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RESEARCH ARTICLE

Environmental perception and cultural identity construction in university aesthetic education: A case study of intangible cultural heritage

Sixiao Chen[1,*], Hui Ni[2]

[1] *Nanjing Normal University Taizhou College, Taizhou, 225300, China*

[2] *Nanjing Medical University, Nanjing, 211100, China*

*** Corresponding author:** Sixiao Chen, xiaoxiao19900314@126.com

ABSTRACT

With the deepening development of globalization, university students' cultural identity faces reshaping and challenges. Intangible cultural heritage, as an important carrier of traditional culture, plays a key role in university aesthetic education. This research adopts a mixed research methodology, integrating environmental psychology and cultural identity theory to explore the influence of environmental perception on cultural identity construction in university aesthetic education. The findings reveal that: the physical environment promotes cultural identification through spatial cognition and place attachment; social interaction strengthens the internalization of cultural values through group interaction and social support networks; emotional experience deepens cultural identity through cultural memory activation, aesthetic experience, and cultural empathy. Based on empirical results, an integrated model of "environmental perception-cultural experience-identity construction" is proposed, revealing the staged characteristics and psychological mechanisms of cultural identity formation in intangible heritage aesthetic education environments. The research demonstrates that optimizing intangible heritage teaching environment design, enhancing social interaction quality, and deepening emotional experience are effective pathways to promote university students' cultural identity construction, providing scientific evidence for theoretical innovation and practical reform of intangible cultural heritage education in university aesthetic education.

Keywords: environmental perception; cultural identity; intangible cultural heritage; university aesthetic education; place attachment

1. Introduction

In the contemporary social context of globalization and digitalization, university students' cultural identity is gradually showing trends of ambiguity and diversification. University aesthetic education, as an important approach to cultivating humanistic literacy and aesthetic ability, faces the challenge of how to guide students to form stable cultural identities. Intangible cultural heritage, as an important carrier of excellent Chinese traditional culture, not only contains rich aesthetic values and spiritual connotations but also carries the genetic code and emotional memories of national culture. Zhang Yujie (2025) points out that

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integrating excellent Chinese traditional culture into university aesthetic education helps cultivate students' cultural confidence and aesthetic appreciation ability, deepening their understanding and recognition of traditional culture[1]. However, current university aesthetic education faces issues such as insufficient attention to intangible cultural heritage, unreasonable curriculum design, and singular teaching methods, causing students' perception of traditional culture to remain at a superficial level, making it difficult to form deep cultural identification.

From the perspective of environmental psychology, one's identity is closely related to the physical environment, social environment, and one's perception methods. Yang He's (2024) research shows that constructing music cultural environments with ethnic characteristics can effectively promote medical university students' identification and inheritance of traditional culture in aesthetic education[2]. Similarly, Wei (2024) emphasizes the importance of aesthetic education base construction for university aesthetic education development, pointing out that suitable educational environments can stimulate students' aesthetic experiences and cultural identification[3]. Therefore, this research focuses on the key role of environmental perception in the inheritance of intangible cultural heritage and cultural identity construction, attempting to explore how to promote university students' deep understanding and internalization of intangible cultural heritage through optimizing educational environments and enriching perceptual experiences, thereby constructing stable yet open cultural identities. Zhang Yifan's (2024) research indicates that the application of Chinese traditional culture in contemporary university aesthetic education has irreplaceable value in guiding students to appreciate, understand, and inherit the essence of national culture[4].

Based on this, this research begins from environmental perception theory to explore the intrinsic connection between the multi-dimensional experience of intangible cultural heritage in university aesthetic education and cultural identity construction. Niu Mengxue (2024) emphasizes that integrating excellent Chinese traditional culture into university aesthetic education requires exploring diversified values and implementation paths to enhance educational effectiveness[5]. Environmental perception, as a basic process of individual-environment interaction, includes three levels: sensory perception, cognitive evaluation, and emotional response, and this process is precisely an important mechanism for cultural identity formation. Using intangible cultural heritage as a medium, this research examines the influence of physical environments (such as cultural space design and arrangement), social environments (such as teacher-student interaction and intergenerational inheritance), and symbolic environments (such as cultural symbols and rituals) on university students' cultural identity construction, and explores the psychological mechanisms therein.

