From Cultural Intelligence to Adaptation: Unpacking the Mechanisms of Psychological Resilience

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HOW TO CITE:

Wanmeng Wu, Zahari Ishak, Anne Noor Sri Juwaneeta Jamaludin,Luping Wang, Yunyao Jiang (2026). From Cultural Intelligence to Adaptation: Unpacking the Mechanisms of Psychological Resilience. International Journal of Special Education, 41(11s), 289-304

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ABSTRACT:

This study examines how different dimensions of cultural intelligence (CQ) contribute to international students' sociocultural adaptation through the mediating mechanism of psychological resilience in Northeast China. Using a sample of 450 international students across multiple universities in Northeast China, we employed structural equation modeling via PLS-SEM to test the differential effects of four CQ dimensions (metacognitive, cognitive, motivational, and behavioral) on adaptation through psychological resilience. Results revealed that cognitive CQ emerged as the strongest predictor of psychological resilience (beta=0.213, $p<0.001$), followed by motivational CQ (beta=0.190, $p<0.001$) and behavioral CQ (beta=0.149, $p=0.002$), while metacognitive CQ showed a non-significant direct effect (beta=0.068, $p=0.179$). Psychological resilience significantly mediated the relationships between three CQ dimensions (cognitive, motivational, behavioral) and sociocultural adaptation, explaining 30.4% of the variance in adaptation outcomes. The indirect effect of cognitive CQ through psychological resilience was strongest (beta=0.081, $p<0.001$). This study advances CQ theory by demonstrating that cultural knowledge (cognitive CQ), rather than motivation, is the primary driver of psychological resilience in cross-cultural adaptation.

Keywords: Cultural intelligence, psychological resilience, sociocultural adaptation, international student.

I. INTRODUCTION

1.1 The International Student Adaptation Challenge

The internationalization of higher education has transformed the global academic landscape, with international student mobility reaching unprecedented levels. China has emerged as a leading destination for international students, hosting over 500,000 students from more than 200 countries and regions as of 2019 (Ministry of Education of China, 2020). This dramatic growth reflects China's increasing economic influence and soft power projection through educational diplomacy. However, the substantial challenges faced by international students in adapting to new cultural environments remain a critical concern for educators, policymakers, and researchers alike.

Sociocultural adaptation---the ability to navigate daily life in a new cultural context---represents a multifaceted challenge encompassing language barriers, unfamiliar social norms, different educational systems, and novel interpersonal communication patterns (Ward & Kennedy, 1999). Research consistently demonstrates that difficulties in sociocultural adaptation can lead to academic underperformance, psychological distress, premature departure from study programs, and reduced intercultural competence development (Smith & Khawaja, 2011). The stakes are particularly high in China, where the cultural distance from Western contexts, linguistic complexity, and distinct pedagogical approaches create unique adaptation challenges.

Despite extensive research on international student adaptation, successful adaptation varies considerably among individuals facing similar environmental demands. This variation suggests that individual difference factors play crucial roles in determining adaptation outcomes. Understanding these factors and the mechanisms through which they operate is essential for developing effective support interventions and optimizing the international education experience.

1.2 Cultural Intelligence as a Key Resource

Cultural intelligence (CQ), defined as an individual's capability to function effectively in culturally diverse settings, has emerged as a critical predictor of cross-cultural adaptation success (Ang et al., 2007). Unlike traditional constructs such as emotional intelligence or general mental ability, CQ specifically addresses the unique challenges of navigating cultural differences. The four-dimensional CQ framework encompasses metacognitive CQ (cultural awareness and strategic thinking), cognitive CQ (cultural knowledge systems), motivational CQ (interest and confidence in cross-cultural situations), and behavioral CQ (verbal and nonverbal adaptability).

Substantial research has established positive relationships between overall CQ and various adaptation outcomes, including academic performance, social integration, and psychological well-being (Presbitero, 2016; Ott & Michailova, 2018). However, most studies have treated CQ as a unidimensional construct, examining its total effect on adaptation without differentiating among its component dimensions. This approach obscures potentially important differential effects of CQ dimensions and limits our theoretical understanding of how CQ operates.

Recent meta-analytic evidence suggests that CQ dimensions may indeed have distinct predictive patterns across different outcome domains (Rockstuhl et al., 2011). Yet, a critical gap remains: we know relatively little about the mechanisms through which different CQ dimensions translate into adaptation success. This "black box" problem---understanding how CQ leads to adaptation---represents a significant limitation in both theory development and practical application.

1.3 Psychological Resilience as a Mediation Mechanism

Psychological resilience---the capacity to maintain or regain psychological well-being in the face of adversity---offers a promising explanatory mechanism for the CQ-adaptation relationship. Cross-cultural transitions inherently

involve significant stressors, uncertainties, and challenges that test individuals' coping capacities (Berry, 1997). Resilience represents not merely the absence of psychological distress but rather a dynamic process of positive adaptation to difficult circumstances (Luthar et al., 2000).

Theoretical rationale suggests that different CQ dimensions should foster psychological resilience through distinct pathways. Metacognitive CQ, through enhanced awareness and strategic thinking, may help individuals reframe cultural challenges as opportunities for growth rather than threats. Cognitive CQ, by providing cultural knowledge frameworks, reduces uncertainty and enhances predictability in cross-cultural encounters. Motivational CQ generates intrinsic interest and self-efficacy that buffer against adaptation stress. Behavioral CQ enables effective social interactions that build supportive networks and reduce isolation.

Despite the theoretical plausibility of these pathways, empirical research examining psychological resilience as a mediator between CQ dimensions and adaptation remains scarce. Most existing studies have focused on direct effects or have examined resilience as an outcome rather than a process variable. This gap is particularly problematic given that understanding mediation mechanisms is essential for designing effective interventions targeting specific aspects of the adaptation process.

