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# Relationship between Interaction Anxiousness, Academic Resilience, Cultural Intelligence and Ego-Identity among Chinese Vocational Pathway University Students: A Conditional Process Analysis Model

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## ABSTRACT

**Background:** University students' ego-identity, an essential component of their psychological development and mental health, has widely attracted the attention of policymakers, schools, and parents. **Method:** A total of 298 Chinese vocational pathway undergraduates were recruited, and a conditional process analysis model was adopted to explore the interaction mechanism of ego-identity. **Results:** The results suggest that the ego-identity of Chinese vocational pathway undergraduates is significantly affected by interaction anxiousness, academic resilience, and cultural intelligence. (1) Interaction anxiousness significantly and positively predicts ego-identity. (2) Academic resilience positively and partially mediates the effect of interaction anxiousness on ego-identity. (3) Cultural intelligence significantly and positively moderates the relationship between interaction anxiousness and ego-identity. However, a similar moderating effect was not found between interaction anxiousness and academic resilience. (4) As cultural intelligence increases, the negative influence of interaction anxiousness on ego-identity gradually diminishes, whatever the cultural intelligence level. **Conclusions:** Interaction anxiousness, academic resilience, and cultural intelligence are essential determinants of ego-identity among Chinese vocational pathway undergraduates. Strategic interventions should be utilized to enhance their abilities to alleviate interpersonal tensions, promote their resilience in facing academic difficulties, cope with diverse cultures, and boost their sense of self-confirmation.

## KEYWORDS

Academic resilience; cultural intelligence; ego-identity; interaction anxiousness; vocational pathway undergraduates

## Introduction

According to the psychosocial development theory, ego-identity refers to the individual skills, abilities, and strengths of the dominant task derived from pre-adult experience [1].

Low ego-identity university students are more likely to develop negative tendencies such as mobile phone addiction [2] and poor interpersonal relationships [3]. Empirical research has shown that vocational pathway university students' ego-identity is relatively challenging due to



unfamiliar peers and different academic expectations [4]. Existing research has commonly shown that ego-identity is influenced by internal (e.g., intelligence and academic achievement [5]) and external (e.g., interpersonal relationships [6]) demands [7]. Furthermore, ego-identity varies in social and cultural contexts [7,8].

Vocational pathway undergraduates' participation in higher education is beneficial to reducing dynamic social inequality and sustainable employability skills [9]. However, due to the different campus cultures and teaching methods between vocational colleges and traditional universities, vocational pathway undergraduates get bogged down in daily studies, lives, and ego-identity [10,11]. Existing studies have shown that these students' transition success is associated with personal background, culture–psychology, and learning–interactions [10]. In order to better facilitate the entry and adjustment of vocational pathway undergraduates into higher education, it is essential to assess these students' interaction, learning, and cultural adjustment.

However, most existing studies only focus on the internal or external dimensions, and few studies put the representative factors of ego-identity in a comprehensive framework. Compared to their general pathway counterparts in China, vocational pathway undergraduates face greater cultural, psychological, cognitive, and behavioral challenges [10]. Hence, there is a need to investigate the influence of interaction anxiousness, academic resilience, and cultural intelligence on ego-identity among Chinese vocational pathway undergraduates facing the knotty study and cultural scenario.

#### *Interaction anxiousness and ego-identity*

Interaction anxiousness is a negative emotion that arises from dissatisfaction with one's current social status and difficulty fitting in with the group [12]. Cross-cultural studies have shown that Asian college students tend to have severer interaction anxiousness [13], and nearly half of the Chinese university students survive with obvious interpersonal problems [14]. Low self-evaluation and few interpersonal skills mainly affect interaction anxiousness among Chinese college students, and the former account for a more significant proportion [13]. Interactive anxiousness is not conducive to education, career, and friendship. Specifically, it was negatively related to resilience [15], academic achievement [16], self-esteem [17], and ego-identity [18].

