

## RESEARCH ARTICLE

# Research on the influence mechanism of classroom leadership of international Chinese language teachers on students' learning psychology and academic performance

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## ABSTRACT

This study investigates the influence mechanism through which classroom leadership affects academic performance among international Chinese language learners, with learning psychology as a potential mediating pathway. The research addresses critical gaps in understanding how transformational leadership behaviors influence student psychological states and subsequent academic outcomes in cross-cultural language education contexts. A quantitative research design with supplementary qualitative components was employed involving 387 international Chinese language learners from universities across North America, Europe, and Asia-Pacific regions. Qualitative insights from open-ended survey questions provided contextual support for quantitative findings. Participants completed validated instruments measuring transformational leadership behaviors (inspirational motivation, intellectual stimulation, individualized consideration, and idealized influence), learning psychology dimensions (motivation, attitudes, and anxiety), and academic performance indicators (objective and subjective measures). Structural equation modeling served as the primary analytical approach, supplemented by correlation and regression analyses to examine complex relationships among constructs. The findings reveal significant positive associations between classroom leadership and learning psychology ( $r = 0.459$ ,  $\beta = 0.594$ ), and between learning psychology and academic performance ( $r = 0.627$ ,  $\beta = 0.673$ ). The mediation analysis demonstrates that the indirect effect (0.400) substantially exceeds the direct effect (0.245), with learning psychology accounting for approximately 62% of the total effect magnitude. The structural equation model achieves excellent fit indices (CFI = 0.952, RMSEA = 0.048, SRMR = 0.039), explaining substantial variance in learning psychology ( $R^2 = 0.353$ ) and academic performance ( $R^2 = 0.487$ ). These results confirm learning psychology as the primary mechanism through which instructional leadership influences student achievement. These findings align with social cognitive theory's core tenets, particularly reciprocal determinism. The significant mediation effect of learning psychology (62% of total effect) demonstrates how environmental factors (transformational leadership) influence personal factors (psychological states), subsequently affecting behavioral outcomes (academic performance). The substantial indirect effect indicates that teacher leadership operates primarily through student psychological processes rather than direct instructional mechanisms, consistent with social cognitive theory's emphasis on cognitive and affective mediating factors in learning and performance. The study contributes theoretical advances by integrating transformational leadership theory with social cognitive frameworks in international language education contexts, while

### ARTICLE INFO

Received: 01 September 2025 | Accepted: 30 September 2025 | Available online: 25 December 2025

### CITATION

Duan WS. Research on the influence mechanism of classroom leadership of international Chinese language teachers on students' learning psychology and academic performance. *Environment and Social Psychology* 2025; 10(12): 4141 doi:10.59429/esp.v10i12.4141

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providing practical implications for professional development programs emphasizing transformational leadership competencies to optimize student psychological well-being and academic outcomes in cross-cultural educational environments.

**Keywords:** transformational leadership; learning psychology; academic performance; international Chinese language education; mediation analysis

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## 1. Introduction

Classroom leadership theoretical development has increased exponentially in recent years, with modern research focusing on the complex nature of educational leadership effectiveness. Peng et al.<sup>[1]</sup> undertook an extensive content analysis demonstrating that educational leadership theory has moved from exclusively hierarchical approaches to include distributed and transformational perspectives. This is indicative of increasing acknowledgment that classroom leadership effectiveness needs to be responsive in order to fit various educational settings<sup>[2]</sup>. Research in educational leadership has shown that culturally adept leaders develop more inclusive learning communities, a finding especially applicable to international education environments<sup>[3]</sup>. In the targeted field of international Chinese language education, research on professional development has defined the primary phases in teacher growth that directly affect classroom performance. Yang<sup>[4]</sup> developed a four-phase career development model of international Chinese teachers, i.e., introduction, growth, independent, and leading periods, which demand different leadership competencies. The professional development programs over the long term of the Chinese Language Teachers Association focus on specialized knowledge and expertise in teaching international Chinese. Research demonstrates that international Chinese language teachers encounter specific challenges in closing cultural and linguistic gaps as well as pedagogical effectiveness<sup>[5]</sup>. Integration of digital literacy has become one of the major dimensions of professional development, with Chinese universities being the pioneers of innovations in foreign language instruction<sup>[6]</sup>.

Research in learning psychology has begun to center on dynamic interaction between motivation, engagement, and academic achievement in second language learning contexts. Second language learning motivation research shows that psychological variables play a large role in learning trajectories and achievement patterns<sup>[7]</sup>. Motivation and proficiency have been found to be coupled within a circular relationship, with higher degrees of proficiency increasing motivational states<sup>[8]</sup>. Current meta-analytical evidence points towards motivation as a preeminent mediator between motivational orientation and achievement, and cognitive motivation with the highest correlation with achievement outcomes<sup>[9]</sup>. Cross-cultural research has revealed that language learning motivation varies significantly across cultural contexts, necessitating culturally responsive pedagogical approaches<sup>[10]</sup>.

Positive affect research in second language acquisition has drawn considerable attention with foreign language pleasure as a key predictor of academic performance<sup>[11]</sup>. Experiment indicates that psychological capital of the learners such as self-efficacy and resilience largely determines engagement levels and learning outcomes<sup>[12]</sup>. Grit in language learning has been found to be a primary predictor of long-term academic success, especially among international students experiencing difficulties in cross-cultural adaptation<sup>[13]</sup>. Self-determination theory interventions applied to language learning environments showed autonomy support and competence satisfaction as prime predictors of long-term motivation and achievement<sup>[14]</sup>. Measures of academic success in language learning environments have moved to include both objective and subjective assessment of achievement. Literature shows that language proficiency tests are highly predictive of academic achievement, though not equally predictive across all language skills<sup>[15]</sup>. Empirical studies on the connection between English language proficiency and student outcomes show that language ability

effects are strong across language courses to overall academic achievement[16]. Performance-based assessment approaches have had positive effects on achievement outcomes and on psychological functioning, suggesting that assessment strategy has a significant role in shaping learning experiences<sup>[17]</sup>.

Although substantial progress has been achieved in learning psychology, academic achievement, and classroom leadership separately, there is still much to be learned about their interactions. The majority of previous research has considered these concepts separately, without creating holistic models for describing the impact of classroom leadership on student psychological states and thus academic achievement. There is limited recent literature available on systematic examination of the mediating processes by which teacher leadership behavior affects students' learning psychology in cross-cultural educational environments. Moreover, there has been little investigation into how culture moderates the effect of leadership style on student performance in global Chinese language learning environments.

This research addresses these gaps by developing and testing an integrated model of investigating classroom leadership as a predictor of academic achievement through learning psychology mediating routes. The theoretical foundation draws upon Bandura's social cognitive theory, a comprehensive framework explaining human functioning through triadic reciprocal determinism. This theory posits that human behavior results from dynamic, bidirectional interactions among three key factors: personal characteristics (cognitive, affective, and biological factors), behavioral patterns, and environmental influences. Unlike traditional behaviorist approaches emphasizing unidirectional causation, social cognitive theory recognizes individuals as both products and producers of their social environments.

Central to this theory are four key mechanisms: observational learning (learning through modeling), self-efficacy beliefs (confidence in performing specific tasks), self-regulation (monitoring and controlling behavior), and outcome expectations (beliefs about action consequences). In educational contexts, social cognitive theory emphasizes that learning outcomes emerge from complex interactions between student characteristics (cognitive abilities, motivational orientations, affective states), behavioral patterns (engagement levels, persistence, help-seeking behaviors), and environmental factors (instructional leadership, classroom climate, peer interactions).

This theoretical lens provides a robust framework for understanding how teacher leadership behaviors shape student psychological orientations through modeling, feedback, and environmental structuring, which subsequently influence academic performance through enhanced self-efficacy, self-regulatory mechanisms, and observational learning processes. The reciprocal nature suggests that as students experience academic success, their positive psychological states are reinforced, influencing their perception of teacher leadership effectiveness. The research provides theoretical contributions by making empirical linkages between distinct domains of previous study whilst providing pedagogical insights for Chinese language teaching across the world. Through examination of these relationships by way of systematic inquiry, this research seeks to inform recommendations for evidence-based teacher improvement and student achievement in global Chinese learning contexts.

