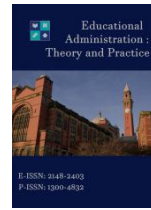




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Mediating Effect of Intrinsic Motivation between Psychological Adaptation and International Students' Academic Adaptation in China during COVID-19

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<p>Article History</p> <p>Article Submission 12 September 2023</p> <p>Revised Submission 11 October 2023</p> <p>Article Accepted 15 November 2023</p>	<p style="text-align: center;">Abstract</p> <p>International students living in foreign countries have been categorized as a "high-risk group" in psychological aspects after the outbreak of COVID-19. The abrupt switch to remote learning has negatively impacted their ability to adjust academically. This research aims to investigate the relationship between international students' psychological adaptation and their academic adjustment, as well as explore the potential mediating effect of intrinsic motivation. There are 259 international students learning in Beijing, Wuhan, and Haikou filling in the questionnaire, most of them are 21-30 years old and have varying degrees of understanding of Chinese culture. The data collected was analyzed using AMOS and SPSS. The findings reveal that psychological adaptation directly influences international students' academic adaptation, and that intrinsic motivation plays a significant role as a mediator between the two. These results have important implications for universities seeking to enhance international students' academic adaptation by prioritizing their psychological well-being and intrinsic motivation.</p> <p>Keywords: COVID-19 Pandemic; International Students Psychological Adaptation; Intrinsic Motivation; Academic Adaptation</p>
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Introduction

Learning in foreign countries for students become a common phenomenon, the population of international students around the world is large. In 2020, the number of international students around the world climbed to 8 million (British Council, 2020) from 4.6 million in 2015 (UNESCO, 2020; Jung & Kim, 2018). The breakout of the COVID-19 pandemic makes students in universities be regarded as a “very high-risk population” in psychological aspects, especially among international students (Browne, Munro, & Cass, 2017; Dodd, Dadaczynski, Okan, McCaffery & Pickles, 2021), colleges and universities around the world experienced various modifications including teaching model, student enrollment and so on, and international students in China take online learning model (June & Elias, 2021; Corpus, Robinson, & Liu, 2022; UNESCO, 2020), all these changes have produced various challenges for international students and disruptions in their academic adaptation, such as missing interactions with classmates and teachers (Gonzalez-Ramirez et al., 2021), difficult online learning (Wilczewski, Gorbaniuk, & Giuri, 2021) and so on. With the span of the COVID-19 pandemic, an increasing amount of academic adaptation has been paid to explore how to improve international students’ academic adaptation. Based on previous research, psychological distress negatively influences international students’ learning and proposes that academic problems have been linked to lower psychological adaptation (Butcher & McGrath, 2004; Yaghou & He, 2020; Ward & Masgoret, 2008). Therefore, it is feasible to optimize international students’ academic adaptation by enhancing their psychological adaptation.

Furthermore, psychological factors such as intrinsic motivation play a significant role in driving students' learning (Camilleri, 2021; Berry, 2005; Ward & Rana-Deuba, 2000; Ryan & Deci, 2000). Various studies have highlighted the importance of intrinsic motivation within the framework of self-determination theory (Raufelder, Drury, Jagenow, Hoferichter, & Bukowski, 2013; Lucas et al., 2010). Numerous educational studies have examined the mediating role of intrinsic motivation (H. Liu, Fan, Fu, & F. Liu, 2018; Van Den Berg, 2011; Areepattamannil, 2012). For instance, intrinsic motivation has been found to mediate the relationship between teachers' autonomy support and perceived academic competence (Guay, Boggiano, & Vallerand, 2001), as well as between transformational leadership and sports performance (Charbonneau, Barling, & Kelloway, 2001; Areepattamannil, 2012; Martín-Núñez, Ar, Fernández, Abbas, & Radovanović, 2023). However, exploring intrinsic motivation as a mediator in analyzing international students' academic adaptation is an area that requires further research in the field of international education.

In 2019, following the outbreak of the COVID-19 pandemic, the Ministry of Education of the People's Republic of China reported that approximately 500,000 international students were studying in China (Ministry of Education of the People's Republic of China, 2020). Despite the circumstances, only a small number of international students chose to return to their home countries and decided to remain in China. To ensure the health and safety of all international students, university authorities advised them to stay on campus and refrain from leaving. However, this situation has had a detrimental impact on their learning and mental well-being (Alam, Lu, Ni, Hu, & Xu, 2021). Numerous scholars have already focused on the psychological adaptation of international students. For example, Alam et al. (2021) conducted research on the psychology of international students in China and found that participants exhibited symptoms of depression, anxiety, stress, insomnia, psychological distress, loneliness, and fear, with percentages of 73.4, 76.6, 58.5, 77.6, 71.4, 62.4, and 73.1, respectively. Analyzing the academic adaptation of international students in China can offer valuable insights to improve their psychological adjustment (Yaghou & He, 2020) and mitigate the academic challenges they face after the COVID-19 period.