As the self-presentational theory suggests, the threats to one's identity are associated with interaction anxiousness [19]. Interaction ignored or shunned increases self-presentational concerns and identity predicaments [20]. Conversely, positive social support and peer attachment promote college students' ego-identity [21,22]. Some empirical support for this view could be found in a study by Warren and Harold [23], who reported that university students' ego-identity and attachment anxiety showed a significantly negative correlation. Existing research also suggests that interaction anxiousness is significantly negatively related to self-acceptance, self-consciousness, and ego-identity [24–26] and that fear of negative evaluation partially mediates the effect of ego-identity on social anxiety among college students [27]. Overall, The higher the level of

interaction anxiousness in university students, the lower their ego-identity [28].

Based on previous studies, it would be predicted that interaction anxiousness Chinese vocational pathway university students received should play a crucially decisive role in decreasing their ego-identity; hence, the following hypothesis was formulated:

Hypothesis 1 (H1). Interaction anxiousness has a significant and negative impact on ego-identity.

#### *Academic resilience as a mediator*

Academic resilience is an individual's ability to deal effectively with academic difficulties and stress [29]. Protecting and risk factors contribute to academic resilience [30]. Concerning the protecting factors, Foster [31] revealed that both internal (e.g., individual attributes) and external determinants (e.g., family, school, and community) buffer against the effects of risky educational situations. To be successful in school, academically resilient students possess positive cultural intelligence [32] and obtain academic support in the trans-cultural environment [33]. Regarding the risky factors, peer support absence [34,35] and, even worse still, interpersonal anxiousness [36] are detrimental to recovering from grave academic threats. Consequently, poor academic resilience leads to dysfunctional academic self-concept [37] and self-acceptance [38], which is pernicious to the positive adjustment experiences of university students.

According to the motivational model of academic resilience [39,40], school anxiety reduces academic resilience. School anxiety arises through examination, relationships, and individual characteristics, while interaction anxiety plays an important role. Positive student-peer relationships are significantly related to academic engagement and motivational academic resilience [41]. Nevertheless, previous studies have indicated that interpersonal anxiety had a significant and negative direct relationship with academic achievement [16], implying a high academic resilience [42]. Similarly, the empirical findings suggest that Chinese university students' interpersonal tension negatively predicts psychological resilience [43]. Tertiary institution students with high social intelligence are less likely to experience anxiety in interpersonal communication and are significantly associated with higher academic resilience [44].

In addition, several empirical findings suggest that academic resilience is tightly bound to the self-concept [45–47]. Due to academics taking up much time, an academic self-concept becomes an essential approach to ego-identity among university students. Furthermore, research suggests that different ego-identity leads to significant differences in students' resilience [48] and interpersonal relationships [49]. A chain mediation research showed that Chinese university students' mental resilience was positively correlated with self-acceptance and negatively related to interpersonal disturbance [50]. Thus, it can be realistically and logically assumed that academic resilience mediates interaction anxiousness and ego-identity.

Accordingly, we hypothesize that interaction anxiousness is a negative contributor to academic resilience, which positively predict ego-identity among Chinese

vocational backgrounds university students; hence, the following hypotheses were proposed:

Hypothesis 2 (H2). Interaction anxiousness has a significant and negative impact on ego-identity.

Hypothesis 3 (H3). Academic resilience has a significant and positive impact on ego identity.

Hypothesis 4 (H4). Academic resilience plays a significant and positive mediating role in the relationship between interaction anxiousness and ego-identity.

#### *Cultural intelligence as a moderator*

Cultural intelligence refers to an individual's ability to adapt effectively to a multicultural environment [51,52]. It was found that cultural intelligence promotes interpersonal trust [53] and decreases interaction anxiety in higher education. In addition, a follow-up survey of university students showed that the trait of biculturalism was strongly interlinked with academic resilience [54]. There is a significant correlation between cultural intelligence and global identity [55]. The empirical research shows that learning adaptation, interpersonal adaptation, and self-adaptation appear significantly in Chinese college students' cultural intelligence [56]. Although many studies have focused on cultural intelligence across nationalities and ethnicities, the cross-cultural challenge between vocational and general education should be taken seriously. In particular, the vocational pathway university students who have been shocked by both study and culture during the transition process. As suggested by Schlossberg [57], vocational pathway undergraduates stepping into a new environment are prone to encounter a cultural shock, resulting from losing familiar signs and symbols of social intercourse [58].