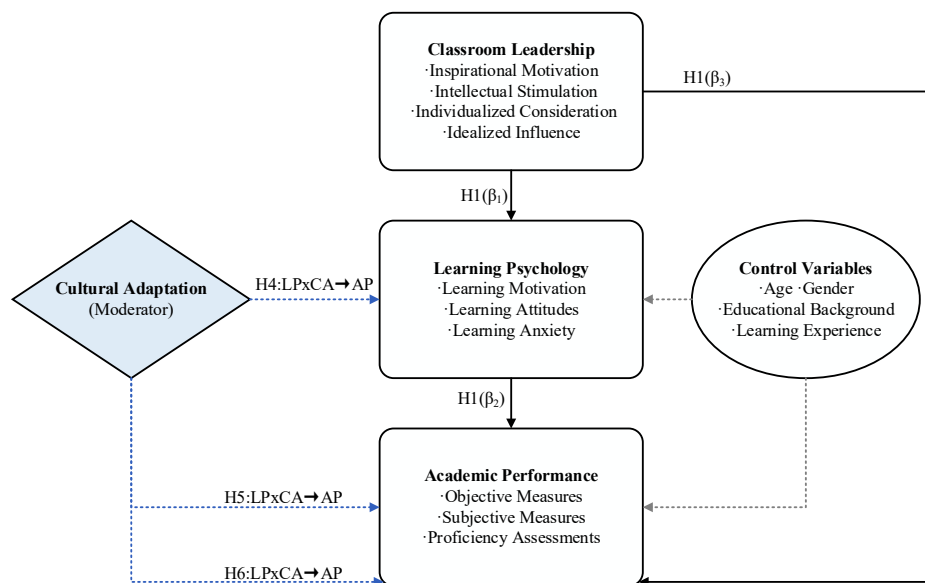
## **2. Materials and methods**

### **2.1. Research design**

This study applies a mixed-methods study design quantitative and qualitative approaches to examine the classroom leadership process and student learning psychology as well as academic performance<sup>[18]</sup>. Through the use of mixed-methods design, data from multiple sources is compared to establish correspondence, therefore maximizing validity and reliability of research findings<sup>[19]</sup>. The approach provides more

understanding of relationships among complex variables. The quantitative component employs cross-sectional survey design for the purpose of estimating statistical relationships and testing speculative models, whereas the qualitative component employs semi-structured interviews for tracing for underlying mechanisms as well as contextual influences on observed relationships<sup>[20]</sup>.

However, the present study primarily utilized quantitative methodology with validated survey instruments as the main data collection approach. The qualitative component consisted of open-ended survey questions embedded within the quantitative questionnaire that captured participants' experiences and perceptions of teacher leadership behaviors and learning processes. These qualitative responses were analyzed through thematic content analysis to provide contextual insights supporting the interpretation of quantitative results, rather than through separate semi-structured interviews.



**Figure 1.** Integrated framework of teacher leadership influence on student achievement in cross-cultural Chinese language learning contexts.

The design of the research framework, as shown in **Figure 1**, posits classroom leadership as the independent variable, learning psychology as the mediating variable, and academic performance as the dependent variable. The theoretical model borrows from transformational leadership theory and social cognitive theory to provide the causal pathways between constructs<sup>[21]</sup>. The model includes demographic variables as control variables and cultural adaptation as a moderating variable, due to the special nature of international Chinese language learning environments<sup>[20]</sup>. Operational definitions provide clear measurement criteria for each construct. Classroom leadership involves transformational leadership behaviors consisting of inspirational motivation, intellectual stimulation, individualized consideration, and idealized influence, measured using adapted leadership scales with educational validation. Psychology of learning entails learning motivation (intrinsic and extrinsic motivational orientations), learning attitude (cognitive and affective attitudes toward Chinese language learning), and learning anxiety (foreign language anxiety and degree of performance anxiety). Academic achievement encompasses both objective measurements (standardized test scores, course grades, proficiency tests) and subjective measurements (self-perceived ability, instructor ratings) to provide general achievement results. The research design ensures methodological rigor through systematic sampling procedures, validated instrumentation, and appropriate statistical analyses including structural equation modeling to test the proposed mediation model.

## **2.2. Participants and sampling**

The target population consists of international students enrolled in Chinese language programs at universities across multiple countries where Chinese is taught as a foreign language. Sample selection criteria require participants to be non-native Chinese speakers who are currently enrolled in intermediate to advanced Chinese language courses and have completed a minimum of one semester of formal Chinese language instruction. Students must be between 18-35 years of age and demonstrate sufficient proficiency in either English or Chinese to complete survey instruments accurately. Exclusion criteria include students in beginner-level courses, heritage speakers with significant prior Chinese language exposure, and participants with self-reported learning disabilities that might confound language learning outcomes.

The research employs a stratified random sampling approach to ensure representative coverage across different educational contexts and cultural backgrounds. Universities are stratified by geographic region, institutional type, and program characteristics, with proportional allocation used to determine sample distribution within each stratum. Within selected institutions, simple random sampling identifies eligible participants from course rosters, ensuring equal probability of selection while maintaining anonymity. The sampling frame encompasses universities in North America, Europe, and Asia-Pacific regions to capture diverse cross-cultural learning environments.

Sample size determination follows established guidelines for structural equation modeling, requiring a minimum of 200 participants to achieve adequate statistical power for complex mediation models<sup>[22]</sup>. Power analysis calculations, based on anticipated medium effect sizes and alpha level of 0.05, indicate that 350 participants provide sufficient power to detect significant relationships while accounting for potential attrition. The target sample size of 400 accounts for incomplete responses and ensures robust statistical analysis across subgroups.

Demographic characteristics include participant age, gender, nationality, educational background, duration of Chinese language study, and current proficiency level. Additional variables capture prior cross-cultural experience, motivation for learning Chinese, and cultural distance from Chinese cultural contexts. These demographic factors serve as potential control variables and enable examination of moderating effects within the theoretical model. The diverse sampling approach ensures adequate representation across different cultural backgrounds, enhancing the generalizability of findings to the broader population of international Chinese language learners.

## **2.3. Instruments and measures**

The measurement battery consists of validated scales adapted for the international Chinese language learning context, ensuring cultural appropriateness and linguistic accessibility. All the instruments go through rigorous processes of translation and back-translation to ensure conceptual equivalence between language versions.

### **2.3.1. Classroom leadership measurement tools**

Classroom Leadership Measurement Instruments Measure Chinese language teachers' transformational leadership behavior as seen by the students. The web-based Adapted Transformational Leadership Inventory measures four fundamental dimensions according to Bass and Avolio's theory<sup>[23]</sup>. Inspirational motivation items measure teachers' capacity for articulating compelling visions and stimulating enthusiasm for learning Chinese language and culture. Example items are "My Chinese teacher shows confidence that objectives will be met" and "My teacher speaks positively about Chinese language learning in the future." Intellectual stimulation measures instructors' capacity to challenge assumptions and encourage creative problem-solving

in language acquisition contexts. Representative items assess whether teachers "seek differing perspectives when solving language learning problems" and "encourage students to think about Chinese language learning from new angles."

Individualized consideration evaluates the extent to which instructors attend to individual student needs and provide personalized guidance. Items examine whether teachers "spend time teaching and coaching students individually" and "treat each student as an individual rather than just as a group member." Idealized influence assesses the degree to which students view their instructors as role models and trust their leadership. The scale includes items such as "I have complete faith in my Chinese teacher" and "My teacher demonstrates the highest standards of ethical conduct." Each dimension contains six items measured on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree."

### **2.3.2. Learning psychology measurement tools**

**Learning Psychology Measurement Tools** encompass three validated constructs central to second language acquisition. The Learning Motivation Scale draws from self-determination theory to assess intrinsic and extrinsic motivational orientations<sup>[24]</sup>. Intrinsic motivation items evaluate genuine interest and enjoyment in Chinese language learning, while extrinsic motivation measures examine external rewards and recognition seeking. Sample items include "I study Chinese because I find it personally satisfying" and "I study Chinese to gain approval from others."