However the research about the effect of psychological adaptation on international students' academic adaptation is rare and limited attention is paid to the mediator role of intrinsic motivation between psychological adaptation on international students' academic adaptation after the COVID-19 era. In order to fill this research gap, the purpose of this research is to investigate to identify the influence of psychological adaptation on international students' academic adaptation and to analyze the mediator of intrinsic motivation between that relationship. Therefore, based on the scarcity in the literature and the purpose of this research, the researcher proposes four

objectives: 1. The relationship between psychological adaptation and international students' academic adaptation; 2. The relationship between intrinsic motivation and international students' academic adaptation; 3. The relationship between psychological adaptation and international students' academic adaptation; 4. the mediator role of intrinsic motivation between that relationship. More specifically, this research concentrates on international students learning in China (distributed in Beijing, Wuhan and Haikou three developed cities in China) as respondents and conducts quantitative research methods to conduct the empirical study.

This research is significant as it combines the Cross-cultural adaptation theory and Self-determination theory, establishing a theoretical and practical connection. By examining variables such as psychological adaptation, intrinsic motivation, and academic adaptation, this study explores the influence of psychological adaptation on international students' academic adaptation amidst the COVID-19 pandemic. The findings reveal a significant positive correlation between psychological adaptation and academic adaptation, emphasizing the crucial role of intrinsic motivation as a mediator in this process. Consequently, this study provides fresh insights into the intricate dynamics of international students' adaptation, offering a valuable understanding of how psychological factors, such as adaptation and motivation, can affect academic outcomes. The implications of this research are important for future studies investigating the experiences of international students and how universities can provide support for their academic success.

Literature Review

Psychological Adaptation and International Students' Academic Adaptation

Academic adaptation for international students is primarily concerned with both the academic and social systems (Zhu, 2011). The academic system focuses on students' academic performance and intellectual development, while the social system encompasses peer-group communication and teacher-student interaction. If international students fail to integrate into both systems, it may result in dropouts. Within the framework of cross-cultural adaptation theory, psychological adaptation plays a significant role in influencing international students' academic adaptation (Ozer, 2015; Li, Chen, & Duanmu, 2010). Psychological adaptation, for the most part, refers to the sense of well-being or satisfaction during transitions (Ward & Searle, 1991; Ward & Rana-Deuba, 2000).

Given the short duration of the COVID-19 pandemic, school closures have been implemented worldwide to mitigate the spread of the virus. Over 180 countries have mandated temporary school closures, leading to a significant shift towards online instruction in colleges and universities since early 2020. This transition has brought about substantial changes to various aspects of institutional functioning, including instructional models, residential offerings, and student enrollment (June & Elias, 2021; Corpus et al., 2022). These changes have particularly impacted international students, affecting their psychological well-being (Alam et al., 2021; Wilczewski et al., 2021; Ma & Miller, 2021; Holzer et al., 2021; Chen, Li, Wu, & Tong, 2020).

Previous studies have shown that when international students experience psychological adaptation, they tend to experience emotional enjoyment and excitement (Ward, Bochner, & Furnham, 2020; Ozer, 2015), which in turn helps them cope with academic challenges. However, anxiety and stress have been identified as significant psychological obstacles for international students (Wan, Chapman, & Biggs, 1992). They often struggle with information overload and are unfamiliar with the educational institution, which can negatively impact their academic achievements (Yaghou & He, 2020; Buddington, 2002). The relationship between psychology and international students' academic adaptation following the COVID-19 epidemic requires further investigation.

Therefore, Godoy, Falcoski, Incrocci, Versuti, and Padovan-Neto (2021) conducted research to examine this relationship, and empirical data revealed a negative association between anxiety-related psychological distress and students' academic performance. Based on previous research and the preceding discussion, the following hypothesis is proposed:

H1. There is a positive relationship between psychological adaptation and international

students' academic adaptation.