Cultural intelligence acts as a moderating mechanism by lessening the impact of culture shock on students' psychological and sociocultural adaptation [59]. Bicultural identity integration was positively associated with academic resilience and negatively correlated to interaction anxiety among Chinese vocational pathway undergraduates [10]. Additionally, existing research has shown the associations among cultural intelligence, interaction anxiousness, and ego-identity. From a cross-cultural perspective, cultural background differences influence social anxiety disorders and identity construct [60]. Existing empirical studies have demonstrated that cultural intelligence, as a moderator, reduces the impacts of interpersonal anxiety on intercultural communication effectiveness [61], which positively facilitates ego-identity [62].

In brief, we suggest that cultural intelligence moderates the relationship between interaction anxiousness, academic resilience, and ego-identity. Therefore, the following hypothesis was proposed:

Hypothesis 5 (H5). Cultural intelligence plays a significant and positive mediating role in the relationship between interaction anxiousness and academic resilience and interaction anxiousness and ego-identity.

According to Stimulus(S)-Organism(O)-Response(R) theory [63], there is a mechanism to be explored between the transitional stimulus and the adaptive response to university. Therefore, this study incorporates interaction

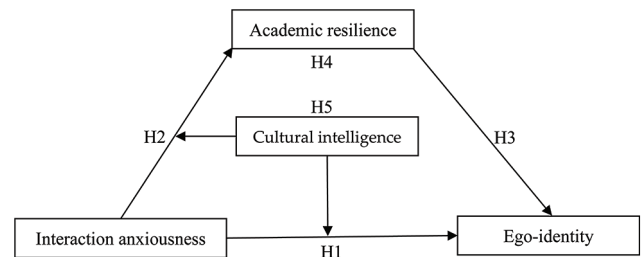


FIGURE 1. Posited model.

anxiousness, academic resilience, cultural intelligence, and ego-identity into an integrated model to explore the intrinsic mental experience among vocational pathway undergraduates in China. In this way, we can clarify the mental experiences of college students in the transition process and provide practical advice for policymakers, schools, and parents against academic and culture shock. In addition, the theoretical literature on ego-identity construction will be enriched by assessing the complex interplay of correlations in a sample composed of Chinese vocational pathway undergraduates. The hypotheses of this study are presented in Fig. 1.

## Materials and Methods

### *Participants*

All participants were recruited from a specific collaborative education program of higher vocational institutions and academic universities. Students spend three years in a higher vocational school focusing on professional qualifications and then transition to two years of university studies focusing on cultural knowledge. This program allows students to link practice and knowledge fully and to become competent with vocational skills and a bachelor's degree in China. We used the widely attached Wenjuanxing survey software and convenience sampling strategy to collect online data from October 24 to November 28, when freshmen and sophomores already had learning and living experience at university. Due to the scarcity and specificity of the sample, we invited university counselors to distribute the questionnaires, and their approachability attracted many respondents. Upon receiving the 313 self-reported questionnaires, we eliminated extremely short and repetitive responses to improve the quality and value of the data. Eventually, a total of 298 high-quality questionnaires were transmitted for the subsequent analysis.

### *Measures*

This study was conducted with the seven-point Likert scale. In each scale's declaration and stem, we clarified that all pending questions range from "1 = strongly disagree" to "7 = strongly agree". More details of the scales are as follows.

#### *Interaction anxiousness scale*

The Interaction Anxiousness Scale originated from Leary et al. [64], while we used a Chinese version of the 15-item scale translated by Peng et al. [65]. The reverse score questions (Items 3, 6, 10, and 15) were carried over to enhance the

validity. We calculate the total score through the reverse scoring process. Eventually, higher scores indicate more severe interaction anxiousness. Along with their perceptions, respondents answered questions such as “I usually feel uncomfortable when I am with a group of people I do not know.” The Cronbach coefficient of this scale ranges from 0.80 to 0.86 for Chinese college students [66–68]. The Cronbach’s  $\alpha$  for this study was 0.89.