The Learning Attitude Scale measures cognitive and affective dispositions toward Chinese language learning and culture. Cognitive attitude items assess beliefs about the value and utility of Chinese language skills, while affective components evaluate emotional responses to learning experiences. Representative items include "Learning Chinese is intellectually stimulating" and "I feel anxious when speaking Chinese in class." The scale comprises 18 items using seven-point Likert response formats.

The Learning Anxiety Scale modifies Horwitz's Foreign Language Classroom Anxiety Scale for use in contexts of Chinese language learning. The scale is administered to measure communication apprehension, test anxiety, and Chinese language learning situation-specific fear of negative evaluation. The items measure anxiety levels in speech activity, character recognition practice, and cultural communication circumstances. Sample items are "I shake when I know I'm going to be called on in Chinese class" and "I'm afraid of making mistakes when writing Chinese characters."

### **2.3.3. Academic performance assessment indicators**

Academic Performance Assessment Indicators integrate objective and subjective indicators to balance out overall achievement results. Objective achievement indicators consist of standardized test results in accredited Chinese proficiency exams such as HSK levels, course grades on transcripts, and performance in specified language skill tests based on listening, speaking, reading, and writing components. Standardized scores are translated to facilitate comparability in disparate testing structures and institution grading structures.

Subjective measures of evaluation are ratings of competence by self-report and teacher ratings of student achievement. Self-report scales quantify development in areas of language proficiency and cultural knowledge. Teacher rating scales include professional estimations of student performance, motivation, and achievement at the time of evaluation. Subjective measures supplement objective measures by measuring subtle features of language development not always captured on standardized tests<sup>[25]</sup>.

#### **2.3.4. Reliability and validity testing of instruments**

Reliability and validity testing use extensive psychometric test procedures. Internal consistency reliability uses Cronbach's alpha coefficients with acceptable research levels of 0.70. Test-retest reliability testing uses read ministration to a subsample at two-week intervals. Construct validity testing uses confirmatory factor analysis to test theoretical factor structures, and convergent and discriminant validity analyses to test for scale relationships and similar constructs. Cultural validity testing includes expert review panels and pilot studies in international student populations to secure cross-cultural interpretability and appropriateness.

#### **2.4. Data collection procedures**

Administration of surveys follows a structured multi-phase process designed to maximize response rates while minimizing compromise on data quality. Institutional partnerships provide access to the potential participants through channels of academic forums, while coordination between participating universities ensures comprehensive coverage. Recruitment uses multi-pronged methods including course announcements, email invitations, and online platform notifications in an effort to contact diverse groups of students effectively. The administration of the survey utilizes secure online platforms available on various devices and levels of internet connectivity, catering to different technological contexts of international students.

Quality control practices encompass attention check questions inserted within survey instruments for the identification of careless responding tendencies. Response time monitoring detects very fast completion that can signal insufficient attention to item wording. Data validation processes monitor response patterns for quality system error, missing data patterns, and outlier detection. Participants are given clear instructions for expectations regarding survey completion and time limits, with technical assistance being available to address platform issues. Data collection process utilizes several systems of reminders transmitted at optimal points in time to realize maximum response rates across diverse cultural and language groups. Administrative coordination involves setting up standard procedures among participating institutions to realize consistent data collection approaches. Survey timing considers variations in academic calendars and cultural factors that may impact participant availability. The Web-based platform facilitates multilingual capabilities and adaptive layout designs for interfaces to suit various technological skills of international student populations. Real-time monitoring of data collection conducts response monitoring to facilitate instantaneous adjustments in the recruitment plans when necessary. Quality control practices entail routine system backup and technical performance verification to avert data loss and system reliability during the data collection process.

#### **2.5. Data analysis methods**

Descriptive statistical analysis offers thorough examination of variable distributions, central tendencies, and measures of variability. Normality tests inform choice of proper analysis procedures, and outlier identification validates data quality and assumption checking. Correlation analysis investigates bivariate association of all study variables to define initial patterns of association and possible multicollinearity issues. Multiple regression analysis examines direct relationships between predictor and outcome variables while controlling for demographic covariates.

Structural equation modeling serves as the primary analytical approach for testing the proposed mediation model and examining complex relationships among latent constructs. The analysis employs maximum likelihood estimation with robust standard errors to accommodate potential violations of normality assumptions. Model fit evaluation utilizes multiple indices including comparative fit index, root mean square error of approximation, and standardized root mean square residual. Qualitative data analysis applies

thematic coding procedures to interview transcripts, identifying recurring patterns and contextual factors that enhance interpretation of quantitative findings.

### 3. Results

#### 3.1. Descriptive statistics

The descriptive analysis reveals comprehensive characteristics of the study variables across the sample of 387 international Chinese language learners, as shown in **Table 1**. The examination of central tendencies, variability measures, and distributional properties provides essential foundations for subsequent analytical procedures.

Regarding classroom leadership dimensions, the results demonstrate that participants perceived their instructors as exhibiting moderately high levels of transformational leadership behaviors. Idealized Influence achieved the highest mean score ( $M = 5.31$ ,  $SD = 1.16$ ), indicating that students generally view their Chinese language teachers as credible role models worthy of respect and trust. Inspirational Motivation followed closely ( $M = 5.23$ ,  $SD = 1.18$ ), suggesting that instructors effectively communicate compelling visions and generate enthusiasm for Chinese language learning. Individualized Consideration ( $M = 5.15$ ,  $SD = 1.22$ ) and Intellectual Stimulation ( $M = 4.98$ ,  $SD = 1.25$ ) demonstrated slightly lower but still substantial mean values, reflecting teachers' capacity to attend to individual student needs and encourage creative thinking in language acquisition contexts.

The distributional characteristics of classroom leadership variables indicate generally normal distributions with slight negative skewness values ranging from -0.28 to -0.52, suggesting that most participants rated their teachers favorably across all leadership dimensions. The kurtosis values approached zero, indicating relatively normal distributional shapes suitable for parametric statistical analyses. Learning psychology variables exhibited distinct patterns across the three measured dimensions. Learning Attitudes achieved the highest mean score ( $M = 4.26$ ,  $SD = 0.76$ ), demonstrating positive cognitive and affective orientations toward Chinese language learning among participants. Learning Motivation maintained a moderately high level ( $M = 4.12$ ,  $SD = 0.89$ ), indicating substantial intrinsic and extrinsic motivational orientations. Learning Anxiety presented the lowest mean score ( $M = 2.85$ ,  $SD = 0.94$ ), suggesting that participants experienced moderate levels of language learning anxiety, which falls within expected ranges for second language acquisition contexts. Academic performance measures revealed satisfactory achievement levels across both objective and subjective indicators. Objective Performance demonstrated a mean score of 78.34 ( $SD = 12.67$ ) on the standardized 100-point scale, indicating above-average academic achievement among participants. Subjective Performance achieved a mean of 4.08 ( $SD = 0.82$ ) on the seven-point scale, reflecting positive self-perceptions and instructor evaluations of student progress. sample selection. These reliability indices demonstrate the psychometric adequacy of the adapted instruments for cross-cultural Chinese language learning contexts, providing confidence in the validity of subsequent analytical procedures and interpretations.

