



The Psychological Mechanisms of Students' Self-Identity in a Cross-Cultural Education Context

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SUMMARY: *This study is based on the concept of self-identity and sets out the factors influencing students' self-identity and methods of measurement. It then selects research subjects in line with the study's objectives and uses a questionnaire to obtain quantitative data. Finally, it uses statistical analysis methods such as structural equation modeling and one-way analysis of variance to explore the psychological mechanisms of students' self-identity in a cross-cultural education context. The results indicate that the regression coefficients of the study variables exhibit significant correlations at the 5% level, with an explanatory power of 82.10%, quantitatively demonstrating the psychological mechanisms of students' self-identity in a cross-cultural educational context.*

KEYWORDS: *structural equation modeling; one-way analysis of variance; self-identity; psychological mechanisms*

1 Introduction

Cross-cultural education refers to educational activities conducted in a multicultural environment to introduce content from other cultures to a group belonging to a particular culture and promote related practices. It serves an educational function in helping all humanity understand cultural differences, achieve cultural integration, and accelerate cultural adaptation [1, 2]. By promoting mutual tolerance and respect among different cultures, intercultural education not only deepens individuals' knowledge acquisition, skill development, and conceptual innovation in a multicultural context, helping them better address global challenges and adapt to globalization, but also further enhances countries' participation and influence in international affairs and global governance, continuously contributing new and greater achievements to the noble cause of human peace and development [3-6]. In today's world of increasing cross-border mobility and international exchanges, intercultural education is an important pathway and inevitable trend for promoting global cooperation and development [7].

In the tide of social progress, students of different ages, through exposure to and learning about diverse cultural ideas and dynamic social factors, exhibit significant differences in their beliefs, values, social perspectives, lifestyles, and career perceptions [8-10]. At this stage, how to accept oneself, build confidence, embrace social realities, and establish a strong sense of self-identity becomes a critical issue. Self-identity represents psychological activity, referring to the self-reflective understanding formed by individuals through personal experiences and knowledge during social development [11]. That is, self-identity represents an individual's internal evaluation of their external self and is also the answer to an individual's confirmation

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of their self-identity. Self-identity, on the one hand, represents an understanding of traditional culture and society, and on the other hand, it is the self-affirmation and evaluation of the image one has shaped [12, 13]. If students lack or have a confused sense of self-identity, they often exhibit poor self-control, extreme sensitivity, and a distaste for life, and may face legal or moral consequences [14, 15]. Self-identity requires individuals to cultivate qualities suitable for society, while also learning to appreciate and encourage themselves, unleash creativity, and break free from constraints to achieve success [16, 17]. However, as the scale of cross-cultural education expands, many international student groups experience cultural marginalization, particularly in multicultural campuses, where students' cultural cognition and adaptability are challenged. Additionally, through the use of online media, students quickly establish cultural identity, but it is not firmly established [18-20].

Literature [21] found through questionnaire analysis that students' birth environment, family income, academic performance, family psychological environment, and campus psychological environment all influence their sense of self-identity, with family and campus psychological environments showing a positive correlation. Literature [22] revealed that due to regional and cultural differences, the self-identity construction of minority youth involves stages of differential cognition, self-doubt, and self-affirmation, all of which are guided by their own value needs. It is evident that students' sources of self-identity vary depending on their cultural backgrounds and living environments. Literature [23] explores the formation of self-identity and belonging among international students in a state of continuous change, pain, and gain, using imagined mobility as a starting point, providing theoretical support for international students' aspirations toward overseas education. Literature [24] analyzes subjective data on personal changes and development among international students during their study abroad period, pointing out that study abroad provides opportunities for personal transformation and identity development, including but not limited to shifts in values, worldviews, academic research, and personal growth. International students, influenced by the culture and other environmental factors of their host country, exhibit the most significant transformations in self-identity. In recent years, due to cross-cultural exchange, some student groups have exhibited cultural biases and delayed identity formation [25]. Immersive cultural experience courses can help enhance students' sense of identity. However, the psychological mechanisms underlying students' sense of self-identity in a cultural education environment remain unclear.

This paper establishes the influencing factors and measurement methods of students' self-identity under the support of relevant theories, and determines the purpose and research subjects of this study. Referring to relevant materials and literature, a self-identity test scale for students was designed, and the scale test method was used to obtain the quantitative values for this study. On this basis, a series of methods, including structural equation modeling and one-factor variance analysis, were used to conduct empirical research and analysis on the psychological mechanisms of students' self-identity in the context of cross-cultural education.

2 Exploring the Psychological Mechanisms of Students' Self-Identity

2.1 Concepts related to self-identity

2.1.1 Self-identity

In the realm of philosophy, the concept of “self” has three distinct meanings: First, the most fundamental self is the physical self, a naturally existing, living, active individual. Second, the

self is an individual capable of acting freely according to its own consciousness. This is also the fundamental distinction between humans and animals: while animals act solely according to the structure of their environment, humans can produce and utilize internal objects within certain parameters. Third, the self is the sum total of all social relationships. Humans cannot exist outside of a group; they are social creatures. Human production gives rise to diverse emotions, interests, and worldviews within various social relationships.