This research has dual significance: at the theoretical level, it expands the application of environmental psychology and cultural identity theory in the field of aesthetic education, deepening the understanding of the educational value of intangible cultural heritage; at the practical level, Mu's (2024) research on the application of Mongolian dance in aesthetic education shows that the educational integration of intangible cultural heritage requires innovative methods and approaches to achieve effective inheritance and development[6]. This research will provide empirical evidence and theoretical guidance for teaching design and environment creation of intangible cultural heritage in university aesthetic education, helping to cultivate new-era university students with cultural confidence and innovative spirit. Hu's (2024) research further confirms that art education has unique value in cultivating students' cultural identity and aesthetic ability, especially when placed in specific cultural environments, which can better evoke students' emotional resonance with traditional culture[7]. This provides new ideas and directions for constructing a university aesthetic education system with Chinese characteristics.

2. Literature review

University aesthetic education, as an important component of higher education systems for cultivating students' aesthetic abilities, humanistic literacy, and cultural identity, has increasingly gained academic attention for its role in inheriting excellent Chinese traditional culture and constructing university students' cultural identity. Dong Yunxia (2023) points out that university aesthetic education plays an irreplaceable role in the inheritance of traditional Chinese art and culture, which can both maintain the vitality of traditional culture and stimulate students' creative thinking[8]. Traditional art itself contains rich cultural connotations and aesthetic values, which can effectively cultivate students' cultural confidence and national identity through the dissemination and innovation of university aesthetic education. Qin Changsheng and Wang Zhen (2017) further discuss the approaches of university aesthetic education in the inheritance of traditional culture, including curriculum design, campus cultural activities, and social practices, advocating the stimulation of students' emotional and value identification with traditional culture through aesthetic education[9]. Chen Wenyuan and Li Hong (2021) specifically explore the feasibility and methods of integrating intangible cultural heritage into university aesthetic education courses, emphasizing that intangible heritage, as living cultural heritage, has vivid educational value and practical significance[10]. They propose that integrating intangible heritage into aesthetic education is not only the imparting of knowledge but also the awakening of cultural memory and the construction of identity. From an environmental perspective, Luo Siqin (2018) studies the construction of aesthetic education curriculum systems in higher vocational colleges from the perspective of Lingnan culture inheritance, believing that regional cultural environments are important resources for aesthetic education teaching that can provide students with authentic and concrete cultural experiences and perceptions[11]. This culture-based education model rooted in the environment helps students form stable cultural identities in specific cultural fields.

Environmental perception, as a basic psychological process of individual-environment interaction, plays a key role in cultural identity construction. Liu Shanshan (2020) explores the teaching practice of university aesthetic education against the background of campus safety culture construction, emphasizing the importance of a good campus cultural environment for students' aesthetic education experience[12]. From a cognitive psychology perspective, environmental perception includes not only sensory reception of physical space but also emotional experience and meaning construction. Li Weiping (2021), in studying the integration path of excellent Chinese traditional culture and university aesthetic education, points out that constructing a campus environment rich in traditional cultural atmosphere allows students to naturally contact and perceive traditional cultural elements in daily life, forming subtle cultural influence[13]. This view echoes the "body and ear" aesthetic education method proposed by Frampton et al. (2024), which emphasizes enhancing students' direct perception and emotional resonance with cultural content through multi-sensory experience and bodily participation[14]. From an environmental psychology perspective, the formation of cultural identity often requires specific environmental support and continuous interactive experiences. Qi Jin (2022) analyzes the path of integrating excellent Chinese traditional culture with university aesthetic education, proposing that the creation of aesthetic education environments should focus on the use of cultural symbols and the creation of ceremonial sense to enhance students' sense of cultural belonging and identity[15].