Intrinsic Motivation and International Students' Academic Adaptation

Amidst the COVID-19 period, approximately 12 billion students have received online education (Gustiani, Ardiansyah, & Simanjuntak, 2022). Students' engagement in online learning largely depends on their individual responsibility and awareness of their own learning. Intrinsic motivation, encompassing interests (Lucas et al., 2010) and basic psychological needs (Schunk, Meece, & Pintrich, 2012), has been identified as a crucial factor associated with students' academic adaptation. Teachers and psychologists acknowledge the significance of motivation in fostering international students' engagement in learning (Raufelder, Drury, Jagenow, Hoferichter, & Bukowski, 2013), and good academic adaptation is often linked to students' motivation to acquire knowledge (Knowles & Kerkman, 2007; Schunk, Meece, & Pintrich, 2013). Previous studies on international students' academic adaptation have provided evidence of numerous positive outcomes associated with high levels of intrinsic motivation (Elliot & Dweck, 2005). Intrinsic motivation is recognized as a stable personal characteristic that contributes to successful online learning. Conversely, the absence of intrinsic motivation is considered a crucial factor in the academic challenges faced by students, particularly in online learning contexts (Gustiani et al., 2022; Keller, 2008; Wighting, Liu, & Rovai, 2008; Yukselturk & Bulut, 2007).

Furthermore, the impact of intrinsic motivation on academic performance aligns with the principles of self-determination theory, which proposes that intrinsic motivation plays a crucial role in improving students' academic outcomes (Deci & Ryan, 2000). This theoretical framework has spurred extensive research in the field of education and has greatly contributed to our understanding of educational results (Niemic & Ryan, 2009; Ryan & Deci, 2009; Ryan & Weinstein, 2009). For instance, Jang, Reeve, Ryan, and Kim (2009) conducted a study among adolescents in South Korea using self-determination theory and found that higher levels of intrinsic motivation were associated with improved academic outcomes (Santana-Monagas & Núñez, 2022; Ryan & Deci, 2020). In the context of the COVID-19 era, Gustiani et al. (2022) conducted empirical research utilizing self-determination theory as a theoretical framework, and their results demonstrated the positive influence of intrinsic motivation on international students' online learning (Gustiani et al., 2022). These previous findings further support the positive relationship between intrinsic motivation and international students' academic adaptation.

Therefore, it is plausible that colleges and universities can enhance international students' academic adaptation by fostering their intrinsic motivation (Elliot & Dweck, 2005; Vansteenkiste, Zhou, Lens, & Soenens, 2005; Bailey & Phillip, 2016). Drawing support from numerous previous studies and within the framework of self-determination theory, the following hypothesis is formulated:

H2: There is a positive relationship between intrinsic motivation and international students' academic adaptation.

The Mediating Role of Intrinsic Motivation

Previous research has provided evidence for the influence of psychological adaptation on intrinsic motivation. Psychological adaptation pertains to the affective aspects of adjusting to a new cultural environment, encompassing evaluations of anxiety, depression, self-esteem, and satisfaction with life (Ward & Kennedy, 1999; Kim, 2017). Consequently, when individuals undergo a change in their environment, it is inevitable for them to experience psychological challenges (Kim, 2017). Several empirical studies have supported the notion that high levels of psychological adaptation can enhance intrinsic motivation. Within the realm of intrinsic motivation research, Huang, Lv, and Wu (2016) proposed a positive relationship between intrinsic motivation and well-being (Huang et al., 2016), and these findings align with the results obtained by Weinstein and Ryan (2010), indicating a negative association between intrinsic motivation and anxiety. Based on this analysis, the following hypothesis is formulated:

H3: There is a positive relationship between psychological adaptation and intrinsic motivation

Numerous literature sources indicate that intrinsic motivation serves as a significant mediator in various domains. It has been identified as a mediator between psychology and work variety in

the labor market (Van Den Berg, 2011), cognition and behaviors (Luther et al., 2016), and identified motivation and organizational performance (Camilleri, 2021). Moreover, researchers have explored the mediating role of intrinsic motivation in the field of education, utilizing the self-determination theory to gain a comprehensive understanding of its function. For example, Aarepattamannil (2012) conducted a study employing the self-determination theory as a theoretical framework, demonstrating that adolescents' perception of academic self-determination positively influenced their intrinsic motivation, subsequently leading to improved academic achievement.