At the same time, self-identity is also the recognition of one's own identity, both a process of self-shaping and the result of self-shaping [26]. The standard for self-identity is measured by the self, and the process of self-identity is confirmed within the existence of one's own identity and status. Humans cannot exist apart from society or the group, so they must inevitably seek their identity through society. By seeking an objective balance between self and others, one becomes a harmonious whole, forming one's self-image. Therefore, self-identity is an intrinsic need for human survival. Once formed, self-identity establishes cognitive avoidance principles to uphold existing avoidance principles. Self-identity is the degree of recognition of self-unity, which is precisely the rational and transcendent aspect that distinguishes humans from animals. Identity is objectively existent and the result of self-recognition. Therefore, issues of self-identity arise at various stages of life. Depending on different experiences, challenges faced, and mental states, the outcomes of self-identity vary greatly.

2.1.2 Identity Crisis

An identity crisis is a form derived from self-identity. A self-identity crisis is a necessary and sufficient crisis, signifying the loss of a sense of identity. Its existence is reversible, as it creates a crisis for the individual. When an individual's existence cannot adapt to external judgments, the self reaches a state of contradiction, psychologically enduring repression. Over time, this accumulates and eventually develops into role confusion, with the ultimate formation of an identity crisis leading to depression. An identity crisis occurs in the context of change. When an individual's past, present, and future lack any experiential connection, the individual may experience identity confusion. If this confusion is not addressed promptly and effectively, it can escalate into a crisis, leading to the dissolution and collapse of the individual's thoughts. The individual may struggle to distinguish between their real and virtual selves, making it difficult to find a genuine sense of self-identity.

Both in the real world and the virtual online world, there are many abnormal behaviors and phenomena that are difficult to understand. The formation of various psychological issues and behavioral deviations is triggered by identity crises, and the spark that ignites these crises is often the root of the problem.

The fundamental cause of identity crises lies in the inability to find a sense of existential value and engage in reflection on ultimate questions. The two fundamental principles of human society are: first, the value of individual existence; second, rational thinking.

This further explains the three causes of identity crises:

First, the gradual development of self-awareness.

Second, the fluidity of social change.

Third, the upheaval and transformation of social values.

The value of individual existence is also the goal that everyone strives for in life, believing that as long as they work hard and do their best, they can demonstrate the existence of value. However, in today's society, teamwork is increasingly emphasized. In the age of information sharing, cooperation between people has become crucial, but this has led to implicit issues such as conflicts, hostility, and hatred between people, as well as varying degrees of psychological anxiety.

2.2 Factors influencing students' self-identity and measurement

This subsection integrates relevant concepts and references in the context of cross-cultural education to determine the factors influencing students' sense of self-identity and methods for measuring it. The details are as follows:

2.2.1 Factors influencing students' self-identity

The factors influencing middle school students' self-identity can be broadly categorized into internal and external factors. Internal factors include mental health. Mental health has a certain degree of influence on middle school students' self-identity. Achievement-oriented identity has a positive predictive effect on psychological resilience levels, while diffuse identity has a negative predictive effect on psychological resilience levels. External factors primarily include family objective environment, family subjective atmosphere, and school environment perception. First, research on family influences shows that adolescents who receive more support from their parents can better explore their self-identity, while those who do not may develop emotional or behavioral issues. A positive family subjective atmosphere facilitates adolescents in forming a healthy self-concept and promotes self-exploration. However, excessive indulgence or authoritarian parenting by parents can have adverse effects on the development of a child's self-identity. During the mid-adolescent stage, the objective family environment plays a significant role, as adolescents tend to develop similar states of identity, behaviors, perspectives, and goals. The objective family environment within students' social support systems has a substantial influence on their sense of self-identity, with its intimacy and psychological acceptance levels surpassing those of parents and teachers. The relationship between teachers and students, the school's educational philosophy, and the level of investment in students all play important roles in the development of college students' self-identity. In summary, the perception of the school environment serves as the backdrop for adolescents' psychological development, and a harmonious school environment perception facilitates their physical and mental development.

2.2.2 Measurement of self-identity

Following the proposed operational definition and research paradigm of self-identity, numerous measurement tools related to self-identity have emerged. In line with the main focus of this study, the Adolescent Identity Crisis Scale was introduced and revised, providing a new measurement tool for research on students' self-identity. This scale is applicable throughout adolescence, demonstrates good reliability and validity, and is considered the most comprehensive and effective method for assessing students' self-identity.