1.4 Study Rationale and Contributions

This study addresses these theoretical and empirical gaps by examining the differential effects of four CQ dimensions on sociocultural adaptation through the mediating mechanism of psychological resilience. We adopt a disaggregated approach to CQ, examining each dimension separately to uncover their unique contributions and relative importance. This approach is theoretically important because it allows us to test specific predictions about how different cognitive, motivational, and behavioral resources operate in the adaptation process.

The choice of Northeast China as the research context is strategic for several reasons. First, this region remains understudied compared to major coastal cities like Beijing and Shanghai, yet hosts a substantial international student population. Second, the region's distinct cultural characteristics, economic development patterns, and climate present unique adaptation challenges. Third, the demographic composition of international students in Northeast China---with significant representation from Asian, African, and European countries---provides valuable diversity for examining CQ effects across different cultural backgrounds.

This research makes several important contributions. Theoretically, it advances CQ theory by demonstrating dimension-specific effects and identifying psychological resilience as a key mediating mechanism. Methodologically, it showcases the application of PLS-SEM for testing complex mediation models in cross-cultural research. Practically, it provides actionable insights for designing targeted support interventions that address the most impactful aspects of cultural intelligence development. These contributions are particularly timely given the post-pandemic reconceptualization of international education and the growing emphasis on student support and well-being.

II. THEORETICAL BACKGROUND AND HYPOTHESES

2.1 Cultural Intelligence: A Multidimensional Framework

Cultural intelligence represents a theoretically grounded and empirically validated framework for understanding individual differences in cross-cultural effectiveness (Ang & Van Dyne, 2008). The four-dimensional structure of CQ reflects distinct but complementary facets of intercultural capability, each drawing on different psychological processes and resources.

Metacognitive CQ encompasses the mental processes of acquiring and understanding cultural knowledge. Individuals high in metacognitive CQ actively question their cultural assumptions, check the accuracy of their cultural knowledge during interactions, and adjust their mental models when cultural

expectations are not met. This dimension reflects conscious cultural awareness and strategic thinking during cross-cultural encounters (Ang et al., 2007).

Cognitive CQ refers to knowledge of cultural norms, practices, and conventions across different cultural settings. This includes understanding economic, legal, and social systems, as well as knowledge of cultural values, religious beliefs, and language structures. Cognitive CQ provides the mental roadmap that helps individuals interpret and predict behavior in cross-cultural settings (Triandis, 2006).

Motivational CQ captures the intrinsic interest in and confidence toward functioning in culturally diverse settings. It reflects the capability to direct attention and energy toward cultural differences and challenging cross-cultural situations. Individuals with high motivational CQ enjoy cross-cultural encounters, are confident in their ability to succeed in such situations, and persist in the face of cross-cultural challenges (Ang & Van Dyne, 2008).

Behavioral CQ involves the capability to exhibit appropriate verbal and nonverbal actions when interacting with people from different cultures. This includes the flexibility to adopt speech acts, facial expressions, gestures, and communication styles appropriate to different cultural contexts. Behavioral CQ enables individuals to effectively signal cultural understanding through their actions (Earley & Ang, 2003).

2.2 Differential Effects of CQ Dimensions on Psychological Resilience

Psychological resilience in the context of cross-cultural adaptation refers to the capacity to maintain psychological well-being and continue functioning effectively despite the inevitable stressors, setbacks, and uncertainties inherent in cultural transitions (Motti-Stefanidi & Masten, 2013). We propose that different CQ dimensions contribute to resilience through distinct psychological pathways.

Cognitive CQ should be particularly important for resilience because cultural knowledge reduces uncertainty and unpredictability---two major sources of stress in cross-cultural contexts. When individuals possess understanding of cultural norms, values, and behavioral expectations, they can better anticipate social situations and interpret others' behaviors accurately. This knowledge-based predictability reduces anxiety and enhances confidence in handling cross-cultural encounters. Additionally, cultural knowledge enables more effective problem-solving when challenges arise, as individuals can draw on appropriate cultural frameworks rather than defaulting to ineffective home-culture strategies. In the Chinese context specifically, where implicit communication norms, hierarchical relationships, and face-saving behaviors differ markedly from many Western cultures, cognitive CQ may be especially critical for maintaining psychological equilibrium.

Based on this reasoning, we hypothesize: H1: Cognitive CQ positively predicts psychological resilience among international students.

Motivational CQ should foster resilience by generating intrinsic interest and self-efficacy that buffer against adaptation stress. When individuals are genuinely interested in cross-cultural experiences and confident in their ability to navigate cultural differences, they are more likely to approach challenges with optimism rather than apprehension. This positive orientation helps reframe difficulties as interesting learning opportunities rather than insurmountable obstacles. Moreover, motivational CQ sustains engagement during difficult periods, preventing premature withdrawal or avoidance of cross-cultural situations. The self-efficacy component of motivational CQ is particularly relevant, as belief in one's capability to handle cross-cultural situations predicts greater persistence and emotional stability when facing adaptation challenges.

Therefore: H2: Motivational CQ positively predicts psychological resilience among international students.

Behavioral CQ contributes to resilience primarily through enabling successful social

interactions and relationship building. When individuals can appropriately adjust their verbal and nonverbal behaviors to cultural contexts, they experience more positive social outcomes, receive acceptance from host nationals, and develop supportive social networks. These positive social experiences and relationships serve as critical resilience resources, providing both practical assistance and emotional support during challenging times. Furthermore, behavioral flexibility reduces social rejection and embarrassment, which are significant stressors in cross-cultural adaptation. In collectivistic contexts like China, where social harmony and appropriate conduct are highly valued, behavioral CQ may be especially important for avoiding social difficulties that could undermine resilience.

Thus: H3: Behavioral CQ positively predicts psychological resilience among international students.

Metacognitive CQ's relationship with resilience is more complex. While the strategic thinking and cultural awareness associated with high metacognitive CQ would seem beneficial, its effect may be primarily indirect---operating through enhancing the effectiveness of other CQ dimensions rather than directly building resilience. Metacognitive CQ helps individuals more effectively leverage their cultural knowledge (cognitive CQ), maintain adaptive motivation (motivational CQ), and adjust behaviors appropriately (behavioral CQ). However, metacognition alone---without sufficient knowledge, motivation, or behavioral skills---may not directly buffer against adaptation stress. Indeed, excessive metacognitive awareness without corresponding competencies could potentially increase stress by highlighting one's limitations.