#### Academic resilience scale

Martin et al. [29] developed the Academic Resilience Scale, consisting of six questions like “I am good at bouncing back from a poor mark in my schoolwork.” The higher the score, the better the student’s academic resilience. The internal consistency coefficient of the Chinese version is 0.87 [46]. The Cronbach coefficient in this study was 0.91.

#### Cultural intelligence scale

The Cultural Intelligence Short Form draws from Ang et al. [69], which consists of nine items, such as “I change my verbal behavior (e.g., accent, tone) when a cross-cultural interaction requires it.” Higher cultural intelligence scores signify that the participants are more comfortable with cross-cultural challenges and could deal with the adverse effects of various cultural differences. The Cronbach’s reliability coefficient for the Chinese version cultural intelligence scale is 0.90 [70]. In this study, Cronbach’s alpha was 0.89.

#### Ego-identity scale

We adopted the Ego-Identity Scale developed by Ochs and Plug [71]. University students were asked to answer 19 items like “I feel that what I am doing in life is not worthwhile.” Items 1, 2, 4, 8, 9, 12, 13, 14, 15, 16, 17, and 18 are reverse scored. Correspondingly, the assessment of higher levels of ego-identity came from higher scores. The Cronbach’s alpha of the Chinese Ego-Identity Scale ranges from 0.73 to 0.91 [72–74]. In this study, Cronbach’s alpha was 0.82.

#### Data analysis

The SPSS v.25 was employed to test the posited model. Firstly, the common method variance (CMV) method was taken to assess the bias with Harman’s one-factor test [75]. The first factor extracted accounted for 20.79%, below the recommended 40%. Thus, the data could be applied to explore the relationship between variables. Secondly, multicollinearity was assessed using the variance inflation factor (VIF). The results indicated that none of the variables exceeded the cut-off value of 5 suggested by Hair et al. [76]. Thirdly, confirmatory factor analysis (CFA) was deployed in Amos v.26. The values of CMIN/DF, GFI, CFI, NFI, IFI, TLI, and RMSEA are 2.89, 0.78, 0.85, 0.79, 0.85, 0.84, 0.08 respectively. The results demonstrated that applying existing instruments to Chinese vocational pathway undergraduates is valid. Fourthly, descriptive statistics were presented to illustrate the participants’ essential characteristics, and correlation analysis was conducted to demonstrate the association between the constructs preliminarily. Fifthly, as suggested by Hayes [77,78], conditional process analysis is an analytical strategy that integrates mediation and

moderation analysis. We used a bootstrapping procedure with 5000 subsamples in PROCESS model 8, consistent with the posited theoretical model, to specify the final model. At last, we use the simple slope test [79] to display the difference in the conditional effects across different levels of the moderator.

#### Ethics

Upon receiving ethical approval from the South China Normal University Academic Ethics Committee, the principal researcher provided the research ethics approval to the participants with the explanatory statement and consent form.

## Results

#### Characteristics of participants

Table 1 shows the details of the study participants. The research enrolled 98 males (32.9%) and 200 females (67.1%). They range from 20 to 27 years old ( $M = 22.29$ ,  $SD = 1.21$ ). 64.4% of respondents are in their first year of university, while 35.6% are in their second year. In terms of residency, more participants were from rural areas than urban areas (69.8% vs. 30.2%). These students majored in different disciplines, including economics (4.4%), education (58.4%), natural science (3.7%), engineering (2.3%), and management (31.2%). The study recruited 176 students from South China Normal University and the rest from Huizhou University.