3 Study Design

3.1 Research Objectives and Research Subjects

3.1.1 Research Objectives

A questionnaire survey was conducted among students from seven undergraduate institutions randomly selected within Province A. First, the Adolescent Self-Identity Scale was validated for use with adolescent populations. Next, the current state of students' self-identity was clarified, and comparisons were made between vocational students of different genders, grades, and places of origin to explore differences in self-identity. Additionally, common method bias was tested to determine whether the use of a single research method had introduced bias into

the study. Finally, structural equation modeling and one-way analysis of variance from mathematical statistics were employed to reveal the psychological mechanisms underlying students' self-identity in a cross-cultural context.

3.1.2 Research subjects

This study took college students as the research subjects, conducting a random sample survey of students from seven universities in Province A. A total of 1,000 questionnaires were distributed, with 600 male students (60.00%) and 400 female students (40.00%) participating. A total of 950 valid questionnaires were collected, with a response rate of 95.00%. Among these, 550 were from male students (57.89%) and 400 from female students (42.11%). The selected sample included students from both public and private universities, as well as undergraduate students from five-year integrated schools, thereby encompassing all current types of undergraduate institutions to ensure the representativeness of the sample.

3.2 Research Methods

3.2.1 Research Tools and Reliability Testing

Adolescent Self-Identity Scale. This scale was tested on adolescent students and confirmed to have good reliability and validity indicators, with a Cronbach's α coefficient of 0.783. It is widely used in studies on student self-identity and is suitable for all adolescent students. The scale is primarily designed to assess whether each individual can progress through the eight developmental stages described by Erikson. The scale consists of 20 items. Items A1–A5 pertain to self-identity, items B1–B3 to the objective family environment, items C1–C3 to the subjective family atmosphere, items D1–D5 to perceptions of the school environment, and items E1–E5 to mental health. Scores range from 1 (completely disagree) to 4 (completely agree). Items 4, 8, 9, 12, 13, 14, 15, 16, 17, 18, and 20 use reverse scoring. When administering this scale to students, their average scores ranged between 56 and 58, with a standard deviation of approximately 7. Individuals scoring significantly above this range indicate that their self-identity has been well-developed during their growth. Those scoring significantly below this range suggest that their self-identity is still in the process of development and formation. To further assess the applicability of this scale in evaluating students' self-identity, this study employed internal consistency reliability to test the scale's consistency. The results showed that the Cronbach's α coefficient for the total score of the Adolescent Self-Identity Scale was 0.792, and the split-half reliability was 0.781, indicating that the Adolescent Self-Identity Scale has good reliability and is suitable for all adolescent students.

3.2.2 Structural equation model

Structural equation modeling (SEM) is a multivariate analysis method used to study the interrelationships between one or more independent variables and multiple dependent variables. This method can be used to analyze complex multivariate research data by examining the interactions between various factors, thereby revealing the relationships between latent variables and complex independent or dependent variables.

(1) Definition of related variables

(a) Observed variables are variables for which data can be obtained through scales, questionnaires, or other means.

(b) Latent variables cannot be directly observed and must be inferred from data generated by observed variables.

(c) A measurement model is a model constructed using observed variables to represent latent variables.

(d) A structural model is a model used to represent the path relationships between latent variables.

(e) The path relationships between observed variables and latent variables.

(f) The path relationships between latent variables.

(2) Measurement model

Based on the above definitions, the corresponding measurement model can be derived:

$$X = \Lambda_x \xi + \delta \quad (1)$$

$$Y = \Lambda_y \eta + \varepsilon \quad (2)$$

In the equation, X is the exogenous observed variable. δ is the exogenous latent variable.

Y is the endogenous observed variable. η is the endogenous latent variable.

Λ_x is the factor loading coefficient matrix of the observed variable X . δ is the error variable of the observed variable X .

Λ_y is the factor loading coefficient matrix of the observed variable Y . ε is the error variable of the observed variable Y .

(3) Structural model

Similarly, the structural model of the variables can be determined based on the data of the relevant variables. Specifically, it is as follows:

$$\eta = \Psi \eta + \Gamma \xi + \zeta \quad (3)$$

In the equation, Ψ is the coefficient matrix representing the influence between endogenous latent variables. Γ is the coefficient matrix representing the influence of exogenous latent variables on endogenous latent variables.

η is the endogenous latent variable. ξ is the exogenous latent variable.

ζ is the error variable of the endogenous latent variable η .

3.2.3 Single-factor variance method

Factors (conditions): In variance analysis studies, the objects being tested are called factors or conditions.

Levels (treatments): The different values corresponding to factors are called levels or treatments.

Observations: The experimental data obtained at each factor level are called observations.