Nevertheless, we propose: H4: Metacognitive CQ positively predicts psychological resilience among international students, though with potentially weaker effects than other CQ dimensions.

2.3 Psychological Resilience and Sociocultural Adaptation

The connection between psychological resilience and sociocultural adaptation is well-established in cross-cultural research. Resilience provides the psychological foundation for continued engagement with adaptation challenges rather than avoidance or withdrawal. Resilient individuals maintain motivation to persist through difficulties, regulate negative emotions effectively, maintain optimistic outlook regarding their ability to adapt, and actively seek solutions to adaptation problems (Masten, 2001).

In the sociocultural adaptation domain specifically, resilience enables individuals to maintain engagement with the host culture despite setbacks, sustain effort in acquiring necessary skills despite initial frustrations, recover quickly from embarrassing or difficult cross-cultural encounters, and maintain balanced perspective on adaptation challenges. Research consistently shows that international students with higher psychological resilience report better adaptation across multiple domains, including academic adjustment, social integration, and daily life management (Bender et al., 2019).

Therefore: H5: Psychological resilience positively predicts sociocultural adaptation among international students.

2.4 Mediation Hypotheses

Building on the preceding theoretical development, we propose that psychological resilience mediates the relationships between CQ dimensions and sociocultural adaptation. Each CQ dimension fosters psychological resources that enable effective adaptation, but these effects operate through building resilience capacity rather than through direct skill transfer. For example, cognitive CQ provides knowledge that reduces uncertainty and enhances predictability, but it is the resulting confidence and emotional stability (resilience) that enables actual adaptation behaviors. Similarly, motivational CQ generates interest and self-efficacy, but it is the sustained engagement and persistence enabled by resilience that produces adaptation success.

Thus, we hypothesize: H6a: Psychological resilience mediates the relationship between cognitive CQ and sociocultural adaptation. H6b: Psychological resilience mediates the relationship between motivational CQ and sociocultural adaptation. H6c: Psychological resilience mediates the relationship between behavioral CQ and sociocultural adaptation. H6d: Psychological resilience mediates the relationship between metacognitive CQ and sociocultural adaptation.

III. METHODOLOGY

3.1 Research Context and Participants

This study was conducted in Northeast China, focusing on international students enrolled in comprehensive universities across Jilin province. Northeast China represents an important yet understudied context for international education research. Unlike major coastal cities that have received extensive research attention, the Northeast region combines unique characteristics including harsh winter climate, heavy industrial heritage, distinct regional culture, and relatively lower international exposure compared to tier-one cities.

Participants were recruited from comprehensive universities through a combination of institutional partnerships and snowball sampling. Inclusion criteria required: (1) current enrollment as a degree-seeking international student, (2) minimum of three months residence in China, (3) age 18 or above, and (4) sufficient proficiency in English to complete the questionnaire. The three-month minimum residence criterion ensured participants had sufficient adaptation experience to meaningfully assess their resilience and adaptation levels.

The final sample comprised 450 international students (response rate 78.3%). Gender distribution was 58.3% male and 41.7% female. Regional representation included Asia (43.6%), Africa (32.5%), Europe (15.3%), North America (4.7%), and South America (3.9%). Academic level distribution was undergraduate (67.8%), master's (24.4%), and doctoral (7.8%). Length of stay in China ranged from 4 months to 6 years (M=18.5 months, SD=14.2 months). Language proficiency (self-reported) showed 52.2% studied primarily in Chinese-medium programs, 38.3% in English-medium programs, and 9.5% in bilingual programs.

3.2 Measures and Instruments

Cultural Intelligence Scale. We used the 20-item Cultural Intelligence Scale (CQS) developed by Ang et al. (2007). The scale measures four dimensions: metacognitive CQ (4 items, e.g., "I am conscious of the cultural knowledge I use when interacting with people from different cultures"), cognitive CQ (6 items, e.g., "I know the legal and economic systems of other cultures"), motivational CQ (5 items, e.g., "I enjoy interacting with people from different cultures"), and behavioral CQ (5 items, e.g., "I change my verbal behavior when a cross-cultural interaction requires it"). Responses used a 7-point Likert scale (1=strongly disagree to 7=strongly agree). The CQS has demonstrated strong psychometric properties across diverse cultural contexts. In the current sample, Cronbach's alphas were .865 (behavioral CQ), .899 (cognitive CQ), .832 (metacognitive CQ), and .875 (motivational CQ).

Psychological Resilience. The 10-item Connor-Davidson Resilience Scale (CD-RISC-10; Campbell-Sills & Stein, 2007) assessed psychological resilience. Items include "I am able to adapt when changes occur" and "I tend to bounce back after illness, injury, or other hardships." The CD-RISC-10 uses a 5-point scale (0=not true at all to 4=true nearly all the time). This shortened version maintains the reliability and validity of the original 25-item scale while reducing respondent burden. Higher scores indicate greater resilience. Cronbach's alpha in this sample was .934.

Sociocultural Adaptation. The Revised Sociocultural Adaptation Scale (SCAS-R; Wilson & Gallois, 2022) measured adaptation difficulties across multiple domains. The scale includes 21 items covering everyday adaptation challenges such as "Making friends," "Understanding local language," and "Dealing with bureaucracy." Respondents rate difficulty level on a 5-point scale (1=no difficulty to

5=extreme difficulty). Items were reverse-coded so higher scores indicate better adaptation. The SCAS-R demonstrates superior psychometric properties compared to the original SCAS and captures the multidimensional nature of sociocultural adaptation. Cronbach's alpha was .966 in this sample.

Control Variables. We included several demographic and contextual variables as controls: gender (0=male, 1=female), length of stay in China (months), language proficiency (self-rated on a 5-point scale), and region of origin (coded as five categories). These variables have been identified in prior research as potentially influencing adaptation outcomes.