Of utmost importance is the connection between psychological adaptation and intrinsic motivation, with studies indicating that psychological adaptation can foster intrinsic motivation (Larson & Rusk, 2011; Huang et al., 2016). In turn, intrinsic motivation is associated with enhanced academic adaptation among international students (Deci & Ryan, 2000). Building upon these findings, it can be posited that intrinsic motivation mediates the relationship between psychological adaptation and international students' academic adaptation. Given the context of the COVID-19 era, further research is warranted to explore the mediating role of intrinsic motivation. With the support of these findings and theoretical underpinnings, the following hypothesis is formulated:

H4: There is a significant mediator role of intrinsic motivation between psychological adaptation and international students' academic adaptation.

In conclusion, the present study has presented empirical evidence to support the correlation between psychological adaptation and academic adaptation in the context of international students. Drawing upon the foundational principles of Cross-cultural adaptation theory and Self-determination theory, as well as the existing body of literature, this study contributes to the existing knowledge by offering a comprehensive model that examines both the direct association and the mediating role of intrinsic motivation in the relationship between psychological adaptation and academic adaptation among international students. The primary aims of this study are two-fold: firstly, to establish the positive influence of psychological adaptation on international students' academic adaptation; and secondly, to investigate the mediating effect of intrinsic motivation within this relationship. Guided by these objectives, the following conceptual framework (Figure 1) is proposed, employing sophisticated terminology and phrasing.

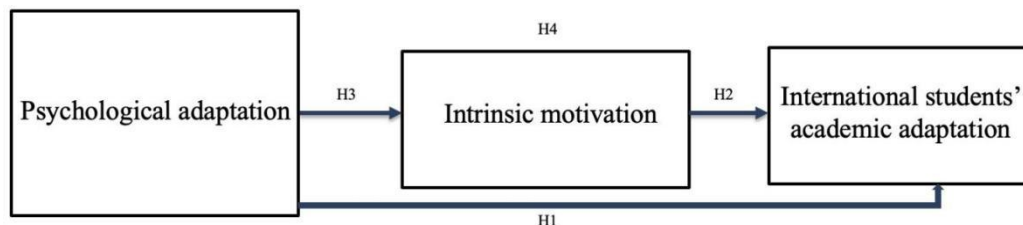


Figure 1. The Conceptual Framework

Methodology

Research Design

From the above conceptual framework, this research is mainly to identify not only the relationship between psychological adaptation and international students' academic adaptation, but also analyze the mediator function of intrinsic motivation between that relationship. According to Creswell (2012), the cross-sectional survey method can measure community needs, in the current study, the researcher conducts this research to analyze international students' learning from a psychological aspect, so cross-sectional is a suitable survey design to analyze the international students' academic adaptation (Yang, 2005). Additionally, data will be collected by using quantitative techniques—questionnaires. For validity and reliability of this questionnaire, the researcher makes the questionnaire of this research by taking the previous questionnaires which are tested to have high validity and reliability as reference. In addition, the researcher sent the table called The Evaluation of Content Validity of Research Instrument to three experts in

related academic areas to ensure the content validity.

Sample and Data Collection

The study focused on international students studying in China, specifically those who were 18 years old or older. The researchers employed SPSS 23 and AMOS 24 as the main data analysis tools for this study. Considering the large population of international students studying in China, the researcher needs to choose a sample in two or more stages because it is hard to easily identify the population of international students learning in China, but getting a complete list of colleges and universities in China might be possible, from the perspective of Creswell (2012), multi-stage cluster sampling approach is more suitable for this research. In the first stage, the cities were categorized into three regions (North, Middle, and South) and representative cities were selected from each region. In the second stage, universities and colleges within these representative cities were chosen based on the number of international students enrolled. To test the proposed conceptual framework (Figure 1), data were collected from international students studying in 16 selected universities, consisting of eight universities in Beijing, six universities in Wuhan, and two universities in Haikou.

The online questionnaires were administered using the Wen JuanXing platform, an online questionnaire tool. The researcher edited the questionnaire online and shared the QR code and link generated by Wen JuanXing with the responsible international students. These students then distributed the QR code and linked to their classmates' groups on WeChat, a widely used communication software in China. Data collection was conducted between May 2022 and July 2022, during which time the questionnaires were randomly distributed to international students enrolled in the selected 16 universities. To ensure transparency and minimize potential biases, the interviewer provided a brief explanation of the study to the participants, emphasizing that participation was voluntary and anonymous. This approach aimed to encourage international students to provide their opinions truthfully. In total, approximately 259 international students participated in filling out the questionnaire.