#### Descriptive statistics

Table 2 represents the correlations of variables. Interaction anxiousness was significantly negatively correlated with academic resilience ( $r = -0.27$ ;  $p < 0.01$ ), cultural intelligence ( $r = -0.16$ ;  $p < 0.01$ ), and ego-identity

TABLE 1

Characteristics of the study participants

Characteristic	Sub-characteristic	Number	Percentage
Gender	Man	98	32.9%
	Woman	200	67.1%
Age	20–22 years	189	63.4%
	23–27 years	109	36.6%
Grade	First-year	192	64.4%
	Second-year	106	35.6%
Residency	Rural	208	69.8%
	Urban	90	30.2%
Discipline	Economics	13	4.4%
	Education	174	58.4%
	Natural science	11	3.7%
	Engineering	7	2.3%
University	Management	93	31.2%
	South China Normal University	176	59.1%
	Huizhou University	122	40.9%



TABLE 2

Correlations of variables

Variables	1	2	3	M	SD
1. IA	(0.89)			4.27	0.83
2. AR	-0.27**	(0.91)		4.64	1.01
3. CI	-0.16**	0.38**	(0.89)	4.83	0.84
4. EI	-0.43**	0.40**	0.26**	4.43	0.66

Notes: \*\* $p < 0.01$ ; IA: interaction anxiousness, AR: academic resilience, CI: cultural intelligence, EI: ego-identity, Cronbach's alphas are listed in parentheses diagonally. The numbers 1 to 3 in the first row refer to the variables with the same numbers in the first column. M: Means, SD: Standard Deviation.

( $r = -0.43$ ;  $p < 0.01$ ), but the coefficients below 0.3 representing exceptionally statistically small correlations [80]. Academic resilience is significantly associated with cultural intelligence ( $r = 0.38$ ;  $p < 0.01$ ) and ego-identity ( $r = 0.40$ ;  $p < 0.01$ ) at low levels. Furthermore, the correlation between cultural intelligence and ego identity is significant ( $r = 0.26$ ;  $p < 0.01$ ), although there may not be a statistically linear correlation.

Conditional process analysis

We first used the PROCESS Model 4 to test the mediating role of academic resilience. As shown in Table 3, interaction anxiousness significantly negatively predicted academic resilience ( $B = -0.32$ ,  $p < 0.001$ ). Moreover, academic resilience had a positive and significant effect on ego-identity ( $B = 0.20$ ,  $p < 0.001$ ). Furthermore, the indirect effect of interaction anxiousness on ego-identity through academic resilience was also significant ( $B = -0.04$ ,  $p < 0.05$ ) with the absence of zero within 95% confidence intervals [-0.09, -0.01]; hence, H4 was validated. This result demonstrated that academic resilience partially mediated the relationship between interaction anxiousness and ego-identity. The final mediating model explained 19% of the variance in ego-identity (ab/c). Fig. 2 shows the specific path coefficient.

We deployed the PROCESS Model 8 to test the total conditional process model. As shown in Table 4, interaction anxiousness negatively significantly predicts ego-identity ( $B = -0.26$ ,  $p < 0.001$ ) and academic resilience ( $B = -0.24$ ,

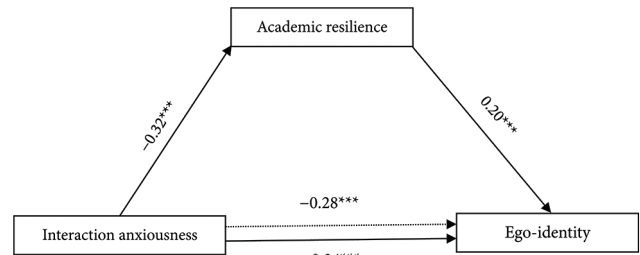


FIGURE 2. Mediation test. \* $p < 0.05$ , \*\*\* $p < 0.001$ .

$p < 0.001$ ); hence, H1 and H2 were supported. Comparatively, academic resilience positively significantly predicted ego-identity ( $B = 0.17$ ,  $p < 0.001$ ), indicating that H3 was verified. Additionally, the interaction of cultural intelligence and interaction anxiousness negatively predicted ego-identity ( $B = -0.12$ ,  $p < 0.01$ ) and academic resilience ( $B = -0.12$ ,  $p > 0.05$ ), but only significantly for the former. Therefore, H5 was partially confirmed. The path coefficients and significance are visually presented in Fig. 3.