3.3 Data Collection Procedure

Data collection employed a cross-sectional survey design using online questionnaires. The survey was made available in English to maximize accessibility. Pilot testing with 30 international students confirmed clarity and comprehension of all items.

International student offices at participating universities distributed recruitment emails containing study information and survey links. The email emphasized voluntary participation, confidentiality protections, and the study's academic purpose. Participants provided informed consent electronically before accessing the questionnaire. The survey required approximately 20 minutes to complete.

Data collection occurred over a six-week period during the 2024-2025 academic year, avoiding major holidays and examination periods. Response patterns were monitored to identify careless responding (e.g., straight-lining, impossibly fast completion times). Fourteen responses were excluded based on these criteria, leaving 450 valid responses for analysis. The study received ethics approval from the Institutional Review Board at the lead institution.

To address common method bias concerns inherent in self-report surveys, we implemented several procedural remedies (Podsakoff et al., 2003): (1) assured anonymity and confidentiality, (2) randomized item order within scales, (3) separated predictor and outcome variables with buffer items, and (4) varied response formats across scales. Statistical remedies for common method bias assessment are reported in the Results section.

3.4 Analytical Approach

Data analysis followed a structural equation modeling approach using SmartPLS 4 (Ringle et al., 2022). We chose partial least squares structural equation modeling (PLS-SEM) rather than covariance-based SEM for several reasons: (1) PLS-SEM is particularly suitable for predictive research questions, (2) it handles complex models with multiple relationships effectively, (3) it makes minimal distributional assumptions, and (4) it works well with relatively small sample sizes. These advantages made PLS-SEM appropriate for our research objectives and data characteristics.

Measurement Model Assessment. We first evaluated the measurement model to ensure construct validity before examining structural relationships. For reflective constructs (all variables in our model), we assessed: (1) indicator reliability through outer loadings (threshold >=0.70), (2) internal consistency reliability via Cronbach's alpha and composite reliability (threshold >=0.70), (3) convergent validity using average variance extracted (AVE) (threshold >=0.50), and (4) discriminant validity through heterotrait-monotrait (HTMT) ratios (threshold <0.85).

Structural Model Testing. After confirming measurement model adequacy, we tested the structural model to examine hypothesized relationships. We used bootstrapping with 5,000 resamples to generate bias-corrected confidence intervals and significance tests for path coefficients. The structural model was evaluated using: (1) path coefficients and significance levels, (2) coefficient of determination (R squared) values, (3) effect sizes (f squared), (4) predictive relevance (Q squared), and (5) standardized root mean square residual (SRMR) as a model fit indicator (threshold <0.08).

Mediation Analysis. We tested specific indirect effects (mediation) using the bootstrapping

procedure with bias-corrected confidence intervals. Mediation is supported when the indirect effect (path through mediator) is significant based on confidence intervals excluding zero. We examined both specific indirect effects for individual paths and total indirect effects for each CQ dimension. Control variables were included in all analyses to partial out their effects.

IV. RESULTS

4.1 Measurement Model Assessment

Table 1 presents the reliability and convergent validity statistics for all constructs. All indicators demonstrated satisfactory outer loadings (range: 0.682--0.836), meeting or approaching the 0.70 threshold. Internal consistency reliability was excellent across all constructs, with Cronbach's alpha values ranging from 0.832 to 0.966, composite reliability (rho_c) values from 0.888 to 0.969, and AVE values from 0.596 to 0.666. These values exceed recommended thresholds, confirming the reliability and convergent validity of the measurement model.

TABLE I MEASUREMENT MODEL: RELIABILITY AND CONVERGENT VALIDITY

Construct	Cronbach's alpha	Composite Reliability (rho_c)	Composite Reliability (rho_a)	AVE
Behavioral CQ	0.865	0.902	0.876	0.647
Cognitive CQ	0.899	0.922	0.902	0.663
Metacognitive CQ	0.832	0.888	0.836	0.665
Motivational CQ	0.875	0.909	0.876	0.666
Psychological Resilience	0.934	0.944	0.935	0.628
Sociocultural Adaptation	0.966	0.969	0.967	0.596

Note. All reliability values exceed recommended thresholds of 0.70 for Cronbach's alpha and composite reliability, and 0.50 for AVE. Discriminant validity was assessed using the heterotrait-monotrait (HTMT) ratio of correlations criterion. All HTMT values were below the conservative threshold of 0.85 (range: 0.379--0.627), with confidence intervals not including 1.0, supporting discriminant validity. The constructs in our model are sufficiently distinct from one another while sharing theoretically meaningful relationships. Common method bias was assessed using Harman's single-factor test. A principal components analysis with all items loaded onto a single factor explained 38.2% of the variance, well below the 50% threshold that would indicate substantial common method bias. Additionally, the marker variable technique using a theoretically unrelated variable (preference for spicy food) showed negligible correlations with study variables ($|r| < .05$), further suggesting that common method bias is not a serious concern in this dataset.

4.2 Structural Model Results

Table 2 presents the structural model path coefficients and significance tests. The model explained 21.0% of variance in psychological resilience (R squared=0.210, $p<0.001$) and 30.4% of variance in sociocultural adaptation (R squared=0.304, $p<0.001$), indicating moderate to substantial explanatory power. The SRMR value of 0.039 is well below the 0.08 threshold, suggesting good model fit.

TABLE II STRUCTURAL MODEL PATH COEFFICIENTS AND HYPOTHESIS TESTING

Path	beta	t-value	p-value	95% CI	f squared
Cognitive CQ -> PR	0.213***	4.535	<0.001	[0.121, 0.304]	0.043
Motivational CQ -> PR	0.190***	4.049	<0.001	[0.096, 0.282]	0.035
Behavioral CQ -> PR	0.149**	3.078	0.002	[0.055, 0.245]	0.022
Metacognitive CQ -> PR	0.068	1.344	0.179	[-0.031, 0.166]	0.004
PR -> SCA	0.380***	8.613	<0.001	[0.294, 0.467]	0.164

Note. PR = Psychological Resilience; SCA = Sociocultural Adaptation. **p<0.01, ***p<0.001. f squared values: 0.02 (small), 0.15 (medium), 0.35 (large).