First, select an appropriate test statistic and calculate its value. Calculate the mean of the

factor at different levels: $\bar{x}_i = \frac{\sum_{j=1}^{n_i} x_{ij}}{n_i}$, $i = 1, 2, \dots, k$, where n_i is the number of experimental data in the i th population. Calculate the overall mean of all observations:

$$\bar{\bar{x}} = \frac{\sum_{i=1}^k \sum_{j=1}^{n_i} x_{ij}}{n} = \frac{\sum_{i=1}^k n_i \bar{x}_i}{n}, \text{ where } n = n_1 + n_2 + \dots + n_k.$$

To construct the test statistic, we first need to calculate three sums of squares: the total sum of squares (SST), the sum of squares for factors (SSA), and the sum of squares for random

errors (SSE). Their formulas are:

$$SST = \sum_{i=1}^k \sum_{j=1}^{n_i} (x_{ij} - \bar{\bar{x}})^2 \quad (4)$$

$$SSA = \sum_{i=1}^k \sum_{j=1}^{n_i} (\bar{x}_i - \bar{\bar{x}})^2 = \sum_{i=1}^k n_i (\bar{x}_i - \bar{\bar{x}})^2 \quad (5)$$

$$SSE = \sum_{i=1}^k \sum_{j=1}^{n_i} (x_{ij} - \bar{x}_i)^2 \quad (6)$$

The identity relationship between the three:

$$\sum_{i=1}^k \sum_{j=1}^{n_i} (x_{ij} - \bar{\bar{x}})^2 = \sum_{i=1}^k n_i (\bar{x}_i - \bar{\bar{x}})^2 + \sum_{i=1}^k \sum_{j=1}^{n_i} (x_{ij} - \bar{x}_i)^2 \quad (7)$$

i.e. $SST = SSA + SSE$

Since the sum of the three errors is affected by the number of observations, the larger the number of observations, the larger the calculated sum of squares of errors. In order to eliminate the influence of the number of observations on the square of the error and the magnitude of the calculation result, it is necessary to divide the sum of the squares by the corresponding degrees of freedom, that is, the mean square. The three degrees of freedom are: $n-1$, $k-1$ and $n-k$.

The mean square of SSA is also known as the between-group mean square or between-group variance and is denoted as MSA. The calculation formula can be expressed as:

$$MSA = \frac{\text{Intergroup sum of squares}}{\text{Degrees of freedom}} = \frac{SSA}{k-1} \quad (8)$$

The mean square error of SSE is also known as the intra-group mean square or intra-group variance, denoted as MSE. Its calculation formula is:

$$MSE = \frac{\text{Sum of squares within groups}}{\text{Degrees of freedom}} = \frac{SSE}{n-k} \quad (9)$$

Statistical theory has proven that the ratio of the between-group mean square to the within-group mean square is a statistic that follows an F distribution. This paper directly uses the result without providing a detailed proof process.

By comparing MSA and MSE, we obtain the required F test statistic.

$$F = \frac{MSA}{MSE} \sim F(k-1, n-k) \quad (10)$$

4 Empirical Analysis of Students' Sense of Self-Identity

4.1 Data Acquisition and Preprocessing

4.1.1 Data Acquisition

The data for this study was obtained through a questionnaire survey. The data not only covers basic personal information such as age, gender, and urban/rural residence, but also includes information on school, family, and mental health, which supports the research work of this paper and is applicable.

4.1.2 Data preprocessing

(1) Data merging. First, using household codes as the basis, individual data was merged with household income data for the corresponding households. Second, using individual codes as the basis, the data from the first merge was combined with parental education level data to obtain the final dataset.

(2) Delete data. The merged data contains missing values such as “not applicable” and “unknown,” which may affect subsequent empirical analysis. After comprehensive consideration, this paper uses the deletion method to handle incomplete sample observations, ultimately obtaining usable data for the study of students' self-identity.

4.2 Analysis of Factors Affecting Adolescents' Sense of Self-Identity

4.2.1 Model Validation

After processing the variable data, it was imported into the AMOS 24.0 software for model fitting, yielding the model fit indices, standardized path coefficients, and p-values for the significance tests of the standardized path coefficients for the structural equation model of adolescents' self-identity and its influencing factors. First, the model fit indices were examined to verify the overall fit of the model for adolescents' self-identity and its influencing factors, thereby assessing the usability of the constructed structural equation model of adolescents' self-identity and its influencing factors. Since the chi-square statistic is easily influenced by sample size and thus provides poor representation of model fit, this indicator was not selected in this study. Table 1 lists the three types of measurement indicators, judgment criteria, and corresponding indicator values for the structural equation model of adolescents' self-identity and its influencing factors in this study. Based on the comparison of the corresponding indicator values and criteria, both RMR and RMSEA are less than 0.05, meeting the criteria. GFI is close to 1, indicating that the model fits the data well. The values of CFI and IFI are both greater than 0.9, indicating good model fit. The results of the PCFI and PNFI tests also meet the criteria. Overall, the constructed structural equation model of adolescents' self-identity and its influencing factors is effective and feasible.