Research Instrument

The survey consisted of five primary sections, the initial section being dedicated to collecting participants' basic personal information. The second section focused on measuring international students' psychological adaptation, drawing from Zung's (1965) Self-rating Depression Scale (ZSDS) as a reference for assessment., international students' psychological adaptation was measured by 5 items adopted from previous studies by using the 5-Liker Scale (no/ slight/ moderate/ great/ extreme). This part questionnaire mainly concentrates on psychological well-being or satisfaction (Ward et al., 2020) and the evaluation of self-esteem, satisfaction with life, and so forth (Ozer, 2015). The third section is about intrinsic motivation with 5 items. This questionnaire takes the Academic Amotivation Inventory (Mcauley, Duncan, & Tammen, 1989) as a reference, all are proven to have good validity and reliability. This part questionnaire uses a 5-Liker scale (very disagree/ disagree/ not sure/ agree/ very agree) and is mainly about students' performance on study for the pleasure and need satisfaction which includes competence, autonomy, relatedness while learning something new (Ryan & Deci, 2000). In the fourth section, international students' academic adaptation was measured by 6 items including the course arrangement of international students, learning content, learning method, learning comment, the students-teachers relationship, extracurricular activities and rules and regulation of universities (Zhu, 2011). This part questionnaire uses a 5-Liker scale (very disagree/ disagree/ not sure/ agree/ very agree).

Validity and Reliability

The study was conducted in China, specifically in the cities of Beijing, Wuhan, and Haikou, with a sample size of 259 participants. To ensure the validity of the items, the researcher performed an Exploratory Factor Analysis (EFA) and eliminated items with factor loadings below 0.4 by using SPSS 23. The reliability coefficients for each construct were found to exceed the established threshold value of 0.7, as demonstrated in Table 1.

Table 1. Factor Analysis

	Factor loading		
	1	2	3
I can understand the context in which the teacher teaches me	.776		
In China, I can adapt to the Chinese teaching style	.765		
I can establish rapport relationship with Chinese teachers	.750		
I can take notes in class	.749		
I can express my ideas in class	.725		
I can catch up with the speed of the teaching	.723		
It was important to me to do well in learning		.795	
Learning in China is a happy thing		.792	
I think I am pretty good at learning in a cross-cultural environment		.769	
I would describe learning in China as very interesting		.759	
In China, I put a lot of effort to study		.755	
I have been happy with my life			.829
I feel hopeful about my life			.791
I feel active			.784
I find it easy to do the things I used to			.762
I feel hopeful about the future			.711

This research takes extant scales as a reference to assess the four constructs included in the proposed conceptual framework. All scales use a five-point scale. The Cronbach's α for psychological adaptation, intrinsic motivation and international students' academic adaptation was 0.861, 0.906, 0.903, respectively, which show that this questionnaire indicates sufficient reliability (Cronbach's $\alpha > 0.70$) (Bagozzi & Yi, 2012).

Data Analysis

Upon reviewing the sample characteristics (by SPSS.23), the analytical process consisted of three primary steps. Firstly, the researcher evaluated the magnitude of the components in the model. A Confirmatory Factor Analysis (CFA) was performed to establish the unidimensionality of the perceived effects and their impact on the academic adaptation of foreign students (by SPSS.23). Secondly, the measurement model underwent evaluation for both reliability and validity (by AMOS 24). Thirdly, the study tested the structural relationship between psychological adaptation and academic adaptation among international students, as well as the mediating effect of intrinsic motivation in this relationship (by AMOS 24).

Results

Demographic Profile

The information of respondents can be found in Table 2, the age of the respondents between 21 and 30 account for 85.7%, the students learning in China for one year, two years and three years account for 21.6%, 37.8% and 22.4%, respectively, undergraduate students make up the highest proposition (41.3%) followed by postgraduate students (39%), most students understand China more or less with much (39.8%) and moderately (37.5%) and can, to some extent, speak Chinese.

Table 2. Basic Information about International Students

Basic Condition	Category	Frequency	Percentage (%)
Gender	male	140	54.1
	female	119	45.9
Age	≤ 20	13	5.0

Basic Condition	Category	Frequency	Percentage (%)
	21-30	222	85.7
	31-40	22	8.5
	41-50	1	.4
	>50	1	.4
The time learning in China	1-4 month	2	.8
	4-6 month	7	2.7
	6-12 month	23	8.9
	one year	56	21.6
	two years	98	37.8
	three years	58	22.4
	other	15	5.8
Education Background	an undergraduate student	107	41.3
	a postgraduate student	101	39.0
	doctoral student	36	13.9
	a Chinese training student	5	1.9
	a language student	5	1.9
	a short-term student	3	1.2
	other	2	.8
Understanding about China	Very much	29	11.2
	much	103	39.8
	moderately	97	37.5
	little	22	8.5
	very little	8	3.1
The level of Chinese	Very good	36	13.9
	good	97	37.5
	moderate	107	41.3
	poor	14	5.4
	very poor	5	1.9