Examination of the path coefficients revealed several key findings. First, cognitive CQ demonstrated the strongest positive effect on psychological resilience (beta=0.213, t=4.535, p<0.001), supporting H1. The effect size (f squared=0.043) indicates a small to medium effect. Second, motivational CQ also significantly predicted psychological resilience (beta=0.190, t=4.049, p<0.001), supporting H2, with a small to medium effect size (f squared=0.035). Third, behavioral CQ showed a significant positive relationship with psychological resilience (beta=0.149, t=3.078, p=0.002), supporting H3, though with a smaller effect size (f squared=0.022).

In contrast to H4, metacognitive CQ did not significantly predict psychological resilience (beta=0.068, t=1.344, p=0.179), with the confidence interval including zero [-0.031, 0.166]. This finding suggests that metacognitive CQ, while theoretically important, does not have a direct effect on resilience in this sample. The minimal effect size (f squared=0.004) further confirms the negligible direct influence of metacognitive CQ on resilience.

Psychological resilience strongly predicted sociocultural adaptation (beta=0.380, t=8.613, p<0.001), supporting H5. The effect size (f squared=0.164) indicates a medium to large effect, suggesting that resilience is a substantial driver of adaptation success. This finding establishes the theoretical importance of resilience as a key mechanism in the adaptation process.

4.3 Mediation Analysis

Table 3 presents the specific indirect effects testing the mediating role of psychological resilience. The bootstrapping procedure with 5,000 resamples and bias-corrected 95% confidence intervals was used to test significance of indirect effects.

TABLE III SPECIFIC INDIRECT EFFECTS THROUGH PSYCHOLOGICAL RESILIENCE

Indirect Path	beta	t-value	p-value	95% CI
Cognitive CQ -> PR -> SCA	0.081***	3.998	<0.001	[0.043, 0.124]
Motivational CQ -> PR -> SCA	0.072***	3.673	<0.001	[0.036, 0.113]
Behavioral CQ -> PR -> SCA	0.057**	2.832	0.005	[0.021, 0.099]
Metacognitive CQ -> PR -> SCA	0.026	1.311	0.190	[-0.012, 0.066]

Note. PR = Psychological Resilience; SCA = Sociocultural Adaptation. **p<0.01, ***p<0.001. Confidence intervals not including zero indicate significant mediation.

The mediation analysis revealed significant indirect effects for three of the four CQ dimensions. Cognitive CQ showed the strongest indirect effect through psychological resilience (beta=0.081, t=3.998, p<0.001, 95% CI [0.043, 0.124]), supporting H6a. This finding indicates that cognitive CQ enhances sociocultural

adaptation primarily by fostering psychological resilience. The confidence interval clearly excludes zero, confirming the significance of this mediation pathway.

Motivational CQ also demonstrated a significant indirect effect through resilience (beta=0.072, t=3.673, p<0.001, 95% CI [0.036, 0.113]), supporting H6b. This result suggests that the motivational aspects of cultural intelligence---interest in and confidence toward cross-cultural situations---facilitate adaptation through building resilience capacity.

Behavioral CQ showed a significant but smaller indirect effect (beta=0.057, t=2.832, p=0.005, 95% CI [0.021, 0.099]), supporting H6c. While behavioral flexibility contributes to adaptation through resilience, its effect is more modest compared to cognitive and motivational dimensions.

In contrast, metacognitive CQ did not demonstrate a significant indirect effect through psychological resilience (beta=0.026, t=1.311, p=0.190, 95% CI [-0.012, 0.066]). The confidence interval includes zero, and the effect is not statistically significant, thus H6d is not supported. This finding is consistent with the non-significant direct effect of metacognitive CQ on resilience reported earlier.

The predictive relevance (Q squared) values further support the model's validity. Q squared for psychological resilience was 0.542 and for sociocultural adaptation was 0.551, both well above zero, indicating substantial predictive relevance of the model.

In summary, the results provide strong support for the hypothesized model, with three of four CQ dimensions (cognitive, motivational, and behavioral) showing significant direct effects on psychological resilience, which in turn mediates their effects on sociocultural adaptation. Cognitive CQ emerged as the strongest predictor, both directly and through its indirect effect via resilience. Metacognitive CQ, contrary to hypothesis, did not demonstrate significant effects in this model.

V. DISCUSSION

5.1 The Primacy of Cognitive Cultural Intelligence

Perhaps the most striking finding of this study is the emergence of cognitive CQ as the strongest predictor of psychological resilience (beta=0.213) and, through resilience, sociocultural adaptation (indirect effect beta=0.081). This pattern challenges conventional emphases in CQ research, which has often prioritized motivational aspects as the primary driver of cross-cultural effectiveness (Ang et al., 2007; Van Dyne et al., 2012). Our results suggest that in the context of international student adaptation in China, cultural knowledge systems provide the most substantial foundation for psychological resilience.

This primacy of cognitive CQ can be understood through several theoretical lenses. First, uncertainty reduction theory (Berger & Calabrese, 1975) suggests that knowledge about cultural norms, values, and behavioral expectations reduces the anxiety-inducing unpredictability of cross-cultural encounters. When individuals possess frameworks for understanding why people behave as they do, they experience less stress and maintain greater emotional equilibrium. In the Chinese context specifically, where implicit communication norms, hierarchical relationships, and face-saving behaviors differ markedly from many Western cultures, possessing this knowledge is particularly crucial for maintaining psychological well-being.

Second, cultural knowledge enables more effective problem-solving during adaptation challenges. Rather than defaulting to potentially ineffective home-culture strategies, individuals with high cognitive CQ can draw on appropriate cultural frameworks to generate locally effective solutions. This capability not only leads to better outcomes but also enhances self-efficacy and confidence---key components of psychological resilience. The knowledge-resilience-adaptation sequence we observed suggests a "knowledge-first" model where understanding precedes and enables effective coping.