Table 1: Model fit verification and results

Name	Absolute fit index			Value-added fitting index		Simple fit index	
	RMR	RMSEA	GFI	IFI	CFI	PNFI	PCFI
Criteria for judgment	<0.05	<0.05	>0.9	>0.9	>0.9	>0.5	>0.5
Initial result	0.026	0.016	0.938	0.927	0.927	0.746	0.816
Final result	0.026	0.016	0.926	0.927	0.927	0.748	0.807

Secondly, the standardized path coefficients were tested to verify the significance of the model's path coefficients. If the P-value of the model's path coefficient is less than 0.05, the path regression coefficient can be considered significant. After testing, all standardized path coefficients except for the “family objective environment → family subjective atmosphere” path coefficient passed the significance test, as shown in Table 2. Although the model fit is relatively ideal based on the above indicators, the standardized estimated results from the regression indicate that the influence coefficient of family objective environment on family subjective atmosphere is not significant. This suggests that the influence of family objective environment on family subjective atmosphere is weak, and there is no causal relationship between the quality of family objective environment and the harmony of family subjective atmosphere. The quality of family subjective atmosphere is more dependent on the management style of family members. Positive interaction patterns such as parents respecting and loving each other and children communicating with parents on an equal footing can create a family atmosphere that meets the needs of adolescents. Therefore, this path can be removed from the analysis.

Table 2: The initial model path coefficient and significance level

Name	Standardized coefficient	P value
School environment perception <-- Family objective environment	0.069	0.014
Subjective atmosphere of the family <-- objective environment of the family	-0.034	0.226
Mental health <-- Family objective environment	0.128	***
Mental health <-- Perception of the school environment	0.134	***
Mental health <-- Family subjective atmosphere	0.314	0.008
Self-identity <-- Family subjective atmosphere	0.106	0.014
Self-identity <-- Family objective environment	0.077	***
Self-identity < perception of the school environment	0.206	0.008
Self-identity <-- Mental health	0.077	0.004

The simplified goodness-of-fit index values of the revised model have improved, indicating that the complexity of the revised model has been reduced and the fit is more accurate. The final result output path diagram is shown in Figure 1.

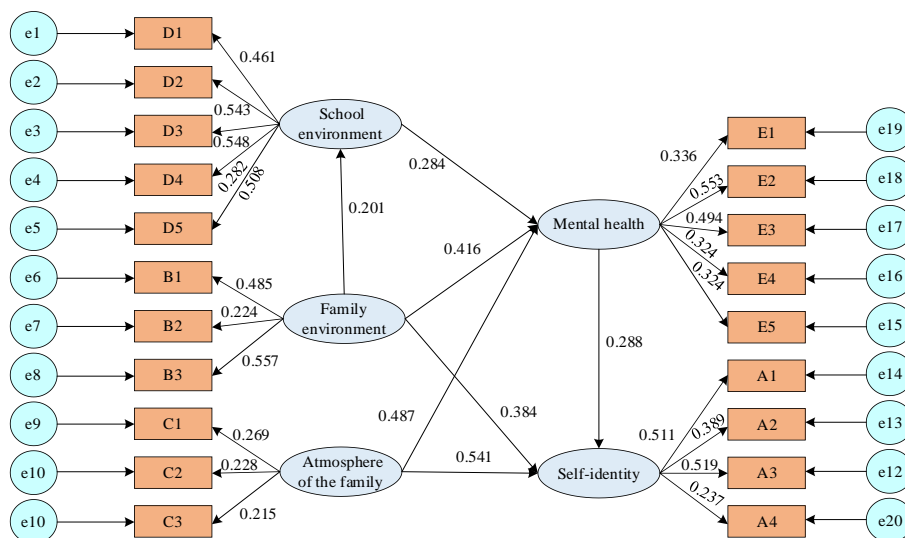


Figure 1: The final result output path diagram

4.2.2 Effect Analysis

The standardized path coefficients in Table 3 objectively reflect the relationships between latent variables and between latent variables and observed variables. Further analysis of the structural equation model results yields the following conclusions:

The objective family environment has a positive impact on adolescents' self-identity, with a standardized path coefficient of 0.084, which is significant at the 1% significance level. This indicates that improvements in the objective family environment can help enhance adolescents' self-identity. The reason lies in the fact that families with better economic conditions and higher parental education levels provide adolescents with more abundant tangible and intangible assets, facilitating their exploration in both breadth and depth, thereby fostering a strong sense of identity. Among these factors, the educational attainment of mothers has a greater impact than that of fathers or family income. Influenced by traditional Chinese family values and family structures, mothers tend to be more involved in their children's upbringing. Generally, highly educated mothers are more likely to adopt proactive parenting styles, providing children with encouragement and affirmation, which helps them develop self-trust and self-acceptance.

