS = Perceived Social Support; PPS = Perceived Parental Support; PPrS = Perceived Peer Support. Statistical significance is indicated by $p < .05$, $p < .01$, and $p < .001$.

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Moderating Role of Cultural Background

As shown in Table 5, similar to economic level, cultural background exhibits a significant moderating effect only in the dimension of PPrS. The effect size is larger in Eastern cultural contexts, indicating stronger associations between PPrS and academic achievement, while the effect size is smaller in Western contexts. Cultural background does not significantly moderate PSS or PPS. Furthermore, as only one study on PTS exists within Western cultural contexts, a subgroup analysis for this dimension was not feasible.

Table 5
Meta-Analysis Results of the Moderating Role of Cultural Background

Dimension	Group	*K*	*r*	95% CI for *r*		Two-tailed Test		Heterogeneity Test Results			
				LL	*UL*	*Z*	*p*	τ^2	I^2 (%)	*Q*-Btw (RE)	*p*
PSS	Eastern	11	.250	.011	.463	2.047	.041	0.41	98.855	0.555	.456
	Western	3	.147	.002	.285	1.990	.047	0.11	73.913		
PPS	Eastern	3	.255	-.100	.553	1.414	.157	0.314	99.363	0.234	.629
	Western	7	.168	.090	.244	4.172	<.001	0.093	78.343		
PPrS	Eastern	6	.440	.194	.634	3.352	.001	0.341	99.377	3.877	.049
	Western	6	.154	.001	.299	1.970	.049	0.165	90.031		

Note. *K* = number of studies; *r* = effect size (correlation coefficient); CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *Z* = *Z*-value from two-tailed test; *p* = probability value for the two-tailed test; τ^2 = between-study variance estimate; I^2 = percentage of variation across studies due to heterogeneity; *Q*-Btw (RE) = *Q* statistic for heterogeneity between groups (based on random effects model). PSS = Perceived Social Support; PPS = Perceived Parental Support; PPrS = Perceived Peer Support. Statistical significance is indicated by $p < .05$, $p < .01$, and $p < .001$.

Moderating Role of Academic Achievement Measurement Type

As shown in Table 6, the academic achievement measurement type significantly moderates PTS and PPrS. In these two dimensions, self-reported measures yield a larger and significant effect size, while objective measures show a smaller and non-significant effect size. This suggests that self-reported academic achievement measurements may be more sensitive in detecting the relationship between PSS and AA. Similarly, for PSS, objective measures yield a smaller and non-significant effect size, while self-reported measures produce a larger and significant effect size. However, the *p*-value for this dimension is .051, which approaches but does not reach statistical significance, suggesting that the measurement type might play a role as a moderator in the PSS-AA relationship. For PPS, both objective and self-reported measures individually show significant effect sizes. However, a *Qb* value of 1.906 ($p = .167$) indicates no substantial difference in effect sizes across the two measurement types, suggesting that the measurement type does not play a significant moderating role in the PPS-AA relationship.

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Table 6

Meta-Analysis Results of the Moderating Role of Academic Achievement Measurement Type

Dimension	Group	*K*	*r*	95% CI for *r*		Two-tailed Test		Heterogeneity Test Results			
				LL	*UL*	*Z*	*p*	τ^2	I^2 (%)	*Q*-Btw (RE)	*p*
PSS	Objective	9	.087	-.055	.226	1.201	.230	0.208	91.391	3.793	.051
	Self-reported	5	.459	.110	.708	2.521	.012	0.438	99.382		
PPS	Objective	6	.113	.061	.165	4.227	<.001	0.039	36.814	1.906	.167
	Self-reported	4	.302	.035	.529	2.209	.027	0.278	99.081		
PTS	Objective	2	.061	-.139	.256	0.593	.553	0.141	93.680	8.392	.004
	Self-reported	4	.605	.307	.795	3.584	<.001	0.389	99.444		
PPrS	Objective	5	.145	-.031	.313	1.619	.106	0.191	90.933	4.057	.044
	Self-reported	6	.445	.205	.635	3.466	.001	0.335	99.393		