Third, cognitive CQ may reduce the cognitive load associated with cross-cultural interactions. When cultural knowledge is well-developed and accessible, individuals spend less mental energy trying to decode ambiguous situations and can instead focus on relationship building and goal pursuit. This reduced cognitive burden likely contributes to maintaining psychological resources and preventing depletion, thereby supporting resilience.

5.2 The Motivational Puzzle: Interest Without Direct Impact

While motivational CQ showed significant effects on both resilience (beta=0.190) and adaptation through resilience (indirect effect beta=0.072), these effects were somewhat weaker than cognitive CQ. This pattern is theoretically interesting and challenges simplistic notions that motivation alone drives cross-cultural success. Our findings suggest that while interest in and confidence toward cross-cultural situations certainly matter, they may be necessary but insufficient for building resilience in the absence of actual cultural knowledge.

This result resonates with broader debates in psychology about the primacy of cognition versus motivation in human functioning (Deci & Ryan, 2008). While motivation provides the energy and direction for behavior, cognitive resources determine how that energy is deployed. In cross-cultural contexts, enthusiastic but culturally uninformed individuals may experience repeated social failures that undermine their initial motivation and resilience. Conversely, individuals with strong cultural knowledge can leverage their understanding to generate positive experiences that sustain and enhance motivation over time.

The finding also has implications for how we conceptualize the development of CQ dimensions over time. Rather than viewing cognitive and motivational CQ as independent capabilities, our results suggest a potentially sequential relationship where early cultural knowledge acquisition may be essential for maintaining long-term motivation. This interpretation would suggest that pre-departure preparation should prioritize knowledge building as a foundation for sustaining motivation during the challenging early adaptation period.

5.3 Behavioral Flexibility: Actions and Outcomes

Behavioral CQ demonstrated significant but more modest effects on resilience (beta=0.149) and indirect effects on adaptation (beta=0.057). This finding suggests that the ability to adjust verbal and nonverbal behaviors appropriately contributes to psychological resilience, likely through enabling more successful social interactions and reducing embarrassing or stressful encounters. However, the smaller magnitude of these effects compared to cognitive and motivational CQ indicates that behavioral flexibility alone provides limited direct buffering against adaptation stress.

This pattern makes theoretical sense when we consider that behavioral CQ operates primarily through interpersonal mechanisms. While appropriate behavioral adjustment facilitates smoother social interactions, it may not directly address other significant sources of adaptation stress such as academic challenges, logistical difficulties, or identity threats. In contrast, cognitive CQ provides broader frameworks for understanding and navigating multiple adaptation domains, potentially explaining its stronger effects.

Nevertheless, the significant effects of behavioral CQ should not be dismissed. In collectivistic contexts like China where social harmony and appropriate conduct are highly valued, behavioral flexibility may prevent social difficulties that could otherwise undermine resilience. The finding underscores the importance of teaching international students not just about cultural values (cognitive CQ) but also specific behavioral scripts for common situations---greetings, gift-giving, expressing disagreement, and so forth.

5.4 The Metacognitive Conundrum: Awareness Without Impact

Perhaps the most surprising finding was the

non-significant effect of metacognitive CQ on psychological resilience (beta=0.068, p=0.179). This result contradicts H4 and suggests that strategic thinking about cultural knowledge, while conceptually appealing, may not directly build resilience in the absence of actual knowledge and skills. Several explanations for this pattern merit consideration.

First, metacognitive CQ may operate primarily through enhancing the effectiveness of other CQ dimensions rather than through direct effects on outcomes. High metacognitive CQ could help individuals more effectively leverage their cultural knowledge (cognitive CQ), maintain adaptive motivation (motivational CQ), and adjust behaviors appropriately (behavioral CQ). If metacognitive CQ's effects are predominantly indirect through other CQ dimensions, our model specification---which examined direct paths to resilience---would not capture these effects.

Second, excessive metacognitive awareness without corresponding competencies could potentially increase rather than decrease stress. Individuals high in metacognitive CQ but low in cognitive CQ might be acutely aware of their cultural knowledge deficits, potentially leading to anxiety rather than resilience. This interpretation suggests potential interaction effects between metacognitive CQ and other dimensions that our linear model did not test.

Third, the relationship between metacognitive CQ and resilience may be more complex than a simple linear association. Metacognitive processes might be most important during specific phases of adaptation (e.g., initial entry) or in response to particular types of challenges (e.g., novel situations with no clear cultural scripts). Our cross-sectional design could not capture such temporal or situational contingencies.

5.5 Psychological Resilience as Central Mechanism

The strong direct effect of psychological resilience on sociocultural adaptation (beta=0.380) and its significant mediating role for three CQ dimensions provide empirical support for resilience as a central mechanism in the adaptation process. This finding extends theoretical models of cross-cultural adaptation by identifying a specific psychological process through which cultural intelligence resources translate into adaptation success.

The mediation pattern we observed---where CQ dimensions foster resilience, which in turn enables adaptation---suggests that simply possessing cultural knowledge, motivation, or behavioral skills is insufficient for successful adaptation. These resources must first be translated into psychological resilience capacity before they can effectively support adaptation behaviors. This two-step process has important implications for both theory and practice.

Theoretically, the findings suggest that resilience serves as a proximal mechanism linking distal individual difference factors (CQ dimensions) to adaptation outcomes. This perspective aligns with contemporary stress and coping theories (Folkman & Moskowitz, 2004) that emphasize the importance of psychological resources for navigating challenging transitions. The substantial variance explained in both resilience (21.0%) and adaptation (30.4%) by our model indicates that this theoretical framing captures important aspects of the adaptation process.

5.6 Contextual Considerations: China as Research Setting

The prominence of cognitive CQ in our findings may be partially context-specific to China and to Northeast China particularly. Chinese culture's high-context communication style, emphasis on social hierarchy and face, and distinct educational norms create substantial knowledge demands for international students. In contexts with more explicit communication norms or greater cultural similarity to students' home cultures, the pattern of results might differ.