We examined the conditional effect of interaction anxiousness on ego-identity in different levels of cultural intelligence. Table 5 shows the results of the conditional effect analysis. At the value of one standard deviation lower and higher than the mean, we distinguished the low and high cultural intelligence levels and explored the affected conditions of different paths. The results indicate that all three levels of cultural intelligence significantly moderated the effect of interaction anxiousness on ego-identity.

As seen in Fig. 4, the predictive effect of interaction anxiousness on academic resilience diminishes as cultural intelligence increases. In greater detail, the coefficient of the interaction term ( $B = -0.12$ ,  $p < 0.01$ ) between cultural intelligence and interaction anxiousness maintain the same negative direction and smaller coefficient compared to the original term ( $B = -0.26$ ,  $p < 0.001$ ), demonstrating that cultural intelligence cushions the negative impact of interaction anxiousness on ego-identity. Similarly, as the level of interaction anxiousness increased, the group with high cultural intelligence showed a slower decline in ego-identity, suggesting that cultural intelligence is a vital protective factor against interpersonal dilemmas and an essential promoter of ego-identity.

TABLE 3

Results of the mediating effect of academic resilience on the relationship between interaction anxiousness and ego-identity

Path		Overall model fit			Regression coefficient significance			
Outcome	Predictor	R	R <sup>2</sup>	F	β	t	LLCI	ULCI
AR	IA	0.27	0.07	22.62	-0.32	-4.76***	-0.46	-0.19
EI	AR	0.52	0.27	55.77	0.20	5.94***	0.13	0.27
	IA				-0.28	-6.84***	-0.36	-0.20
Total effect		0.43	0.19	68.39	-0.34	-8.27***	-0.42	-0.26
Indirect effect					-0.04	2.00*	-0.09	-0.01

Notes: \* $p < 0.05$ , \*\*\* $p < 0.001$ ; IA: interaction anxiousness, AR: academic resilience, CI: cultural intelligence, EI: ego-identity, LLCI: lower limit confidence interval, ULCI: upper limit confidence interval.

TABLE 4

Results of the moderating effect of cultural intelligence on the mediating role of academic resilience in the relationship between interaction anxiousness and ego-identity

Regression equation		Overall model fit			Regression coefficient significance			
Outcome	Predictor	R	R <sup>2</sup>	F	β	t	LLCI	ULCI
AR	IA	0.43	0.19	22.83	-0.24	-3.61***	-0.36	-0.11
	CI				0.38	5.90***	0.26	0.51
	IA*CI				-0.12	-1.67	-0.26	0.02
EI	AR	0.55	0.30	31.46	0.17	4.70***	0.10	0.24
	IA				-0.26	-6.30***	-0.34	-0.18
	CI				0.07	1.56	-0.02	0.15
	IA*CI				-0.12	-2.66**	-0.20	-0.03

Notes: \*\*p < 0.01, \*\*\*p < 0.001; IA: interaction anxiousness, AR: academic resilience, CI: cultural intelligence, EI: ego-identity, LLCI: lower limit confidence interval, ULCI: upper limit confidence interval.

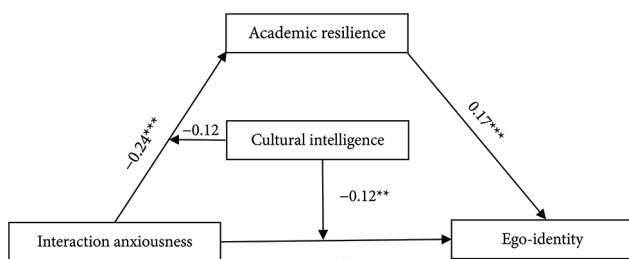


FIGURE 3. Established model. \*\*p < 0.01, \*\*\*p < 0.001.