Table 3: Model path coefficient and significance level

Name	Standardized coefficient	P value
School environment perception <-- Family objective environment	0.201	0.002
Mental health <-- Family objective environment	0.487	0.005
Mental health <-- Perception of the school environment	0.416	0.004
Mental health <-- Family subjective atmosphere	0.284	0.009
Self-identity <-- Family subjective atmosphere	0.541	0.006
Self-identity <-- Family objective environment	0.384	0.01
Self-identity < perception of the school environment	0.277	0.009
Self-identity <-- Mental health	0.288	0.003
D1<-- School environment perception	0.461	0.009
D4<-- School Environment Perception	0.282	0.007
D5<-- School Environment Perception	0.508	0.007
D3<-- School Environment Perception	0.548	0.008
D2<-- School Environment Perception	0.543	0.005
B1<-- Family objective environment	0.485	0.001
B2<-- Family objective environment	0.224	0.005
B3<-- Family objective environment	0.557	0.007
C2<-- Subjective atmosphere of the family	0.228	0.001
C3<-- Family Subjective atmosphere	0.215	0.008
C1<-- Family subjective atmosphere	0.269	0.006
A1<-- Self-identity	0.511	0.004
A3<-- Self-identity	0.389	0.004
A2<-- Self-identity	0.519	0.003
A4<-- Self-identity	0.237	0.007
E1<-- Mental health	0.336	0.005
E5<-- Mental health	0.553	0.001
E2<-- Mental health	0.494	0.009
E3<-- Mental health	0.324	0.008
E4<-- Mental health	0.324	0.005

4.3 Differential Analysis

4.3.1 Analysis of grade differences

To investigate differences in students' sense of belonging across grade levels, a one-way

analysis of variance (ANOVA) can be conducted. Figure 2 presents the analysis of school environment perception and grade level differences, Figure 3 shows the analysis of family objective environment and grade level differences, Figure 4 displays the analysis of family subjective atmosphere and grade level differences, Figure 5 illustrates the analysis of mental health and grade level differences, and Figure 6 presents the analysis of self-identity and grade level differences. Based on Figures 2–6, it can be concluded that school environment perception ($F = 3.014$, $P = 0.002$), family objective environment ($F = 7.607$, $P = 0.001$), family subjective atmosphere ($F = 5.306$, $P = 0.008$), mental health ($F = 2.462$, $P = 0.006$), self-identity ($F = 7.134$, $P = 0.006$) exhibit significant differences across grade levels, confirming that there are significant differences in the psychological mechanisms underlying self-identity between the study sample characteristics and student self-identity.

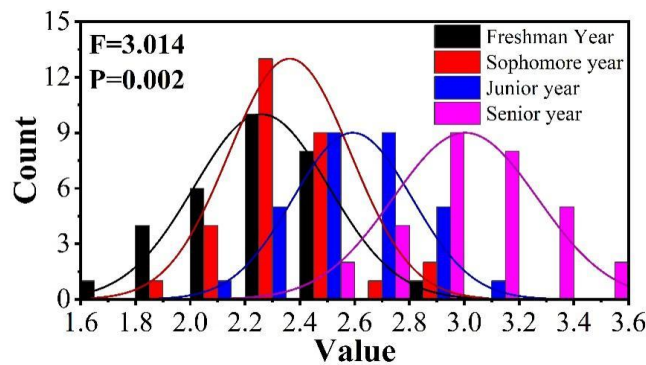


Figure 2: Analysis of School Environment Perception and Grade Differences

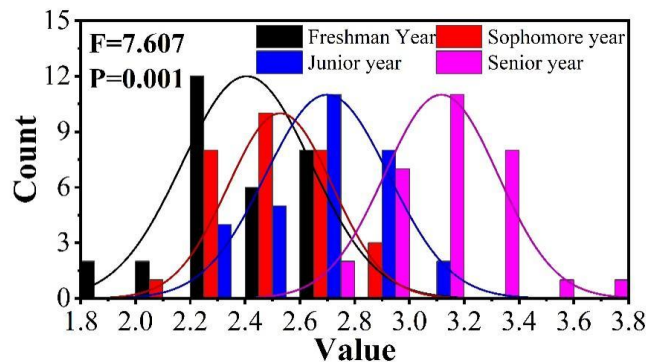


Figure 3: The objective family environment and grade differences

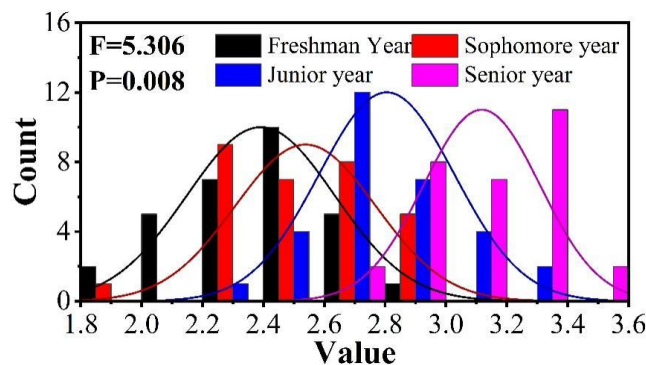


Figure 4: Analysis of the Differences between Family Subjective Atmosphere and Grade