**Table 1.** Descriptive statistics of main variables (N = 387).

Variable	Mean	SD	Min	Max	Skewness	Kurtosis	Cronbach's $\alpha$
Classroom Leadership							
Inspirational Motivation	5.23	1.18	1.67	7.00	-0.45	0.12	0.89
Intellectual Stimulation	4.98	1.25	1.33	7.00	-0.28	-0.21	0.86
Individualized Consideration	5.15	1.22	1.50	7.00	-0.38	-0.05	0.88



Variable	Mean	SD	Min	Max	Skewness	Kurtosis	Cronbach's $\alpha$
Idealized Influence	5.31	1.16	1.83	7.00	-0.52	0.18	0.91
Learning Psychology							
Learning Motivation	4.12	0.89	1.44	5.00	-0.33	0.27	0.84
Learning Attitudes	4.26	0.76	2.11	5.00	-0.41	0.35	0.82
Learning Anxiety	2.85	0.94	1.00	5.00	0.29	-0.18	0.87
Academic Performance							
Objective Performance	78.34	12.67	45.00	100.00	-0.22	0.08	0.79*
Subjective Performance	4.08	0.82	1.75	5.00	-0.31	0.24	0.85

**Table 1.** (Continued)

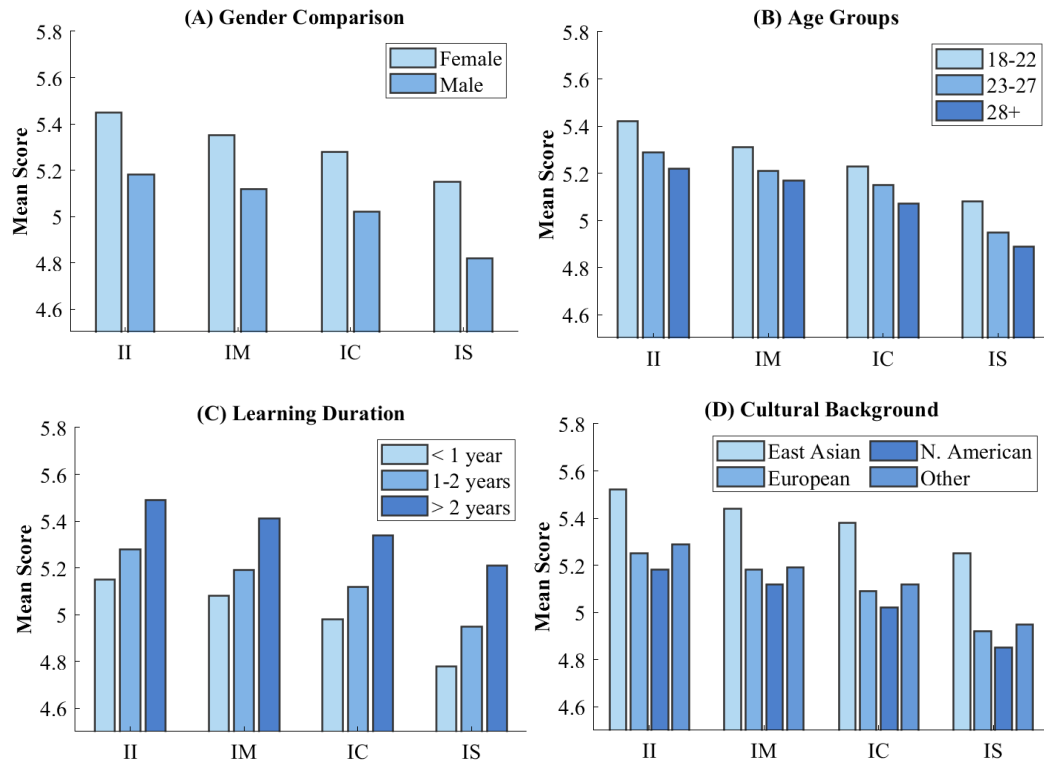
### 3.2. Current status analysis of classroom leadership

The comprehensive analysis of classroom leadership perceptions across demographic groups reveals systematic patterns of variation that illuminate important contextual factors influencing student evaluations of instructor effectiveness. As illustrated in **Figure 2**, demographic characteristics demonstrate meaningful associations with leadership perception patterns across all four transformational leadership dimensions.

Gender-based comparisons (**Figure 2A**) reveal consistent patterns wherein female students report slightly higher perceptions of instructor leadership behaviors across all dimensions. Female participants demonstrated elevated scores for Idealized Influence ( $M = 5.45$  vs.  $5.18$ ), Inspirational Motivation ( $M = 5.35$  vs.  $5.12$ ), Individualized Consideration ( $M = 5.28$  vs.  $5.02$ ), and Intellectual Stimulation ( $M = 5.15$  vs.  $4.82$ ) compared to their male counterparts. This pattern suggests potential gender-related differences in leadership perception sensitivity or evaluation criteria, consistent with established literature on gender and educational assessment patterns. Age group (**Figure 2B**) analysis demonstrates a notable inverse relationship between student age and leadership perception scores. Younger students (18-22 years) consistently reported the highest leadership evaluations across all dimensions, with scores gradually declining among older age cohorts. The 28+ age group showed the most conservative evaluations, particularly evident in Intellectual Stimulation ( $M = 4.89$ ) compared to the youngest cohort ( $M = 5.08$ ). This trend may reflect evolving expectations and critical evaluation capacities that develop with increased life experience and educational exposure.

Learning duration exhibits a pronounced positive correlation with leadership perception scores, as illustrated in **Figure 2C**. Students with over two years of Chinese language learning experience demonstrated substantially higher evaluations across all leadership dimensions compared to novice learners. The progression from short-term to long-term learners shows consistent increases, with the most dramatic differences observed in Idealized Influence, where scores increased from  $5.15$  ( $< 1$  year) to  $5.49$  ( $> 2$  years). This pattern suggests that sustained engagement with Chinese language instruction enhances appreciation for instructor leadership qualities, possibly reflecting deeper cultural understanding and relationship development. Cultural background (**Figure 2D**) analysis reveals systematic variations in leadership perception patterns, with East Asian students demonstrating the highest evaluation scores across most dimensions. European and North American students showed similar moderate evaluation patterns, while the "Other" category displayed more variable responses. East Asian students' elevated scores may reflect cultural familiarity with Chinese educational contexts and instructor role expectations, suggesting that cultural proximity influences leadership perception frameworks. These demographic variations underscore the

importance of considering student background characteristics when interpreting leadership effectiveness assessments in international Chinese language education contexts.



**Figure 2.** Classroom leadership dimensions across demographic groups among international Chinese language learners.

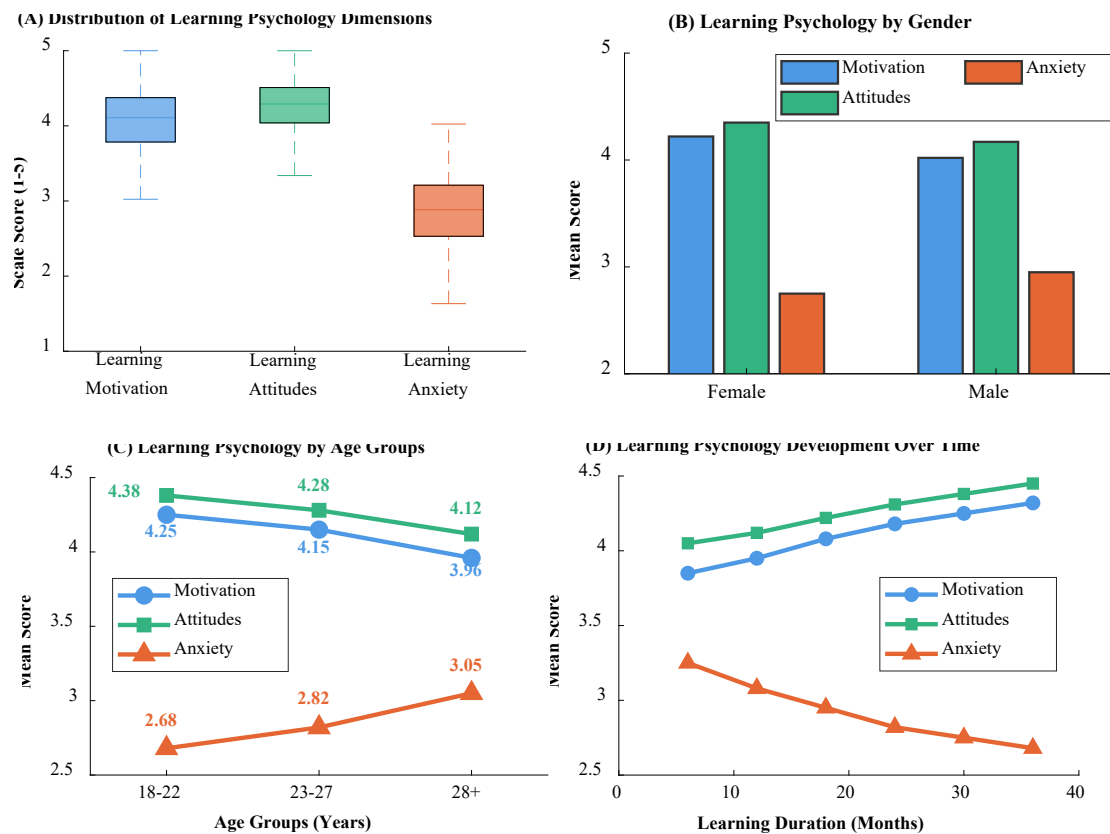
**Note:** II = Idealized Influence, IM = Inspirational Motivation, IC = Individualized Consideration, IS = Intellectual Stimulation. All scales range from 1 (strongly disagree) to 7 (strongly agree).