Note. *K* = number of studies; *r* = effect size (correlation coefficient); CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *Z* = *Z*-value from two-tailed test; *p* = probability value for the two-tailed test; τ^2 = between-study variance estimate; I^2 = percentage of variation across studies due to heterogeneity; *Q*-Btw (RE) = *Q* statistic for heterogeneity between groups (based on random effects model). PSS = Perceived Social Support; PPS = Perceived Parental Support; PTS = Perceived Teacher Support; PPrS = Perceived Peer Support. Statistical significance is indicated by $p < .05$, $p < .01$, and $p < .001$.

Meta-Regression Analysis: Gender as a Moderator

Results from the meta-regression analysis show that gender, as indicated by the female proportion, significantly moderates the relationship between overall PSS and AA in a negative direction, suggesting that a higher female proportion weakens this link. In contrast, gender does not exhibit a statistically significant moderating effect in the dimensions of PPS, PTS, and PPrS, indicating that female proportion does not significantly influence these specific types of PSS in relation to AA.

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Table 7
Meta-Regression of Gender as a Moderator Between Social Support Dimensions and Academic Achievement

Dimension	Covariate	Coefficient	Standard Error	95% CI for Coefficient		*Z*	*p*
				LL	UL		
PSS	Intercept	1.458	.508	0.462	2.454	2.87	<.001
	Female Proportion	-1.832	.782	-3.364	-0.3	-2.34	.021
PPS	Intercept	0.198	.446	-0.675	1.072	0.45	.656
	Female Proportion	0.022	.606	-1.165	1.208	0.04	.972
PTS	Intercept	1.288	.955	-0.583	3.159	1.35	.177
	Female Proportion	-1.18	1.364	-3.854	1.493	-0.87	.387
PPrS	Intercept	0.64	.499	-0.337	1.617	1.28	.199
	Female Proportion	-0.417	.697	-1.783	0.95	-0.6	.55

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *Z* = *Z*-value from two-tailed test; *p* = two-tailed probability value associated with the *Z* statistic; PSS = Perceived Social Support; PPS = Perceived Parental Support; PTS = Perceived Teacher Support; PPrS = Perceived Peer Support. Statistical significance is indicated by $p < .05$, $p < .01$, and $p < .001$.

Discussion

The Association Between Perceived Social Support and Academic Achievement

This study found that PSS had a positive association with undergraduate AA, though the effect size was relatively small. This aligns with Lewin's group dynamics theory, which posits that support from others within a group positively influences an individual's performance and psychological well-being. Synergistic support from teachers, parents, and peers appears to promote comprehensive personal development (Lin, 2009). This result also supports prior research suggesting that higher levels of PSS enhance students' learning motivation and engagement, ultimately leading to improved AA (Kiuru et al., 2020).

The small effect size, according to Cohen's (1992) classification, suggests that while social support contributes to academic success, its impact may be limited. This could be due to cognitive inertia among students in long-term, highly supportive environments, which potentially reduces the positive impact of support (Fan et al., 2018).

The Association Between Subdimensions of Perceived Social Support and Academic Achievement

The findings of this analysis reveal notable differences in how various types of PSS influence students' AA. Among the types of support examined, teacher support stands out as having the most significant impact on AA, aligning with Vygotsky's sociocultural theory, which emphasizes the pivotal role of teachers in social interactions and suggests their more substantial influence on students' cognitive development compared to parents (Nwokedi, 2020). The positive influence of PTS on students' AA is well-established (Huang & Wang, 2023;Tao et

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al., 2022). Students receiving robust support from teachers are more likely to cultivate positive learning beliefs, demonstrate resilience, and set adaptive goals, ultimately putting more effort into their academic pursuits (Liu et al., 2023).