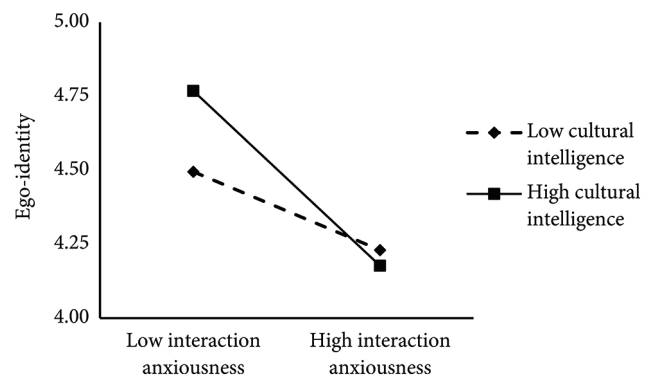


FIGURE 4. Simple plot image.

TABLE 5

Conditional effect analysis

Level	Effect	S.E.	t	p
Low CI (M-1SD)	-0.16	0.06	-2.70	0.007**
Mean CI (M)	-0.26	0.04	-6.30	<0.001***
High CI (M+1SD)	-0.35	0.05	-7.00	<0.001***

Notes: \*\*p < 0.01, \*\*\*p < 0.001; CI: cultural intelligence, M: Means, SD: Standard Deviation, S.E.: standard error.

Discussion

This study explores the impact of interaction anxiousness, academic resilience, and cultural intelligence on the ego-identity of Chinese vocational pathway undergraduates. The overall mean values were above the midpoint, indicating that they were genuinely experiencing interpersonal disturbances. Nevertheless, they positively deal with the study burdensome from the learning shock, favorably respond to the cultural differences between vocational and general education, and eventually develop a sense of identification and affirmation. These results appear consistent with the existing research suggesting that university students from higher vocational colleges present relatively high cultural intelligence and academic resilience [70] and tend to be anxious in peer interaction [10]. Moreover, their ego-identity is slightly lower than that of general Chinese university students [81].

Additionally, the following subsections detail the interrelationship between interaction anxiousness, academic resilience, cultural intelligence, and ego-identity.

The relationship between interaction anxiousness and ego-identity

The results revealed that interaction anxiousness was a significant predictor of ego-identity. Specifically, the worse interaction anxiousness is, the lower the ego-identity vocational pathway university students have.

This result is supported by previous theoretical research [18,20]. According to self-presentation theory [19], positive interpersonal relationships will boost the self-concept. Conversely, highly interaction-anxious individuals were excessively concerned about the impression they made and inclined to self-close [82]. When they accomplish the goal of self-presentation, they will gain confidence in external interactions and increase their internal identity confirmation. This result also aligns with the empirical study revealing that less interpersonal fear is significantly conducive to a higher level of ego-identity in first-year university students [83]. The social evaluation of vocational pathway undergraduates in China can explain this result. Due to their poor scores in the college entrance examination, they suffer considerable prejudice [84] and maintain less impression motivation [85] than their general

counterparts. However, this psychological cognition conflicts with the interaction demand when entering a new university [86], resulting in interpersonal anxiety and ultimately affecting ego-identity.

Therefore, several methods can be implied to alleviate interaction anxiousness and improve the ego-identity of university students with vocational backgrounds. For example, the stereotype of vocational college students should be transformed for their psychological identity. In addition, universities should coordinate with vocational universities to provide undergraduates in transition with psychological counseling and team self-presentation [87] to alleviate anxiousness.

#### *The mediating role of academic resilience*

The results supported that academic resilience partially mediates the effect of interaction anxiousness and ego-identity; that is, the impact of interaction anxiousness on ego-identity could be partly direct and partly indirect through academic resilience.

This result is consistent with the assumption that interaction anxiousness is significantly associated with mental resilience among university students [88]. According to Yin's classification [31], social support and comfortable campus environments are protective factors of academic resilience. These positive emotions promote cross-cultural learning resilience [89]. On the contrary, college students' interaction anxiousness arises from low peer support and impaired academic resilience. Empirical research has shown that the worse the relationship with peers, the more challenging to be academically resilient [90]. The risk contributors of unfamiliar campus and low peer support manifest in poor academic performance and evolve into incorrect self-evaluation during the transition period [91].