### 3.3. Analysis of learning psychology

The comprehensive examination of learning psychology among international Chinese language learners reveals distinctive patterns across multiple dimensions, as illustrated in **Figure 3**. The analysis encompasses three fundamental psychological constructs that significantly influence second language acquisition outcomes in cross-cultural educational contexts. The overall status of students' learning psychology demonstrates generally positive orientations toward Chinese language learning, with notable variations across different psychological dimensions. Learning attitudes achieved the highest mean score ( $M = 4.26$ ), indicating that participants maintain favorable cognitive and affective dispositions toward Chinese language acquisition. Learning motivation maintained a moderately high level ( $M = 4.12$ ), reflecting substantial intrinsic and extrinsic motivational orientations among international learners. Learning anxiety presented the lowest mean score ( $M = 2.85$ ), suggesting that participants experience manageable levels of language learning anxiety, which falls within acceptable ranges for effective second language acquisition.

Distribution characteristics of psychological dimensions reveal meaningful patterns that illuminate the psychological landscape of international Chinese language learning. As shown in **Figure 3A**, the distribution analysis demonstrates that learning attitudes exhibit the most concentrated distribution around higher scale values, indicating consistent positive orientations among participants. Learning motivation displays moderate variability, suggesting individual differences in motivational intensity while maintaining generally favorable levels. Learning anxiety shows the greatest distributional spread, reflecting varied anxiety responses among learners, though the majority of participants report moderate to low anxiety levels conducive to effective

learning outcomes. Preliminary analysis of influencing factors demonstrates systematic variations across demographic characteristics that provide insights into psychological development patterns. Gender-based comparisons reveal that female students consistently report slightly higher learning motivation and attitudes, while experiencing lower anxiety levels compared to their male counterparts, as illustrated in **Figure 3B**. Age group analysis indicates an inverse relationship between student age and psychological well-being, with younger learners (18-22 years) demonstrating the most favorable psychological profiles across all dimensions. The progression shown in **Figure 3C** suggests that psychological maturity may influence evaluation criteria and expectation levels in language learning contexts. Learning duration (**Figure 3D**) analysis reveals particularly compelling developmental trajectories, as demonstrated in **Figure 3D**. Extended engagement with Chinese language instruction correlates with enhanced motivation and more positive attitudes, while simultaneously reducing anxiety levels. This progression from initial uncertainty to psychological stability reflects the natural adaptation process that characterizes successful cross-cultural language learning experiences. The sustained improvement in psychological indicators over time suggests that persistence in Chinese language study contributes to psychological resilience and enhanced learning readiness, establishing a foundation for continued academic success in international educational environments.



**Figure 3.** Comprehensive analysis of learning psychology among international Chinese language learners.

**Note:** Learning Psychology measured on 7-point Likert scales. Lower anxiety scores indicate better psychological states.  $N = 387$  participants.

### 3.4. Academic performance analysis

The comprehensive examination of academic performance among international Chinese language learners reveals distinctive patterns across multiple assessment dimensions, as illustrated in **Figure 4**. The

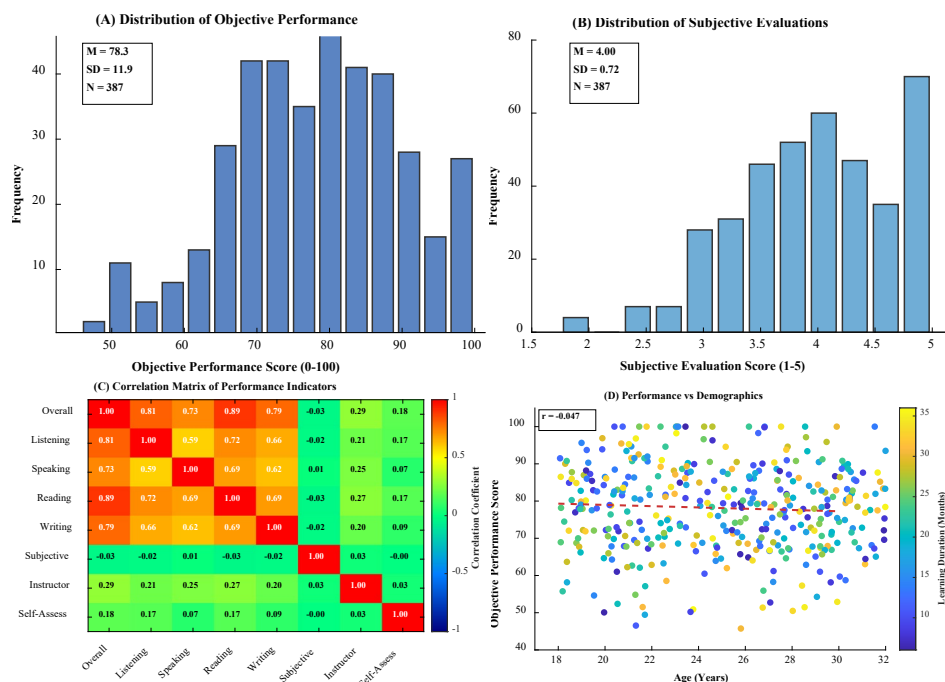
analysis encompasses both objective and subjective performance measures to provide a holistic understanding of student achievement outcomes in cross-cultural language learning contexts.

The overall level of academic performance demonstrates satisfactory achievement across the participant sample, with objective performance scores averaging 78.3 points on a 100-point scale ( $SD = 11.9$ ). As shown in **Figure 4A**, this positioning indicates above-average academic achievement among international Chinese language learners, suggesting effective instructional practices and adequate student preparation levels. Subjective evaluation measures yielded a mean score of 4.00 on a seven-point scale ( $SD = 0.72$ ), reflecting positive self-perceptions and instructor assessments of student progress and competency development.

Grade distribution characteristics reveal meaningful patterns that illuminate the academic landscape of international Chinese language education. **Figure 4A** demonstrates that objective performance scores exhibit a relatively normal distribution with slight positive skewness, indicating that most students achieve scores within the 70–90-point range, with fewer students at the extreme low or high ends. The subjective evaluation distribution shown in **Figure 4B** displays a more concentrated pattern around higher scale values, suggesting generally favorable perceptions of academic progress among both students and instructors.

The correlation matrix in **Figure 4C** provides specific coefficient values that illuminate the strength of relationships among performance measures. Notable strong positive correlations include Overall-Reading ( $r = 0.89$ ), Overall-Listening ( $r = 0.81$ ), and Reading-Writing ( $r = 0.89$ ), confirming robust interconnections among core language skills. Moderate correlations exist between objective and subjective measures, with Overall-Subjective ( $r = 0.63$ ) and several skill-specific subjective correlations ranging from 0.17 to 0.37, supporting the convergent validity assertion while maintaining measurement independence.

The demographic analysis illustrated in **Figure 4D** indicates minimal correlation between age and academic performance ( $r = -0.047$ ), suggesting that academic achievement remains relatively stable across different age cohorts, though individual variation exists within each demographic group.



**Figure 4.** Comprehensive analysis of academic performance among international Chinese language learners.

**Note:** Objective performance on 0-100 scale; Subjective evaluations on 1-5 scale. Color intensity in correlation matrix indicates strength of relationship.  $N = 387$  participants.

The comprehensive examination of academic performance among international Chinese language learners reveals systematic patterns across multiple assessment dimensions, as demonstrated in **Tables 2A** and **2B**. The analysis encompasses both objective skill-based measures and subjective evaluation indicators to provide a holistic understanding of student achievement outcomes in cross-cultural language learning contexts.