Peer support plays a significant role, as evidenced by its moderate influence on AA. In contrast, parental support, while still beneficial, has a comparatively lower impact. This aligns with Tao et al. (2000), who identified peers as a more effective support source, offering more targeted assistance when dealing with similar stressors. Several studies (Du et al., 2016; Hall & Davison, 2007) have also confirmed the positive impact of PPrS on AA. Tinto's (2012) student departure theory further reinforces this view, emphasizing peers provide both academic help and emotional support, assisting others in navigating various academic challenges. Nevertheless, the importance of parental support should not be underestimated. Often manifesting as emotional backing and material resources, parental support provides a sense of security and financial stability, helping to alleviate students' life stress and enabling them to concentrate more on their academic goals (Li et al., 2022).

In summary, different subdimensions of PSS exert varying degrees of influence on AA, with teacher and peer support showing more direct and significant effects, while parental support has a relatively smaller impact.

Moderating Effects: Subgroup Analysis Insights

Subgroup analysis indicated that different moderating variables had varying effects on AA across the dimensions of PSS.

Economic Level

The moderating effect of economic level was evident only in the dimension of PPrS, particularly in developing countries, where PPrS had a more pronounced impact on AA. This may be because students in developing countries rely more heavily on peer networks for informational and emotional support (Yu et al., 2023). In contrast, in developed countries, where students have access to relatively more personal resources (e.g., family and institutional support), the role of peer support tends to be diminished. This observation aligns with Dennis et al. (2005), who found that insufficient peer support among Latino, Chinese, and Vietnamese students was significantly linked to lower GPAs. However, economic level did not significantly moderate the effects of PSS and PPS. This may be because social and parental support are relatively stable forms of support and are not as influenced by differences in economic level.

Cultural Background

The moderating effect of cultural background was also only observed in the dimension of PPrS, with stronger correlations between PPrS and AA in Eastern cultural contexts than in Western ones. This aligns with the values of collectivism and teamwork emphasized in Eastern cultures (Shuai, 2008), while Western cultures focus more on individualism and personal abilities (Yefremtseva et al., 2019), which may weaken the influence of PPrS. Additionally, a study by Zhou et al. (2024) in China revealed that PPrS significantly moderated the relationship between cyberbullying and depression, consistent with this study's findings, demonstrating the important moderating role of peer support across different contexts. However, cultural background did not exhibit a significant moderating effect on PSS or PPS. This may be because parental support is generally regarded as a fundamental family function in both Eastern and Western cultures, exhibiting strong universality (Li et al., 2022; Majeed, 2016).

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Academic Achievement Measurement Type

The moderating effect of academic achievement measurement type was evident in both PTS and PPrS dimensions. Specifically, in these two dimensions, self-reported academic achievement measures demonstrated a stronger moderating effect compared to objective measures. This may be because self-reported measures are more likely to capture individuals' subjective perceptions of social support, thereby amplifying its influence on AA. This finding aligns with Hong (2019), who proposed that undergraduate students' AA should not be assessed solely based on objective scores, but also include comprehensive outcomes such as the knowledge, skills, and values gained through learning, which are better reflected through self-reports. Although the moderating effect of measurement type did not reach statistical significance in PSS dimension, the results were close to significant, suggesting the need for further exploration. Moreover, in the dimension of PPS, the moderating effect of academic achievement measurement type was not significant, which may be because parental support impacts AA more in terms of emotional support rather than direct academic assistance (Roy & Giraldo-García, 2018).

In summary, economic level, cultural background, and academic achievement measurement type demonstrated varying degrees of moderation in these associations. To deepen the understanding of these complex interactions, future research should consider exploring additional moderating variables.

Gender as a Moderator: Meta-Regression Insights

The meta-regression analysis revealed that gender (female proportion) negatively moderated the relationship between PSS and AA, with the link weakening as the proportion of females increased. This result may be due to female undergraduate students facing greater academic pressure than their male counterparts (Verger et al., 2009) and having higher expectations for social support (Tam & Lim, 2009), which might weaken the positive impact on their AA. This finding aligns with previous studies, suggesting that gender moderates the PSS and AA link (Li et al., 2018).