Additionally, Northeast China's harsh winter climate, heavy industrial heritage, and lower international exposure compared to tier-one coastal cities may create unique adaptation challenges that elevate the importance of cultural knowledge. Students in this region may have fewer opportunities to learn through

observation of other international students or through exposure to internationally-oriented service sectors. In such contexts, pre-existing cultural knowledge becomes particularly valuable.

These contextual considerations underscore the importance of conducting CQ research across diverse settings rather than assuming universal patterns. The relative importance of different CQ dimensions may vary systematically with cultural distance, communication style explicitness, availability of international networks, and other contextual factors. Future research should explicitly test such boundary conditions.

5.7 Practical Implications for International Education

The findings carry several important practical implications for supporting international students' adaptation. Most fundamentally, they suggest that pre-departure and orientation programs should prioritize substantial cultural knowledge acquisition rather than focusing primarily on motivation-building or general cultural awareness activities. Effective programs would provide concrete information about Chinese cultural values, communication norms, educational expectations, daily life practices, and social relationship patterns.

Specifically, programs should address: (1) high-context communication and implicit meaning, (2) hierarchical relationships and appropriate deference behaviors, (3) face-saving and indirect conflict resolution, (4) collectivistic values and group harmony, (5) educational expectations including student-teacher relationships, and (6) practical daily life skills specific to the Chinese context. This knowledge base would support the development of psychological resilience by reducing uncertainty and enabling effective problem-solving.

Second, institutions should develop CQ-based assessment tools to identify students who may be at higher risk for adaptation difficulties. Students with low cognitive CQ profiles could be flagged for additional support or more intensive pre-departure preparation. Such early identification and intervention could prevent adaptation problems before they become serious.

Third, the findings suggest value in explicitly teaching resilience-building strategies alongside cultural knowledge. Since resilience mediates the relationship between CQ and adaptation, interventions that simultaneously build cultural knowledge and resilience skills (emotion regulation, reframing challenges as opportunities, maintaining social connections) would be particularly effective.

Fourth, faculty development programs should help instructors understand the knowledge demands faced by international students and adjust their pedagogy accordingly. Faculty awareness of students' cultural knowledge gaps can enable more explicit instruction about educational norms and more patience with initially inappropriate behaviors. Creating psychologically safe learning environments where students can learn from cultural mistakes without severe consequences would support resilience development.

VI. LIMITATIONS AND FUTURE RESEARCH

Several limitations qualify the interpretation of our findings. First, the cross-sectional design precludes definitive causal inferences about the relationships among CQ dimensions, psychological resilience, and adaptation. While our theoretical model posits that CQ dimensions influence resilience, which in turn affects adaptation, the data cannot rule out alternative causal sequences. For example, successful adaptation experiences might enhance both CQ and resilience rather than being caused by them. Longitudinal designs tracking students from pre-departure through multiple adaptation stages would enable stronger causal inference and could reveal temporal dynamics that our single-time-point assessment cannot capture.

Second, the study was conducted in a single cultural context (China) with specific regional focus (Northeast). While this specificity provides important contextual depth, it limits generalizability to other destinations. The primacy of cognitive CQ we observed may be partially specific to high-context cultures with

substantial cultural distance from many students' home cultures. Comparative studies examining the same model across diverse destinations (e.g., US, Australia, Japan, Germany) would clarify which findings generalize and which are context-specific.

Third, reliance on self-report measures raises concerns about common method bias, response styles, and social desirability, despite our use of multiple procedural and statistical remedies. Future research should incorporate objective adaptation indicators (e.g., academic performance, social network measures), informant reports (e.g., host national perceptions of adaptation), and behavioral assessments of CQ dimensions to complement self-reports.

Fourth, our sample, while diverse in geographic origins, was drawn from university students. The adaptation dynamics and relative importance of CQ dimensions might differ for other international sojourner populations such as expatriate workers, military personnel, or immigrants. The developmental period (emerging adulthood) and institutional context (higher education) likely shape adaptation processes in ways that may not apply to other groups.

Fifth, the measurement of metacognitive CQ may require refinement. The unexpected null finding for this dimension raises questions about whether our measures adequately captured metacognitive processes or whether the construct itself needs reconceptualization in adaptation contexts. More fine-grained assessment of metacognitive strategies and their deployment in actual cross-cultural situations could provide clearer understanding of this dimension's role.

Several promising directions for future research emerge from these limitations and findings. First, experimental interventions testing whether increasing cognitive CQ through pre-departure training enhances subsequent resilience and adaptation would provide strong evidence for the causal sequence we proposed. Randomized controlled trials comparing knowledge-focused versus motivation-focused training programs could directly test our theoretical model while providing practical guidance for program design.

Second, qualitative research exploring how international students actually use different CQ dimensions during adaptation challenges would complement our quantitative findings. In-depth interviews or experience sampling methods could reveal the specific mechanisms through which cultural knowledge builds resilience and clarify why metacognitive CQ did not show expected effects.

Third, examining potential moderators of the relationships we observed would refine theoretical understanding. Cultural distance from China, prior international experience, language proficiency, and personality characteristics might all moderate the effects of CQ dimensions on resilience and adaptation. Such moderation analyses would identify for whom and under what conditions different CQ dimensions are most important.

Fourth, investigating the development of CQ dimensions during the adaptation process would address important questions about learning and change. Do different dimensions develop at different rates? Does growth in one dimension facilitate growth in others? How do critical incidents or specific experiences shape CQ development? Longitudinal designs with multiple assessment points could address these questions.

VII. CONCLUSION

This study advances understanding of how cultural intelligence facilitates international student adaptation by demonstrating that psychological resilience serves as a key mediating mechanism. The findings reveal important differential effects among CQ dimensions, with cognitive CQ emerging as the strongest predictor of both resilience and, through resilience, sociocultural adaptation. This pattern challenges conventional emphases on motivational factors and suggests a "knowledge-first" theoretical model where cultural understanding provides the foundation for psychological resilience during adaptation.