From a teaching methodology perspective, the integration of intangible cultural heritage into contemporary university aesthetic education requires innovative teaching models and methods. Zhao Fen (2024) explores the collaborative teaching model of club culture festivals and university student art festivals in aesthetic education courses, believing that this teaching method integrating campus cultural activities can provide students with richer cultural experiences and environmental perceptions[16]. Li and Wang (2024) study the innovative design of ideological and political education in higher education art courses, using the

"Creative Design Thinking and Methods" course as an example, emphasizing that traditional culture teaching should focus on cultivating students' critical thinking and creative application abilities[17]. This view aligns with Xiao and Yujie's (2024) research on teaching reform of interior design courses based on traditional culture, who propose from an aesthetic education perspective that traditional cultural elements should be creatively transformed through modern design language, allowing students to deepen their understanding and recognition of traditional culture in the environmental design process[18]. These studies point to an important view: education on intangible cultural heritage should not remain at the simple imparting of knowledge but should create appropriate teaching environments and methods to promote students' active perception, experience, and reflection.

Cultural identity construction, as a complex psychological process, is influenced by both external environments and closely related to individuals' internal cognition and emotions. Hu Jinglian (2018), in studying the vulgarization tendency of campus culture and university aesthetic education, points out that poor campus cultural environments can disturb students' cultural identity and cause confusion in values, therefore university aesthetic education should take on the responsibility of purifying campus cultural environments and guiding healthy aesthetics[19]. This view emphasizes the profound influence of environment on cultural identity construction. Gao Yi (2018), in discussing the role of university aesthetic education in traditional art culture education, emphasizes the importance of emotional experience and value identity in the aesthetic education process, believing that the formation of cultural identity needs to undergo a transformation process from perceptual knowledge to rational recognition[20]. From an international perspective, Woglom and Jones (2024) propose the "Speculative-Mutant Pedagogies" aesthetic education theory, advocating for students to experience different cultural perspectives in a "What If World" through creative hypothetical situations, promoting multicultural understanding and identity reflection[21]. This teaching method is closely related to environmental perception, as it creates a special imaginative environment that stimulates students' perceptual experiences and emotional investment.

As an important cultural resource, intangible cultural heritage faces challenges in material selection and compilation strategies in its application in university aesthetic education. Chen Yuangui (2024) studies the compilation strategies of university aesthetic education textbooks from the perspective of cultural communication, pointing out that textbook design should focus on the development and transformation of traditional cultural resources to make teaching content both culturally deep and modern and acceptable[22]. Li Hongchao (2021), using art design courses as an example, studies the teaching methods combining university aesthetic education with excellent traditional culture, emphasizing that situational experiences should be created in the teaching process to allow students to feel the charm of traditional culture through personal participation, thus internalizing it into their own cultural identity[23]. These studies show that the entry of intangible cultural heritage into university aesthetic education requires reasonable teaching design and environmental creation to stimulate students' perceptual interest and identity motivation. Skender and Dubovicki (2024), in their study of guidelines for the future development of visual arts education in Croatia using the Delphi method, emphasize that art education should be connected with cultural traditions while opening up multicultural perspectives, which provides inspiration for the teaching of intangible cultural heritage in university aesthetic education in China[24].

From the perspectives of environmental psychology and social cognitive theory, cultural identity construction is often achieved through situational learning and socialization processes. Yang et al. (2024) study the application of the Montessori teaching method in the connection between kindergarten and primary school aesthetic education, emphasizing the importance of prepared environments for aesthetic experience and cultural learning, which is equally applicable to environmental creation in university aesthetic

education[25]. Penketh C (2024) discusses the "Timing Out" issue in art education from a temporal dimension, pointing out that art education requires sufficient time experience and emotional accumulation, which contemporary educational environments often neglect[26]. This reminds us that environmental perception of intangible cultural heritage in university aesthetic education needs appropriate time and space arrangements to allow students to fully experience and internalize cultural connotations.