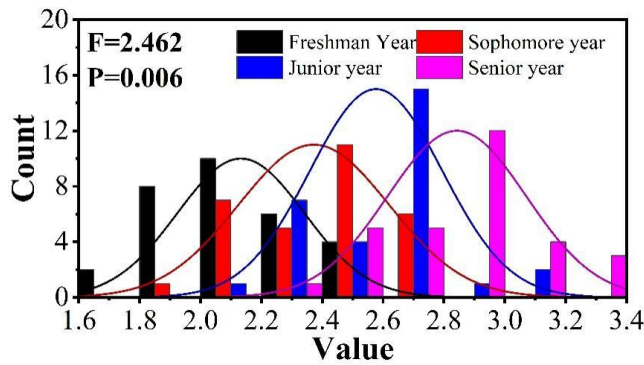


Figure 5: Analysis of Mental Health and Grade Differences

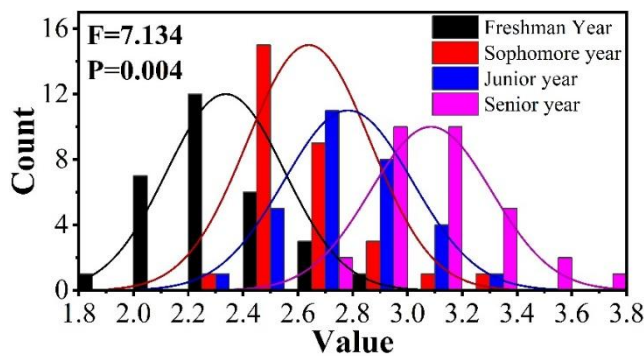


Figure 6: Analysis of Self-Identity and Grade Differences

4.3.2 Analysis of age differences

A one-way analysis of variance (ANOVA) was conducted to examine the differences in the psychological mechanisms of identity among students of different ages (20, 21, 22, and 23 years old). The results of the differential analysis are shown in Figures 7–11. Based on the P-values in the figures, it can be concluded that school environment perception ($F=20.332$, $P=0.011$), family objective environment ($F=14.272$, $P=0.003$), family subjective atmosphere ($F=8.054$, $P=0.004$), mental health ($F=4.328$, $P=0.002$), self-identity ($F=2.431$, $P=0.008$) exhibit significant differences across grade levels, indicating that there are significant differences in the psychological mechanisms underlying self-identity between the study participants and students of different ages.