Measurement Model

Prior to examining the proposed hypotheses, an evaluation of the measurement model was conducted to assess the reliability and validity (convergent and discriminant) of the study constructs. The results, as presented in Table 3, indicate that the Composite Reliability (CR) estimates for all constructs surpassed the recommended threshold of 0.70, indicating satisfactory reliability (Bagozzi & Yi, 2012). Convergent validity, which assesses the extent to which the items of a specific construct converge with the underlying construct, was evaluated using factor loadings and Average Variance Extracted (AVE). As depicted in Table 1, the factor loadings for each construct ranged from 0.60 to 0.91, exceeding the threshold of 0.50 and demonstrating statistical significance ($P < 0.001$). Moreover, all constructs exhibited AVE values greater than 0.50, indicating acceptable convergent validity (Fornell & Larcker, 1981). Discriminant validity, which examines the distinctiveness of a particular construct from other constructs in the model (Hair Jr, Black, Babin, & Anderson, 2013), was assessed by comparing the square root of AVE for each construct with the inter-construct correlations. The findings presented in Table 4 confirm the establishment of discriminant validity, as the diagonal elements exceeded the off-diagonal elements (Fornell & Larcker, 1981). Overall, the measurement model demonstrated a good fit, as supported by the aforementioned analyses.

Table 3. Reliability and Validity Test of Scale

Indicators	Un.E std	S.E.	Z- value	P- value	Estimat e	Cronbach' s α	CR	AVE
Intrinsic Motivation (IM)								
I would describe learning in China as very interesting	1				0.84	0.906	0.907	0.66
It was important to me to do well in learning	0.995	0.065	15.283	***	0.81			
In China, I put a lot of effort into study	0.991	0.069	14.345	***	0.776			
I think I am pretty good at learning in a cross-cultural environment	1.01	0.068	14.832	***	0.794			
Learning in China is a happy thing for me	0.985	0.061	16.116	***	0.841			
Psychological Adaptation (PA)								
I feel active	1				0.776	0.861	0.864	0.562
I have been happy with my life	0.982	0.077	12.814	***	0.798			
I feel hopeful about my life	1.071	0.082	13.045	***	0.812			
I feel hopeful about life	0.839	0.083	10.154	***	0.644			
I find it easy to do the things I used to	1.029	0.092	11.219	***	0.705			
Academic Adaptation (AA)								
I can establish rapport relationship with Chinese teachers	1				0.749	0.903	0.901	0.61
I can catch up with the speed of the teaching	0.976	0.078	12.534	***	0.778			
I can understand the context in which the teacher teaches me	1.048	0.078	13.377	***	0.827			
In China, I can adapt to the Chinese teaching style	1.073	0.084	12.832	***	0.795			
I can express my ideas in class	1.003	0.082	12.173	***	0.758			
I can take notes in class	0.99	0.079	12.511	***	0.777			

Note: ***p<0.001 level; CR=composite reliability; AVE=average variance extracted

Table 4. Correlations and Average Variance Extracted

Construct	Mean	SD	AA	PA	IM
Academic Adaptation (AA)	1.749	0.960	0.781		
Psychological Adaptation (PA)	1.763	0.794	0.428	0.75	
Intrinsic Motivation (IM)	1.903	0.736	0.748	0.304	0.812

Note: The bold elements are the square roots of each AVE; construct correlations are shown off-diagonal

Structural Model

The proposed model was evaluated using Structural Equation Modeling (SEM) in AMOS.24, which estimates the entire system in a hypothesized model using data and allows for the assessment of variables (Jöreskog & Sörbom, 1982). Variables that did not ensure unidimensionality were excluded to improve the fit of the model. Multiple fit indices were utilized to evaluate the measurement model's quality. While the chi-square statistic can be influenced by sample size, Brown (2015) suggests employing various fit measures. The Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (SEA), and Standardized Root Mean Square Residual (SRMR) were employed. Typically, TLI and CFI values of 0.95 or higher indicate a well-fitting model (Hu & Bentler, 1998). RMSEA values below 0.07 suggest a good fit, while values near 0.10 indicate a mediocre fit (Bagozzi & Yi, 2012). These indices were selected based on their satisfactory performance in the Hu and Bentler (1998) simulation. As presented in Table 5, the results indicate $\chi^2/df = 1.413$, SRMR = 0.04, RMSEA = 0.0396, GFI = 0.911, AGFI = 0.889, IFI = 0.975, CFI = 0.978, and TLI = 0.975. These findings demonstrate that all indices, except for AGFI = 0.889, which is slightly below 0.9, meet the recommended cut-off values. Therefore, based on the empirical data, the hypothesized model is considered to be a good fit.