In summary, environmental perception and cultural identity construction in university aesthetic education is a multi-dimensional, multi-level complex process. Existing research shows that university aesthetic education with intangible cultural heritage as a carrier needs to create suitable physical environments, social environments, and cultural atmospheres, promoting students' deep perception and emotional identification with traditional culture through multi-sensory experiences, situational teaching, and social interaction, thereby constructing stable yet open cultural identities. However, current research still has some deficiencies: first, research on the specific mechanisms and influence paths of environmental perception is not deep enough; second, there is a lack of systematic empirical research to verify the relationship between environmental perception and cultural identity construction; third, research on innovative applications of intangible cultural heritage in university aesthetic education needs to be expanded. Future research should strengthen the application of environmental psychology theory in the field of aesthetic education, deeply explore the intrinsic connection between perceptual experiences and cultural identity construction in intangible cultural heritage environments, and provide more solid academic support for theoretical innovation and practical reform of university aesthetic education.

3. Research methods

3.1. Research design

This research adopts a mixed-methods approach, combining quantitative and qualitative research to construct a theoretical framework of "environmental perception-cultural experience-identity construction," exploring the influence mechanism of environmental perception of intangible cultural heritage in university aesthetic education on cultural identity construction. The research framework consists of three core levels: firstly, the environmental level encompasses the physical environment (such as intangible heritage exhibition spaces, workshops, and training centers), social environment (such as teacher-student interaction, peer communication, and guidance from inheritors), and cultural symbolic environment (such as intangible heritage works, rituals, and performances); secondly, the perception level includes sensory perception (multi-sensory experiences including visual, auditory, tactile, etc.), cognitive evaluation (understanding of cultural connotations and meaning construction), and emotional response (aesthetic pleasure, cultural resonance, sense of belonging, etc.); finally, the identity construction level includes cultural identification (recognition and acceptance of traditional cultural values), cultural confidence (positive evaluation and pride in one's national culture), and creative transformation (integration of traditional cultural elements into modern life and creation)[27]. Data will be collected through questionnaire surveys, semi-structured interviews, and participatory observation, and analyzed using structural equation modeling and grounded theory analytical methods to elucidate the intrinsic connection between intangible cultural heritage environmental perception and university students' cultural identity construction.

Based on the aforementioned research framework and related theories, the following research hypotheses are proposed: Hypothesis One, the physical characteristics of intangible cultural heritage environments (such as spatial layout, atmosphere creation, audiovisual elements, etc.) have a significant positive impact on university students' multi-sensory perception, thereby enhancing their sense of cultural identity; Hypothesis Two, social interaction in intangible cultural heritage environments (such as teacher-

student co-creation, peer collaboration, guidance from inheritors, etc.) can promote university students' cultural meaning construction and value internalization, thus enhancing their cultural confidence; Hypothesis Three, emotional experiences in intangible cultural heritage environments (such as aesthetic pleasure, cultural resonance, sense of achievement, etc.) can stimulate university students' cultural creativity, promoting their active construction of cultural identity; Hypothesis Four, the three dimensions of environmental perception (sensory perception, cognitive evaluation, emotional response) have interactive effects on cultural identity construction, with the mediating effect of emotional response being the most significant; Hypothesis Five, individual factors (such as cultural background, academic discipline, prior experience, etc.) and environmental factors (such as participation frequency, environmental immersion, interaction quality, etc.) will moderate the relationship between environmental perception and cultural identity construction[28]. These hypotheses will be verified through empirical research to reveal the intrinsic mechanisms of how intangible cultural heritage environmental perception influences cultural identity construction.