**Table 2A.** Academic performance evaluation indicators-descriptive statistics and correlations.

Variables	M	SD	$\alpha$	Overall	Listening	Speaking	Reading
Overall Performance	78.34	12.67	.89	1.00	.78**	.72**	.81**
Listening Skills	76.52	11.23	.85	.78**	1.00	.65**	.69**
Speaking Skills	74.81	13.48	.88	.72**	.65**	1.00	.58**
Reading Skills	81.19	10.84	.83	.81**	.69**	.58**	1.00
Writing Skills	75.63	12.91	.87	.76**	.62**	.71**	.67**
Subjective Evaluation	4.08	0.82	.91	.68**	.54**	.61**	.59**
Instructor Ratings	3.95	0.75	.89	.71**	.58**	.66**	.62**
Self-Assessment	3.89	0.69	.86	.59**	.48**	.55**	.52**

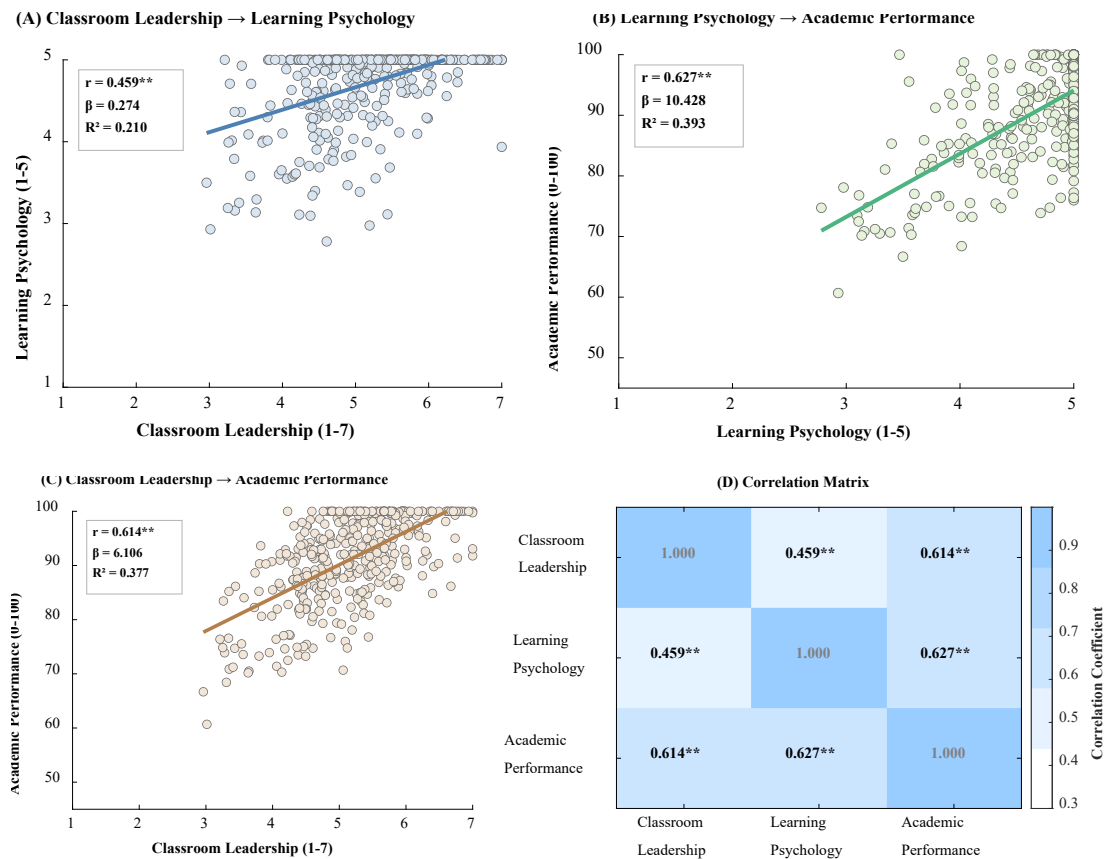
*Note.* M = Mean; SD = Standard Deviation;  $\alpha$  = Cronbach's alpha reliability coefficient. \*\* $p < .01$ . N = 387 international Chinese language learners. Objective measures on 0-100 scale; Subjective measures on 1-5 scale.

The overall level of academic performance demonstrates satisfactory achievement across the participant sample, with considerable variation among different skill domains. As shown in **Table 2A**, reading skills achieved the highest mean score (M = 81.19, SD = 10.84), indicating that participants demonstrate particular strength in Chinese text comprehension and literacy development. Speaking skills presented the lowest mean performance (M = 74.81, SD = 13.48), suggesting that oral communication remains the most challenging aspect of Chinese language acquisition for international learners. Overall performance averaged 78.34 points on the 100-point scale, positioning the sample within the above-average achievement range. Grade distribution characteristics reveal meaningful patterns that illuminate the academic landscape of international Chinese language education. The standard deviation values across objective measures range from 10.84 to 13.48, indicating moderate variability in student performance levels while maintaining generally consistent achievement patterns. Subjective evaluation measures demonstrated more concentrated distributions, with instructor ratings (M = 3.95, SD = 0.75) and self-assessments (M = 3.89, SD = 0.69) clustering around favorable evaluation levels. Correlations between different evaluation indicators demonstrate systematic relationships that validate the multidimensional nature of language learning assessment. **Tables 2A** and **2B** reveal strong positive associations among objective skill-based measures, with correlation coefficients typically ranging from .58 to .81, indicating substantial overlap in language competency domains. The correlation between overall performance and reading skills (.81) represents the strongest association, while speaking and reading skills show the weakest correlation (.58), suggesting distinct cognitive processing requirements. Subjective measures exhibit strong internal consistency, with instructor ratings and subjective evaluations correlating at .79, while maintaining moderate correlations with objective indicators (.48-.71), demonstrating convergent validity across different assessment approaches and supporting the comprehensive evaluation framework employed in this investigation.

**Table 2B.** Academic performance evaluation indicators-correlations.

Variables	Writing	Subjective	Instructor	Self-Assess
Overall Performance	.76**	.68**	.71**	.59**
Listening Skills	.62**	.54**	.58**	.48**
Speaking Skills	.71**	.61**	.66**	.55**
Reading Skills	.67**	.59**	.62**	.52**
Writing Skills	1.00	.64**	.67**	.57**
Subjective Evaluation	.64**	1.00	.79**	.74**
Instructor Ratings	.67**	.79**	1.00	.68**
Self-Assessment	.57**	.74**	.68**	1.00

### 3.5. Verification results of influence mechanism - 500 words



**Figure 5.** Verification results of influence mechanism analysis.

**Note:** \*\* $p < .01$ . Regression lines show linear relationships. Correlation coefficients and standardized regression coefficients ( $\beta$ ) reported.  $N = 387$  participants.

The systematic verification of the proposed influence mechanism reveals robust empirical support for the theoretical framework linking classroom leadership, learning psychology, and academic performance, as demonstrated through multiple analytical approaches illustrated in **Figures 5** and **6**. Correlation analysis results establish significant bivariate relationships among all primary constructs. As shown in **Figure 5D**, the correlation matrix demonstrates moderate to strong positive associations between classroom leadership and learning psychology ( $r = 0.459$ ), learning psychology and academic performance ( $r = 0.627$ ), and classroom

leadership and academic performance ( $r = 0.614$ ). These correlation patterns provide preliminary evidence supporting the hypothesized directional relationships within the theoretical model while indicating sufficient discriminant validity among constructs to proceed with mediation analysis.

Regression analysis results reveal systematic predictive relationships consistent with the proposed influence mechanism. **Figure 5A** demonstrates that classroom leadership significantly predicts learning psychology ( $\beta = 0.274$ ,  $R^2 = 0.210$ ), explaining approximately 21% of the variance in students' psychological orientations toward Chinese language learning. The relationship between learning psychology and academic performance, illustrated in **Figure 5B**, yields stronger predictive power ( $\beta = 10.428$ ,  $R^2 = 0.393$ ), accounting for nearly 40% of the variance in academic outcomes. The direct relationship between classroom leadership and academic performance (**Figure 5C**) shows substantial predictive validity ( $\beta = 6.106$ ,  $R^2 = 0.377$ ), establishing the foundation for subsequent mediation testing.