Moreover, the conclusion that university students' academic resilience significantly and positively promotes ego-identity [92] was verified in our research. Resilient students in higher education can handle various academic difficulties, get better grades [93], and achieve a more stable identity state [94]. Conversely, Chinese nursing vocational pathway undergraduates bear excessive academic pressure and perform less resilience, leading to self-perception dissonance and ego-identity disorders [95].

Additionally, the mediating effect of academic resilience on interaction anxiousness and ego-identity was confirmed. This result is consistent with the conclusion that college students with high interaction anxiety have lower psychological resilience and ego-identity [50]. Noteworthily, both direct and indirect effects of interaction anxiousness on ego-identity were significant, indicating that academic resilience functioned as a partial mediator.

Thus, some recommendations to improve academic resilience should be implemented. Universities and educators should incorporate resilience skill-building into the school curriculum and teaching strategies [90]. Furthermore, teachers and parents should be aware of the importance of academic resilience and guide students when they encounter academic difficulties.

#### *The moderating role of cultural intelligence*

The conditional effect outcome showed that cultural intelligence moderates the relationship between interaction anxiousness and ego-identity. Specifically, whatever Chinese vocational pathway undergraduates' sense of cultural intelligence was, the negatively predictive effect of interaction anxiousness on ego-identity was significantly moderated by cultural intelligence. However, the moderating effect of cultural intelligence between interaction anxiousness and academic resilience was insignificant.

This result further confirms the theory of ego-identity, which theorizes that social and cultural factors influence ego-identity [7,8]. The existing research has verified the significantly positive correlation between adolescents' mental health, social support, and ego-identity [22]. Moreover, the empirical study also has clarified that individuals with high cultural intelligence are more likely to develop the identity of ethnic minority groups [96]. As suggested by Kleinknecht et al. [97], cultural variables can favorably mediate the expression of social anxiety and significantly accelerate the construction of identity among university students.

However, the current findings do not fully support the previous research, which maintains that cultural discontinuity will generate stress and low academic resilience [54]. Unlike the previous study, this result revealed that cultural intelligence does not significantly moderate the effect of interaction anxiousness on academic resilience. Given the negative interaction term ( $B = -0.12$ ) on academic resilience, this result can be interpreted by the protective factors model, which proposes that academic resilience is affected by a complex interaction of protective and risky effects [98]. Indeed, empirical studies have demonstrated that the impact of cross-cultural intelligence on academic adaptation may depend upon the contexts and demand they navigate [99]. Multiple protective factors are conducive to academic resilience [98].

Therefore, various campus activities can be organized to improve students' familiarity and adaptability to increase cultural intelligence. Alternatively, multiple protections from parents and communities should be emphasized to increase the effectiveness of risk mitigation and promote academic resilience.

#### **Limitations and Future Work**

Admittedly, three limitations should be put forward for later efforts. First, we invited respondents from two universities in the collaborative education program, limiting the generalizability of these findings. Although the established model was statistically accepted, future studies should recruit representatives from more universities to increase sample diversity. Second, the self-report questionnaire may lead to social desirability bias issues and causality. Therefore, a simple self-reported item can be adopted to circumvent the problem. Third, covariates (e.g., age and gender) were not integrated into the conditional analysis model. In the future, a comprehensive model containing the characteristics of the participants should be developed for the practicality of conclusions.

## Conclusion

Based on the self-representation and transition theories, this research proposes a conditional analysis model to investigate the relationship between interaction anxiousness, academic resilience, cultural intelligence, and ego-identity among Chinese vocational pathway undergraduates. The results revealed that these students have relatively high levels of interaction anxiousness, academic resilience, cultural intelligence, and ego-identity. Meanwhile, their interaction anxiousness significantly and negatively predicts ego-identity. Academic resilience partially and positively mediates the relationship between interaction anxiousness and ego-identity. Cultural intelligence moderates the effect of interaction anxiousness on ego-identity, regardless of its level. Overall, this empirical study expands our understanding of university students' mental health and provides practical advice for stakeholders. Future studies could recruit more samples and incorporate covariates into the model to further strengthen the reliability and generalizability of the research.

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