To ensure the scientific nature and operability of the research, core variables are clearly defined: (1) Independent variables: intangible cultural heritage environment, specifically including the physical environment dimension (defined as spatial layout, material facilities, and atmosphere creation in intangible heritage teaching activities, measured through the "Environmental Suitability Scale"), social environment dimension (defined as interpersonal interaction and social support networks in the intangible heritage teaching process, assessed through the "Social Interaction Quality Questionnaire"), and cultural symbolic environment dimension (defined as cultural symbols and ritual activities in the intangible heritage environment, measured through the "Cultural Symbol Perception Scale"); (2) Mediating variables: environmental perception, including sensory perception (defined as the reception and processing of visual, auditory, tactile, and other sensory stimuli in the intangible heritage environment, measured through the "Multi-sensory Experience Scale"), cognitive evaluation (defined as the understanding of intangible heritage cultural connotations and meaning construction, measured through the "Cultural Cognitive Evaluation Questionnaire"), and emotional response (defined as emotional states and psychological experiences generated in the intangible heritage experience, measured through the "Cultural Emotional Response Scale"); (3) Dependent variables: cultural identity construction, including the cultural identification dimension (defined as the degree of acceptance of traditional cultural values and behavioral norms, measured through the "Cultural Identification Scale"), cultural confidence dimension (defined as positive evaluation and pride in one's national culture, measured through the "Cultural Confidence Scale"), and creative transformation dimension (defined as the ability to integrate traditional cultural elements into modern life and creation, measured through the "Cultural Creativity Scale" and evaluation of creative works); (4) Moderating variables: individual factors (including gender, academic discipline, cultural background, etc.) and environmental factors (including participation frequency, environmental immersion, interaction quality, etc.). All scales have been revised through pre-testing and validity testing to ensure the scientific nature and effectiveness of the measurement tools.

3.2. Research tools

This research collects quantitative data through questionnaire surveys, with the questionnaire consisting of four parts: basic information, environmental perception scale, cultural identity scale, and intangible heritage experience evaluation scale. The basic information section collects demographic variables of subjects, including gender, age, major, ethnicity, hometown, experience with intangible cultural heritage, etc. The environmental perception scale is divided into three dimensions: physical environment perception

subscale (15 items, including spatial layout, material texture, sound and light environment, etc., such as "The spatial layout of the intangible heritage workshop helps me immerse in the traditional cultural atmosphere"), using a 5-point Likert scale; social environment perception subscale (12 items, including teacher-student interaction, peer collaboration, guidance from inheritors, etc., such as "Interaction with intangible heritage inheritors makes me feel the continuity of cultural inheritance"), using a 5-point Likert scale; cultural symbol perception subscale (10 items, including cultural symbols, ritual activities, etc., such as "Participating in traditional ritual activities gives me a deeper understanding of the cultural spirit they embody"), using a 5-point Likert scale. The cultural identity scale is similarly divided into three dimensions: cultural identification subscale (12 items, measuring the degree of acceptance of traditional cultural values, such as "I believe the spirit of 'excellence' embodied in traditional crafts is worth learning for contemporary people")[29]; cultural confidence subscale (10 items, measuring positive evaluation of traditional culture and willingness to inherit, such as "I am proud of our country's diverse intangible cultural heritage"); creative transformation subscale (8 items, measuring the ability to integrate traditional cultural elements into modern life and creation, such as "I can creatively apply traditional craft elements to modern design"). The intangible heritage experience evaluation scale (15 items) assesses the effectiveness of students' participation in intangible heritage aesthetic education activities from three aspects: emotional experience, cognitive gains, and behavioral intentions. The questionnaire has been reviewed by experts and pre-tested, with Cronbach's α coefficients all above 0.82, and confirmatory factor analysis shows good structural validity for each scale.

The semi-structured interview outline is designed to obtain students' deep experiences in intangible heritage aesthetic education environments and their cultural identity construction process, divided into four thematic modules, each containing guiding questions and in-depth exploration questions. The environmental experience module focuses on students' subjective feelings about intangible heritage aesthetic education environments, with main questions including: "Please describe the intangible heritage course/activity environment that impressed you the most, which environmental elements left a deep impression on you?" "How did these environmental elements influence your understanding and experience of traditional culture?" "What impact did the physical environment (such as space, materials, tools, etc.), interpersonal interaction, and cultural symbols have on your experience respectively?" The perception process module explores students' internal psychological experiences in intangible heritage activities, with main questions including: "When participating in intangible heritage activities, how were your senses (visual, auditory, tactile, etc.) activated? Can you give examples?" "What cognitive changes or moments of insight did you experience in the process of understanding intangible heritage cultural connotations?" "What emotional responses did the intangible heritage experience trigger in you? How did these emotions influence your attitude towards traditional culture?" The cultural identity module explores students' cultural identification and identity changes, with main questions including: "How have your views on traditional culture changed before and after participating in intangible heritage aesthetic education activities?" "How have these experiences influenced your understanding of your own cultural identity?" "Have you integrated intangible heritage elements into your daily life or creation? Please give examples." The educational reflection module collects students' suggestions and reflections on intangible heritage aesthetic education, with main questions including: "What do you think are the advantages and disadvantages of the current intangible heritage aesthetic education environment?" "How can the intangible heritage aesthetic education environment be optimized to better promote cultural identity construction?" "What long-term impacts might intangible heritage aesthetic education have on your future learning, work, and life?" The interview outline has been reviewed by experts and revised through trial interviews, ensuring the openness, specificity, and hierarchy of the questions, which can effectively stimulate interviewees' deep reflection and authentic expression.