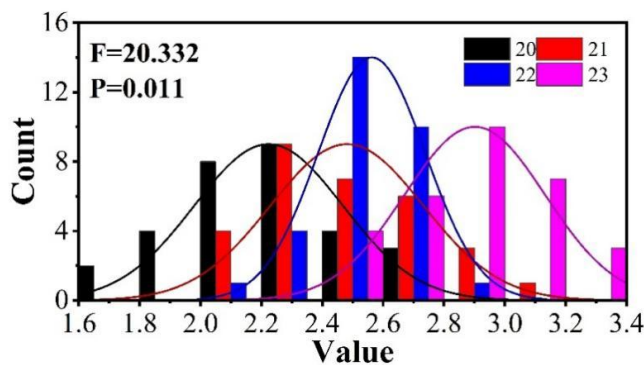


Figure 7: Analysis of School Environment Perception and Age differences

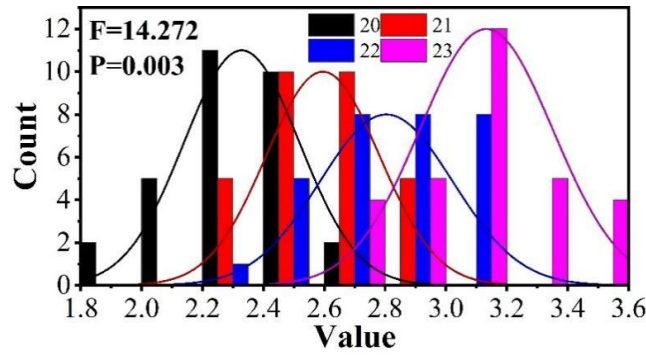


Figure 8: The objective family environment and Age differences

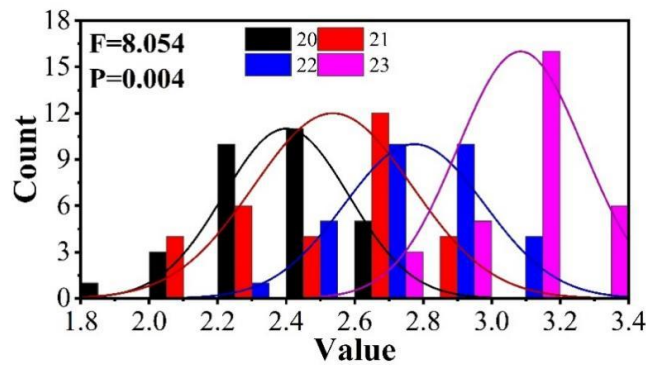


Figure 9: The objective family environment and Age differences

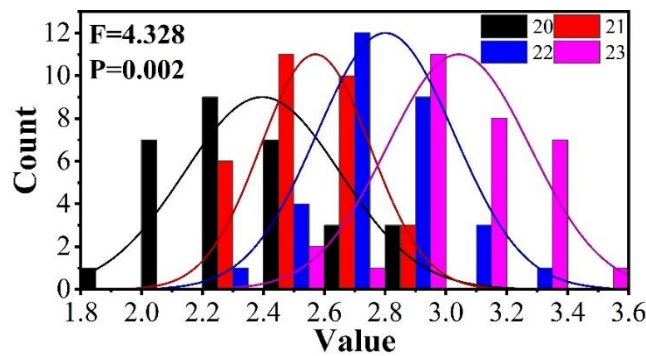


Figure 10: Analysis of the Differences between Family Subjective Atmosphere and Age

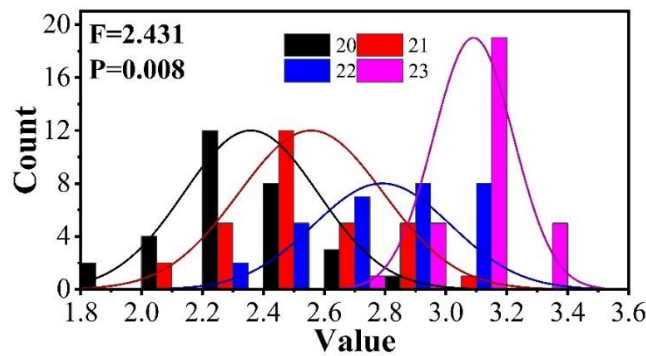


Figure 11: Analysis of Self-Identity and Age Differences

4.4 Correlation Analysis and Regression Analysis

4.4.1 Correlation Analysis

Using Pearson's correlation coefficient from mathematical statistics to analyze the correlation between the study variables, the aim was to verify whether the variables set in this paper met the research requirements. The results of the correlation analysis are shown in Table 4. As can be seen from the data in the table, the study variables set in this paper have a significant correlation (Sig. < 0.05) and can be used to explore the psychological mechanisms of students' self-identity in a cross-cultural education context.

Table 4: Results of correlation analysis

Name		School environment perception	Family objective environment	Mental health	Family subjective atmosphere	Self-identity
School environment perception	Pearson	1	0.328	0.782	0.498	0.327
	Sig.		0.003	0.005	0.002	0.006
	N	950	950	950	950	950
Family objective environment	Pearson	0.328	1	0.345	0.508	0.797
	Sig.	0.003		0.001	0.002	0.007
	N	950	950	950	950	950
Mental health	Pearson	0.782	0.345	1	0.391	0.278
	Sig.	0.005	0.001		0.006	0.004
	N	950	950	950	950	950
Family subjective atmosphere	Pearson	0.498	0.508	0.391	1	0.427
	Sig.	0.002	0.002	0.006		0.009
	N	950	950	950	950	950
Self-identity	Pearson	0.327	0.797	0.278	0.427	1
	Sig.	0.006	0.007	0.004	0.009	
	N	950	950	950	950	950

4.4.2 Regression Analysis

To further reveal the psychological mechanisms of students' self-identity in a cross-cultural educational context, a regression analysis was conducted on the research variables. The results of the regression analysis are shown in Table 5. The results indicate that the regression coefficients ($P < 0.05$) are significantly correlated, with an explanatory power of 82.10%, which effectively explains the psychological mechanisms of students' self-identity in a cross-cultural educational context. This not only promotes the improvement of students' psychological literacy but also facilitates the high-quality and rapid development of their self-identity.

Table 5: Regression analysis results

Model	B	S.E.	Beta	T	P
Constant	0.026	0.038		2.245	0.016
School environment perception	0.213	0.022	0.214	1.126	0.004
Family objective environment	0.117	0.037	0.107	3.404	0.002
Mental health	0.244	0.027	0.244	2.176	0.001
Family subjective atmosphere	0.183	0.046	0.181	0.506	0.006
Grade	0.072	0.049	0.072	2.192	0.008
Age	0.061	0.034	0.057	1.421	0.009
R^2	0.821				
F	8.352				

5 Conclusion

This paper, based on the concept of self-identity, identifies the factors influencing students' self-identity and the methods for measuring it, and employs a series of methods such as structural equation modeling and one-way analysis of variance to develop an appropriate research plan. Under the guidance of this plan, the psychological mechanisms underlying students' self-identity in a cross-cultural educational context are explored. Analysis reveals that the regression coefficients ($P < 0.05$) exhibit significant correlations, thereby elucidating the psychological mechanisms of students' self-identity and contributing to further enhancements in their self-identity levels.

About the Author

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