The research makes several important theoretical contributions. First, it extends CQ theory by disaggregating the construct and demonstrating dimension-specific effects rather than treating CQ as a unidimensional capability. This disaggregation reveals that not all aspects of cultural intelligence operate similarly in adaptation contexts. Second, it identifies psychological resilience as a specific mechanism through which CQ resources translate into adaptation success, addressing the "black box" problem in prior research. Third, it demonstrates the utility of combining CQ theory with resilience frameworks to understand cross-cultural adaptation processes.

Practically, the findings suggest that international education support should prioritize substantial cultural knowledge acquisition in pre-departure and orientation programming rather than focusing primarily on motivation-building. Institutions should develop comprehensive cultural knowledge curricula covering values, norms, communication patterns, and behavioral expectations specific to their context. Assessment tools based on CQ profiles could enable early identification of at-risk students for targeted intervention. Integration of resilience-building strategies with cultural knowledge training would provide particularly powerful support for adaptation.

The study also highlights the importance of contextual specificity in cross-cultural research. The pattern of findings we observed in Northeast China---particularly the primacy of cognitive CQ---may be partially specific to this setting's unique characteristics. This contextual sensitivity underscores the need for adaptation research across diverse destinations rather than assuming universal patterns. What works for supporting international students in China may differ from effective practices in other cultural contexts.

Despite limitations inherent in cross-sectional self-report research, the findings provide robust support for the proposed theoretical model and generate several hypotheses for future investigation. The substantial variance explained in both resilience and adaptation outcomes indicates that cultural intelligence and psychological resilience represent important but not exhaustive explanations of adaptation success. Other individual difference factors, situational contingencies, and institutional support systems likely also play significant roles.

As international education continues expanding globally, understanding the psychological processes underlying successful adaptation becomes increasingly important. This research contributes to that understanding by specifying how different aspects of cultural intelligence operate through psychological resilience to enable sociocultural adaptation. The "knowledge-first" pattern we observed suggests that supporting international students' adaptation begins not with exhortations to stay positive or try hard, but with providing them the cultural knowledge foundation they need to understand, predict, and navigate their new environment with confidence and resilience.

ACKNOWLEDGEMENT

The authors would like to thank all the international students who participated in this study. We also gratefully acknowledge the support of the international student offices at participating universities.

REFERENCES

Ang, S., & Van Dyne, L. (2008). Conceptualization of cultural intelligence: Definition, distinctiveness, and nomological network. In S. Ang & L. Van Dyne (Eds.), Handbook of cultural intelligence: Theory, measurement, and applications (pp. 3-15). M.E. Sharpe.

Ang, S., Van Dyne, L., Koh, C., Ng, K. Y., Templer, K. J., Tay, C., & Chandrasekar, N. A. (2007). Cultural intelligence: Its measurement and effects on cultural judgment and decision making, cultural adaptation and task performance. Management and Organization Review, 3(3), 335-371.

Bender, M., van Osch, Y., Sleegers, W., & Ye, M. (2019). Social support benefits psychological adjustment of

international students: Evidence from a meta-analysis. Journal of Cross-Cultural Psychology, 50(7), 827-847.

Berger, C. R., & Calabrese, R. J. (1975). Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. Human Communication Research, 1(2), 99-112.

Berry, J. W. (1997). Immigration, acculturation, and adaptation. Applied Psychology, 46(1), 5-34.

Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis and refinement of the Connor-Davidson Resilience Scale (CD-RISC): Validation of a 10-item measure of resilience. Journal of Traumatic Stress, 20(6), 1019-1028.

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. Canadian Psychology, 49(3), 182-185.

Earley, P. C., & Ang, S. (2003). Cultural intelligence: Individual interactions across cultures. Stanford University Press.

Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. Annual Review of Psychology, 55, 745-774.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. Child Development, 71(3), 543-562.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. American Psychologist, 56(3), 227-238.

Ministry of Education of China. (2020). Statistics on international students in China 2019. Retrieved from http://www.moe.gov.cn

Motti-Stefanidi, F., & Masten, A. S. (2013). School success and school engagement of immigrant children and adolescents: A risk and resilience developmental perspective. European Psychologist, 18(2), 126-135.

Ott, D. L., & Michailova, S. (2018). Cultural intelligence: A review and new research avenues. International Journal of Management Reviews, 20(1), 99-119.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology, 88(5), 879-903.

Presbitero, A. (2016). Culture shock and reverse culture shock: The moderating role of cultural intelligence in international students' adaptation. International Journal of Intercultural Relations, 53, 28-38.

Ringle, C. M., Wende, S., & Becker, J. M. (2022). SmartPLS 4. SmartPLS GmbH. Retrieved from http://www.smartpls.com

Rockstuhl, T., Seiler, S., Ang, S., Van Dyne, L., & Annen, H. (2011). Beyond general intelligence (IQ) and emotional intelligence (EQ): The role of cultural intelligence (CQ) on cross-border leadership effectiveness in a globalized world. Journal of Social Issues, 67(4), 825-840.

Smith, R. A., & Khawaja, N. G. (2011). A review of the acculturation experiences of international students. International Journal of Intercultural Relations, 35(6), 699-713.

Triandis, H. C. (2006). Cultural intelligence in organizations. Group & Organization Management, 31(1), 20-26.

Van Dyne, L., Ang, S., Ng, K. Y., Rockstuhl, T., Tan, M. L., & Koh, C. (2012). Sub-dimensions of the four factor model of cultural intelligence: Expanding the conceptualization and measurement of cultural intelligence. Social and Personality Psychology Compass, 6(4), 295-313.

Ward, C., & Kennedy, A. (1999). The measurement of sociocultural adaptation. International Journal of Intercultural Relations, 23(4), 659-677.

Wilson, J., & Gallois, C. (2022). The revised sociocultural adaptation scale (SCAS-R): Refinement and validation. Journal of Cross-Cultural Psychology, 53(2), 155-178.