The participatory observation scale, as a qualitative research tool, is used for researchers to systematically record students' behavioral performance and interaction processes in intangible heritage aesthetic education environments in natural settings. The observation scale is divided into three dimensions and nine specific observation items. The environmental interaction dimension records students' interactive behaviors with environmental elements, including: physical environment interaction behaviors (such as students' contact frequency and manner with intangible heritage materials and tools, exploration and usage patterns of space, focus of attention on exhibits, etc., recorded as behavior frequency statistics and qualitative descriptions); social interaction behaviors (such as content, manner, and emotional expression of students' communication with teachers, inheritors, and peers, role division and participation in collaboration processes, etc., recorded as interaction event sampling and detailed descriptions); cultural symbol interaction behaviors (such as students' attention to and discussion of cultural symbols, degree of involvement and facial expression changes when participating in cultural rituals, etc., recorded using time sampling method and behavioral descriptions)[30]. The perception response dimension records students' explicit perception and emotional expressions, including: sensory attention behaviors (such as gaze duration, tactile exploration, focused listening, and other non-verbal behaviors, recorded as duration records and behavioral descriptions); cognitive response performance (such as questioning, discussion, note-taking, and other cognitive processing behaviors, recorded as event records and content analysis); emotional expression behaviors (such as facial expressions, use of emotional vocabulary, emotional sharing, etc., recorded as emotional state scoring and performance descriptions). The cultural practice dimension records students' cultural learning and creative behaviors, including: skill learning behaviors (such as imitation, practice, improvement processes and performance, recorded on skill progress assessment forms); cultural expression behaviors (such as creation processes, work characteristics, and use of cultural elements, recorded as creation process records and work analysis); cultural dissemination behaviors (such as behaviors of introducing, sharing, and promoting intangible heritage culture to others, recorded as dissemination event records). The observation scale has undergone three rounds of revision and reliability testing (inter-rater consistency coefficient > 0.85), ensuring the systematicity, objectivity, and comprehensiveness of observations.

3.3. Data collection and analysis

This research adopts a multi-stage stratified sampling method, selecting 2 comprehensive universities from each of China's eastern, central, western, and northeastern regions (8 universities in total) to ensure geographical representativeness of the sample. Within each university, 80 students from each of three major categories—arts, humanities and social sciences, and science and engineering—are selected using quota sampling, totaling 1,920 students participating in the questionnaire survey. The basic characteristics of the sample are as follows: gender ratio is 42.8% male and 57.2% female; grade distribution is 28.6% freshmen, 26.4% sophomores, 24.5% juniors, and 20.5% seniors; ethnic composition is 82.7% Han and 17.3% ethnic minorities; major distribution conforms to the preset proportions: 33.3% arts, 33.3% humanities and social sciences, and 33.3% science and engineering. Based on the questionnaire survey, purposive sampling is further adopted to select 120 students for semi-structured interviews according to their evaluation scores of intangible heritage aesthetic education environment experiences (40 each from high-score, medium-score, and low-score groups) and cultural identity levels (40 each from high-identity, medium-identity, and low-identity groups). Meanwhile, 3 representative intangible heritage aesthetic education courses/activities (including traditional crafts, folk music, opera performance, etc.) are selected from each of the 8 universities, totaling 24 teaching scenarios for participatory observation over one semester. The sample selection process follows the principle of voluntary participation, with all participants signing informed consent forms, and the research protocol approved by the university ethics committee.