Table 5. Fit Index of Structural Model

Fit Indices	χ^2/df	SRMR	RMSEA	GFI	AGFI	IFI	CFI	TLI
Reference	≤ 3	< 0.08	< 0.08	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9
Measurement Model	1.413	0.04	0.0396	0.911	0.889	0.975	0.978	0.975

Note: TLI: Tucker-Lewis index; CFI: Comparative fit index; RMSEA: Root mean square error of approximation; SRMR: standardized root mean square residual

Table 6 presents the correlation coefficients, providing evidence for all proposed hypotheses (direct effects), and it is obvious that the first three hypotheses are supported. As for the fourth hypothesis about the mediator role of intrinsic motivation, the effects of mediators were evaluated using a percentile bootstrapping approach with 1000 bootstrap samples and bias-corrected percentile at a 95% confidence interval (Taylor, MacKinnon, & Tein, 2008). To determine the significance of the indirect relationship, lower and upper bounds of the confidence interval were computed, as suggested by Preacher and Hayes (2008). The results in Table 7 confirmed the presence of a positive and significant mediating effect of intrinsic motivation for psychological adaptation on the academic adaptation of international students (standardized indirect effect = 0.184, $P < 0.01$), supporting all proposed hypotheses. The implications of these findings are discussed in the subsequent section.

Table 6. Hypothesized Relationship

Hypothesis	Path analysis	Un.std.	S.E.	Z-value	P-value	Std.	Result
H2	Psychological Adaptation → Academic Adaptation	0.187	0.047	3.972	***	0.216	Support
H4	Psychological Adaptation → Intrinsic Motivation	0.616	0.065	9.511	***	0.679	Support
H5	Intrinsic Motivation → Academic Adaptation	0.262	0.046	5.744	***	0.374	Support

Table 7. The Mediating Effect of Intrinsic Motivation between Psychological Adaptation and International Students' Academic Adaptation

Path relationship	Point estimate	Product of coefficient		Bootstrapping 1000 times 95% CI					
				Bias-corrected			Percentile		
		SE	Z-value	Lower	Upper	P	Lower	Upper	P
Indirect Effect									
Psychological Adaptation→Intrinsic Motivation→Academic Adaptation	0.184	0.062		0.09	0.338	0.002	0.09	0.335	0.002
Direct Effect									
Psychological Adaptation→Academic Adaptation	0.198	0.081		0.051	0.376	0.005	0.037	0.361	0.008
Total Effect									
Psychological Adaptation→Academic Adaptation	0.382	0.078		0.25	0.576	0.001	0.233	0.555	0.002

Discussion

In the discussion section, the researcher explains the contributions of this study to the fields of cross-cultural education and motivation literature. This study extends the previous work conducted by Ryan and Deci (2009) and Ryan and Weinstein (2009) by examining the mediating role of intrinsic motivation in the relationship between psychological adaptation and international students' academic adaptation. The findings of this study provide support for our hypothesis and align with the principles of self-determination theory (Deci & Ryan, 1985; E. Burkley & M. Burkley, 2020) and cross-cultural adaptation theory. They are also consistent with prior research that has explored the mediator role of intrinsic motivation (Camilleri, 2021; Luther et al., 2016; Van Den Berg, 2011). The following explanations further elucidate these results:

Firstly, this study makes a valuable contribution by integrating the theories of cross-cultural adaptation and self-determination to develop and examine the proposed model. While previous studies have explored the impact of psychological adaptation on students' academic adaptation (Yu & Wright, 2016; Buddington, 2002; Cliniciu, 2013), this study adds a unique perspective by investigating both the direct and indirect effects of psychological adaptation on international students' academic adaptation within the context of the COVID-19 pandemic. The conceptual framework proposed in this study establishes a solid theoretical foundation for investigating the influence of psychological adaptation on international students' academic adaptation in the specific context of China.

Furthermore, the findings of this study align with the research conducted by Godoy, Falcoski, Incrocci, Versuti, and Padovan-Neto (2021) and Yaghou and He (2020), indicating that psychological adaptation has a positive impact on international students' academic adaptation. This consistency in findings suggests that colleges and universities should prioritize and pay more attention to the psychological adaptation of international students, as it can greatly benefit their academic adaptation.