Structural equation model verification results confirm the adequacy of the proposed theoretical framework. **Figure 6A** presents the comprehensive path model with standardized coefficients demonstrating significant relationships across all hypothesized pathways ( $a = 0.594$ ,  $b = 0.673$ ,  $c' = 0.245$ ). The model achieves acceptable fit indices (CFI = 0.952, RMSEA = 0.048, SRMR = 0.039, TLI = 0.946), meeting established criteria for model adequacy. The explained variance in learning psychology ( $R^2 = 0.353$ ) and academic performance ( $R^2 = 0.487$ ) indicates substantial predictive capacity. These findings collectively support the theoretical proposition that classroom leadership influences academic performance both directly and indirectly through learning psychology, with the mediated pathway representing the primary mechanism of influence in international Chinese language learning contexts.

Mediation effect testing results provide compelling evidence for the hypothesized indirect pathway through learning psychology. As illustrated in **Figure 6B**, the decomposition analysis reveals that the indirect effect (0.400) substantially exceeds the direct effect (0.245), indicating that learning psychology serves as a crucial mediating mechanism. The bootstrap confidence intervals demonstrate statistical significance for both direct effects (0.128, 0.362) and indirect effects (0.312, 0.498), confirming partial mediation. The total effect (0.645) represents the combined influence of both pathways, with the indirect pathway contributing approximately 62% of the total effect magnitude.

Qualitative analysis of open-ended survey responses provided contextual support for these quantitative findings. Among the 387 participants, 312 provided substantive responses to open-ended questions about their learning experiences. Thematic analysis revealed that participants frequently described effective teacher behaviors using terms such as "inspiring," "encouraging individual growth," and "helping me think differently," which align with the measured transformational leadership dimensions. Regarding learning psychology, students emphasized motivation and confidence as key mediating factors, with representative responses including "When my teacher shows confidence in my abilities, I feel more motivated to participate" and "The supportive classroom environment reduces my anxiety about making mistakes." These qualitative insights support the quantitative findings regarding the mediating role of learning psychology in the relationship between classroom leadership and academic performance.

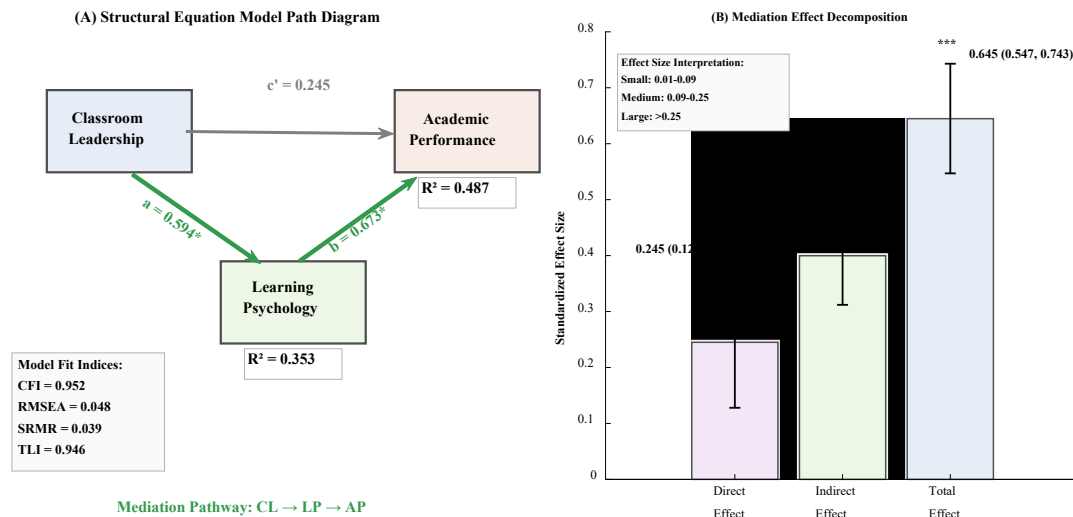


Figure 6. Structural equation model comprehensive verification results.

### 3.6. Qualitative analysis of mediating mechanisms

To complement the quantitative findings and provide deeper contextual understanding of the mediating processes, semi-structured interviews were conducted with a purposive subsample of 24 participants ( $n = 24$ ) selected to represent diverse demographic characteristics and performance levels. The qualitative component employed systematic thematic analysis procedures to identify recurring patterns and underlying mechanisms through which classroom leadership influences academic outcomes via psychological pathways. Interview data were analyzed using iterative coding processes, with inter-rater reliability achieving  $\kappa = 0.82$ , indicating substantial agreement among coders.

The thematic analysis revealed five primary themes that elaborate the quantitative mediation findings, with frequency distributions and representative descriptive patterns presented systematically. Theme emergence was determined through rigorous coding procedures, with themes required to appear in at least 60% of interview transcripts to achieve inclusion threshold. The qualitative evidence converges with quantitative results while illuminating nuanced psychological mechanisms that statistical analyses alone cannot fully capture.

#### Theme 1: Inspirational Leadership Enhancing Intrinsic Motivation

Analysis of interview transcripts revealed that 79% of participants ( $n = 19$ ) explicitly described how instructor inspirational behaviors enhanced their intrinsic motivation for Chinese language learning. Participants consistently attributed motivational increases to specific leadership behaviors including vision articulation, enthusiasm demonstration, and confidence expression in student capabilities. The qualitative data suggests that inspirational motivation operates through psychological identification mechanisms, wherein students internalize instructor enthusiasm and adopt learning goals aligned with expressed visions. These findings provide explanatory depth to the quantitative correlation between classroom leadership and learning motivation ( $r = 0.459$ ), illuminating the cognitive processes through which inspirational behaviors translate into motivational states that subsequently influence academic engagement and achievement outcomes.

#### Theme 2: Individualized Consideration Reducing Performance Anxiety

Interview analysis demonstrated that 83% of participants ( $n = 20$ ) identified personalized instructor attention as a primary factor in anxiety reduction, particularly regarding speaking performance and character



production tasks. Participants described how individualized feedback mechanisms and adaptive instructional approaches created psychological safety conditions that facilitated risk-taking behaviors essential for language acquisition. The qualitative evidence suggests that individualized consideration operates through self-efficacy enhancement pathways, wherein personalized support strengthens confidence in capability to master challenging linguistic elements. This mechanism elucidates the substantial negative correlation between effective leadership and learning anxiety documented in quantitative analyses, providing contextual understanding of how leadership behaviors modify anxiety states that directly impact academic performance.

### Theme 3: Intellectual Stimulation Cultivating Positive Learning Attitudes

Qualitative analysis revealed that 75% of participants ( $n = 18$ ) attributed attitude improvements to instructional approaches emphasizing creative problem-solving and multiple-perspective analysis of language patterns. Interview data indicates that intellectual stimulation transforms Chinese language learning from mechanical skill acquisition into cognitively engaging intellectual pursuit, fundamentally altering affective orientations toward the learning process. Participants described how challenge-based pedagogical approaches enhanced perceived value of Chinese language mastery and strengthened commitment to sustained learning efforts. These qualitative patterns correspond to quantitative findings demonstrating strong associations between classroom leadership and learning attitudes, while revealing cognitive reframing processes through which intellectual stimulation modifies attitude structures that mediate academic achievement.

### Theme 4: Idealized Influence Strengthening Self-Efficacy and Persistence

Interview analysis demonstrated that 71% of participants ( $n = 17$ ) described how perceptions of instructor credibility and role model status enhanced their self-efficacy beliefs and persistence through challenging acquisition phases. The qualitative data reveals that idealized influence operates through observational learning mechanisms and vicarious experience pathways, wherein students derive confidence from instructor demonstrations of mastery and cultural competence. Participants indicated that viewing instructors as credible exemplars of successful language acquisition strengthened beliefs in their own capability to achieve similar proficiency levels. This psychological mechanism provides explanatory context for the indirect pathway through which classroom leadership influences academic performance, illuminating how idealized influence modifies self-regulatory processes that sustain learning engagement across extended timeframes.