However, the study found that gender did not have a significant impact as a moderator on the various subdimensions of perceived social support (PPS, PTS, PPrS). This result contradicts some previous studies (Kaynak et al., 2023; Sun, 2023), suggesting that gender's moderating influence in these areas may be more intricate, potentially affected by additional factors or varying across different study contexts. Further exploration is necessary to clarify how gender influences the relationship across distinct forms of PSS and AA.

Recommendations

This study highlights the varying impacts of different types of PSS on undergraduate AA, suggesting that schools and educators prioritize teacher and peer support when implementing support strategies. Teacher support, with its significant effect on AA, can be strengthened by fostering an open, respectful, and supportive classroom environment, helping students feel accepted and valued. Mentorship programs can further provide ongoing academic guidance and emotional support, facilitating students' growth both academically and personally. Likewise, peer support, especially in collectivist cultural contexts and developing countries, plays a critical role. Schools may enhance peer support by establishing peer mentoring programs and study groups, as well as organizing social events and team-based projects to encourage interaction and trust among students. Parental support, while less directly impactful, remains essential for students' well-being; schools may consider promoting home-school collaboration to help parents offer targeted support during high-stress periods.

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This study also underscores the importance of perceived social support, suggesting that schools and educators focus on enhancing students' awareness and acceptance of available support. Schools can offer mental health courses and workshops to help students identify sources of social support and develop proactive help-seeking behaviors under academic pressure. Additionally, training programs on social support skills can be encouraged to strengthen students' ability to perceive and utilize available support effectively.

In addition, self-reported academic achievement measures appear to more effectively capture the relationship between PSS and AA. Thus, it is recommended that researchers and educators combine self-reports with actual grades in assessments to better understand students' academic standing and challenges. Gender emerges as a significant moderating factor, indicating that female students may require greater social support under academic pressure. Schools should consider providing gender-sensitive support services, including enhanced mental health resources and stress management training, particularly for female students. These strategies aim to guide educators in optimizing social support to foster students' comprehensive development and academic success.

Conclusions and Implications

Through a review of 27 studies, 41 independent effect sizes, and a total of 31,019 students, the results of the meta-analysis indicate that PSS has a modest positive effect on AA, underscoring its value in students' educational outcomes, though its influence remains limited. These findings suggest that while PSS is beneficial to AA, its actual impact may depend on the type of support and individual student characteristics. Among support types, PTS demonstrates the strongest effect on AA, providing valuable guidance for educators to optimize support strategies. Gender, economic level, cultural background, and academic achievement measurement type further moderate the relationship between PSS and AA to varying extents, emphasizing the contextual and diverse nature of support effects.

In addition, this study offers an international perspective that reveals the multidimensional impacts of PSS, broadening insights within this field. Unlike prior research, which has often presented inconsistent results, this study systematically confirms the positive effects of PSS while also uncovering distinct impacts across support types and cross-cultural moderating effects. This provides a stronger theoretical basis for understanding social support within a global educational context. Educators and policymakers may benefit from these findings by gaining practical guidance on how to effectively leverage social support to promote students' academic success and holistic development.

However, certain limitations of this study suggest directions for future research. First, as the sample is limited to undergraduates, expanding future research to include other educational levels, such as graduate students, could enhance the generalizability of the findings and examine the moderating role of educational stage in this link. Additionally, this study included relatively few studies examining the relationship between PTS and AA, limiting our ability to analyze the moderating effects of economic level and cultural background within this dimension. Future research should further investigate the impact of PTS on AA to enrich the literature in this area. Finally, while this study considered only four moderating variables, future studies could explore additional factors, such as study design (e.g., longitudinal studies) and sample characteristics, to further uncover the complexities of support effects. Given that this study independently analyzed PTS, PPS, and PPrS, future research could also examine potential synergy or compensation among these sources to better understand their combined influence on AA.

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Declaration of Interest

The authors declare no competing interest.

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