Lastly, the results of this study confirm the mediating role of intrinsic motivation in the relationship between psychological adaptation and international students' academic adaptation. Consistent with the hypothesized model, it is recognized that high levels of anxiety can potentially impact the academic performance of international students, especially in the context of remote learning during the COVID-19 pandemic (Buddington, 2002; Godoy et al., 2021; Yaghou & He, 2020). The findings indicate that improving psychological adaptation can enhance intrinsic

motivation, which in turn leads to improved academic adaptation, including academic performance and interaction with teachers, through a causal chain mechanism (Clinciu, 2013; Buddington, 2002; Ozer, 2015; Zhang & Goodson, 2011).

Conclusion

This research is significant as it combines the Cross-cultural adaptation theory and Self-determination theory, establishing a model, based on this model, this research is mainly to identify not only the relationship between psychological adaptation and international students' academic adaptation, but also analyze the mediator function of intrinsic motivation between that relationship. The cross-sectional survey with quantitative techniques—questionnaires is suitable in current study. In addition, study focused on international students studying in China, specifically those who were 18 years old or older, 258 international students in Beijing, Wuhan, and Haikou were willing to fill in the questionnaire. By analyzing via SPSS and AMOS, the findings are that psychological adaptation has a positive impact on international students' academic adaptation, then intrinsic motivation can be a significant mediator for the relationship between psychological adaptation and international students' academic adaptation. These findings can clarify that in order to enhance international students' academic adaptation, teachers should not only concentrate on international students' psychological adaptation, but also the essential role of intrinsic motivation. The following part mainly explains the implication of this study.

Implications

The current study shows that psychological adaptation has an influence on international students' academic adaptation directly and indirectly, and the mediate function of intrinsic motivation is feasible in Chinese international education after the COVID-19 era. The findings of the present research contribute to theoretical and managerial implications which are proposed in the following part.

Theoretical Implications

Firstly, this article verifies the significant positive (negative) impact of psychological adaptation on international students' academic adaptation. This finding is consistent with the study conducted by Godoy *et al.* (2021). However, the conclusion drawn by Godoy *et al.* (2021), which focused on students learning in Brazil, needs further examination to determine if it can be applied to China. Unlike previous research, this study's sample population is representative of China and specifically focuses on international students studying in China. It discovered the influence of psychological adaptation on international students' academic adaptation. Therefore, this study further enriches the empirical research on cross-cultural adaptation and academic adaptation in the field of international education.

Secondly, based on the self-determination theory, this study identifies intrinsic motivation as an important mediating variable. The research results of this article also demonstrate that intrinsic motivation plays a mediating role between psychological adaptation and international students' academic adaptation. This finding further supports the self-determination theory's proposition regarding the mediating role of intrinsic motivation. However, previous research has predominantly focused on the psychological perspective, uncovering the mechanisms through which psychological adaptation and international students' academic adaptation are linked but overlooking the process of understanding these relationships from the perspective of intrinsic motivation. In comparison to previous studies on international students, this research responds to the call made by Jung and Kim (2018) to explore international students' learning in Asia. It expands the study of academic adaptation of international students beyond Western countries to include Asian countries and verifies the universality of intrinsic motivation as an important mediating variable. Therefore, this study provides a new explanatory framework for understanding the relationship between psychological adaptation and international students' academic adaptation, deepens the exploration of the mechanisms of intrinsic motivation, and broadens the application scope of the self-determination theory, effectively complementing

existing research findings.

Managerial Implications

First, this study found that psychological adaptation significantly influences international students' academic adaptation and has a positive impact on it. This finding can inspire colleges and universities to pay further attention to the psychology of international students. For instance, in the post-pandemic era, counselors in colleges and universities should make an effort to become familiar with the diverse cultural backgrounds, customs, and psychological conditions of international students. It is crucial for counselors to understand and appreciate the uniqueness and interaction of different cultures, as this enables effective communication with teachers and facilitates a comprehensive understanding of the psychological needs of international students (Gao, 2018).

In addition, the finding about the significant mediator role of intrinsic motivation, in colleges and universities, the importance of intrinsic motivation should be highlighted, teachers should try to guide international students to study or improve their competence as a learning goal, so that they will have a lasting interest in learning. In addition, optimizing the psychological counseling system becomes crucial in fostering high levels of intrinsic motivation among international students, facilitating their engagement in learning and successful graduation in the post-pandemic era.

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