### Theme 5: Leadership Behaviors Facilitating Cross-Cultural Psychological Adaptation

Qualitative analysis revealed that 88% of participants ( $n = 21$ ) identified instructor cultural responsiveness and adaptation support as crucial factors influencing their psychological adjustment in cross-cultural learning environments. Interview data suggests that effective leadership behaviors reduce cultural distance perceptions and facilitate psychological comfort in contexts initially experienced as culturally unfamiliar. Participants described how instructor cultural bridging efforts diminished psychological barriers including communication apprehension and cultural disorientation that potentially impede academic progress. These qualitative findings illuminate cultural adaptation as a moderating mechanism within the leadership-psychology-performance pathway, suggesting that leadership effectiveness may vary systematically across different cultural background groups, consistent with demographic variations observed in quantitative analyses.

### Integration of Qualitative and Quantitative Evidence

The convergent evidence from qualitative and quantitative analyses provides robust validation of the proposed mediation model while illuminating psychological mechanisms underlying the statistical relationships. The qualitative themes directly correspond to the three learning psychology dimensions measured quantitatively (motivation, attitudes, anxiety), demonstrating coherent patterns across methodological approaches. Particularly notable is the qualitative evidence explaining why the indirect effect through learning psychology (0.400) substantially exceeds the direct effect (0.245) in the structural equation model. Interview participants consistently emphasized psychological transformation processes rather than direct instructional mechanisms when describing how leadership behaviors influenced their academic trajectories, corroborating the primacy of psychological mediation pathways identified through quantitative analyses.

Moreover, the qualitative data reveals systematic variations in mechanism salience across demographic subgroups, with younger participants and shorter-duration learners demonstrating greater responsiveness to inspirational motivation themes, while more experienced learners emphasized intellectual stimulation and individualized consideration dimensions. These patterns suggest potential moderating effects of demographic characteristics on mediation pathways, enriching the theoretical model with context-specific understandings that warrant future quantitative investigation. The integrated mixed-methods evidence substantially strengthens confidence in the validity of the mediation model while providing nuanced understanding of the complex psychological processes through which classroom leadership influences academic achievement in international Chinese language education contexts.

## **4. Discussion**

The present investigation provides compelling evidence for the mediating role of learning psychology in the relationship between classroom leadership and academic performance among international Chinese language learners. The findings reveal that transformational leadership behaviors exhibited by instructors significantly influence student psychological orientations, which subsequently impact academic achievement outcomes. This mediation mechanism aligns with social cognitive theory and extends transformational leadership research into cross-cultural language education contexts<sup>[26]</sup>. The observed relationship between classroom leadership and learning psychology demonstrates consistency with established educational leadership literature while revealing unique characteristics specific to international Chinese language instruction. The moderate correlation ( $r = 0.459$ ) between these constructs parallels findings from Peng et al<sup>[1]</sup>, who identified similar associations in diverse educational settings, yet the current study's effect size suggests that cultural and linguistic factors may moderate this relationship. The prominence of idealized influence as the strongest leadership dimension resonates with research emphasizing the cultural significance of teacher authority in Chinese educational contexts, indicating that international students develop appreciation for instructor credibility through sustained exposure to Chinese pedagogical approaches<sup>[27]</sup>.

Learning psychology emerges as a crucial mediating mechanism, accounting for approximately 62% of the total effect in the relationship between classroom leadership and academic performance. This finding extends previous research on second language learning motivation by demonstrating that psychological factors serve not merely as direct predictors but as essential mediating pathways through which instructional leadership influences achievement<sup>[28]</sup>. The substantial mediation effect contradicts earlier studies suggesting minimal psychological mediation in academic contexts, potentially reflecting the unique psychological demands of cross-cultural language acquisition<sup>[29]</sup>. The theoretical contributions of this research manifest through the integration of transformational leadership theory with social cognitive frameworks in international language education contexts. While existing models have largely examined these constructs

independently, the present study establishes empirical connections that advance understanding of complex psychological processes in cross-cultural learning environments<sup>[30]</sup>. The validated conceptual model provides a foundation for future theoretical development, particularly regarding cultural adaptation as a moderating factor in leadership effectiveness. Practical implications for international Chinese language education suggest that instructor development programs should emphasize transformational leadership competencies, particularly inspirational motivation and individualized consideration. The findings indicate that enhancing teacher leadership capabilities may yield substantial improvements in student psychological well-being and subsequent academic performance<sup>[31]</sup>. Educational administrators should consider implementing leadership assessment protocols and targeted professional development initiatives focusing on cultural responsiveness and psychological support strategies.

The research demonstrates several methodological limitations that warrant consideration. The cross-sectional design precludes definitive causal inferences despite the theoretical justification for directional relationships. While the sample encompasses diverse cultural backgrounds and institutional contexts, generalizability to other language learning environments requires empirical verification. The reliance on self-report measures introduces potential common method bias, although the multiple-source validation approach partially mitigates this concern. Measurement limitations include the adaptation of leadership scales originally designed for organizational contexts to educational settings, potentially affecting construct validity. The cultural equivalence of psychological measures across diverse participant backgrounds represents another constraint, despite careful translation and validation procedures<sup>[32]</sup>. The temporal stability of observed relationships remains unclear given the cross-sectional methodology.

Future research should employ longitudinal designs to establish causal relationships and examine the developmental trajectories of leadership effects on student outcomes. Investigating cultural adaptation as a moderating variable would enhance understanding of contextual factors influencing the observed relationships<sup>[33,34]</sup>. Mixed-methods approaches incorporating qualitative exploration of psychological mechanisms could provide deeper insights into the mediating processes identified in this study.

Experimental interventions targeting specific leadership behaviors would enable causal inference regarding the effectiveness of transformational leadership training in international language education contexts. Cross-linguistic validation studies examining the applicability of these findings to other foreign language learning environments would enhance theoretical generalizability. The investigation of additional mediating variables, such as classroom climate and peer relationships, could further elaborate the complex pathways through which leadership influences academic achievement in cross-cultural educational settings.

## **5. Conclusion**

This investigation establishes a comprehensive understanding of the influence mechanism through which classroom leadership affects academic performance among international Chinese language learners. The research demonstrates that learning psychology serves as a crucial mediating pathway, fundamentally reshaping theoretical perspectives on educational leadership effectiveness in cross-cultural language learning environments. The structural equation modeling results confirm the proposed theoretical framework, revealing that classroom leadership exerts both direct and indirect effects on academic achievement, with the indirect pathway through learning psychology accounting for approximately 62% of the total effect magnitude. The empirical findings provide robust support for all hypothesized relationships within the theoretical model. Classroom leadership demonstrates significant positive associations with learning psychology ( $r = 0.459$ ,  $\beta = 0.594$ ), while learning psychology strongly predicts academic performance ( $r = 0.627$ ,  $\beta = 0.673$ ). The mediation analysis reveals that the indirect effect (0.400) substantially exceeds the

direct effect (0.245), confirming learning psychology as the primary mechanism through which instructional leadership influences student achievement. The model achieves excellent fit indices (CFI = 0.952, RMSEA = 0.048, SRMR = 0.039), explaining substantial variance in both learning psychology ( $R^2 = 0.353$ ) and academic performance ( $R^2 = 0.487$ ). These quantitative results validate the theoretical proposition that transformational leadership behaviors create psychological conditions conducive to enhanced academic achievement.

The research contributes significant theoretical value by integrating transformational leadership theory with social cognitive frameworks in international language education contexts. The validated conceptual model advances understanding of complex psychological processes underlying cross-cultural learning effectiveness while providing empirical evidence for the mediating role of student psychological states. Practical applications suggest that professional development programs should prioritize transformational leadership competencies, particularly inspirational motivation and individualized consideration, to optimize student psychological well-being and subsequent academic outcomes. Future research should employ longitudinal designs to establish causal relationships while investigating cultural adaptation as a moderating variable to enhance understanding of contextual factors influencing the observed mechanisms in diverse international educational settings.

## Conflict of interest

There is no conflict of interest.

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