Data collection is conducted in three phases over one academic year. First phase (2 months): Questionnaire survey and pre-test. The research team first contacts the academic affairs departments and relevant colleges of each university to obtain permission to conduct the research, then distributes survey questionnaires using a combination of online and offline methods. Online questionnaires are published through the Questionnaire Star platform, while offline questionnaires are distributed at intangible heritage aesthetic education courses or related cultural activities. To ensure questionnaire quality, time control and attention detection questions are set to screen out invalid questionnaires. Meanwhile, environmental assessment and student pre-tests are conducted for the 24 intangible heritage aesthetic education scenarios under observation to establish baseline data. Second phase (6 months): Participatory observation and process data collection. Research team members enter intangible heritage aesthetic education teaching scenarios as observers, observing once every two weeks for 2-3 hours each time, using observation scales to record students' environmental interaction behaviors, perception responses, and cultural practice performances[31]. The "minimum intervention principle" is adopted during the observation process to avoid affecting normal teaching activities. Meanwhile, students' process experience data are collected through classroom instant feedback forms and mini-interviews to establish a longitudinal database. Third phase (4 months): Semi-structured interviews and post-test. Based on the analysis results of the first two phases, 120 representative students are screened for one-on-one in-depth interviews, each interview lasting 60-90 minutes, conducted in quiet meeting rooms, with the entire process recorded with interviewees' consent and transcribed into text. Meanwhile, post-tests are conducted for students participating in the observation to compare pre-test and post-test differences. In addition, works created by students during the intangible heritage aesthetic education process (such as crafts, design works, performance videos, etc.) are collected as supplementary data to comprehensively evaluate cultural identity construction performance. The entire experimental process strictly follows research ethics norms, protects participants' privacy, and provides research briefings to participants after data collection is completed.

Multiple methods are used to analyze the collected quantitative and qualitative data. Quantitative data analysis uses SPSS 26.0 and AMOS 24.0 software, with main analysis methods including: (1) Descriptive statistical analysis, calculating means, standard deviations, skewness, and kurtosis of each variable to test data distribution characteristics; (2) Reliability analysis, using Cronbach's α coefficient and test-retest reliability to test the internal consistency and stability of scales; (3) Confirmatory factor analysis, testing the structural validity and measurement model fit of each scale; (4) Correlation analysis, examining the correlations between dimensions of environmental perception, cultural experience, and cultural identity; (5) Multi-level linear regression analysis, exploring the predictive effects of different environmental factors on environmental perception; (6) Mediating effect analysis, using the Bootstrap method (5,000 resamples) to test the mediating effect of environmental perception between environmental elements and cultural identity construction; (7) Moderating effect analysis, examining the moderating effects of individual factors and environmental factors on the relationships between research variables; (8) Structural equation modeling analysis, constructing and validating the overall path model of "environmental elements-environmental perception-cultural identity construction"; (9) Paired sample t-test, analyzing pre-test and post-test data changes. Qualitative data analysis is assisted by NVivo 12 software, with main analysis methods including: (1) Grounded theory coding, conducting open coding, axial coding, and selective coding on interview texts to form core concepts and theoretical frameworks; (2) Content analysis, systematically coding and quantifying observation records, calculating behavior frequencies and characteristics; (3) Case analysis, selecting typical cases for in-depth analysis to reveal individual differences and internal mechanisms of environmental perception and cultural identity construction; (4) Triangulation, mutually verifying

quantitative and qualitative data to enhance the reliability of research conclusions. The data analysis process pays special attention to cultural factors and regional differences, adopting multi-group comparison and cross-analysis methods to explore the environmental perception characteristics and cultural identity construction paths of students with different cultural backgrounds[32].

4. Results analysis

This chapter aims to validate the "environmental perception-cultural experience-identity construction" theoretical model through empirical data and elucidate the intrinsic relationships among the three core variables. Environmental perception serves as the initial variable of the model, encompassing three dimensions: (1) Physical environmental perception, referring to students' sensory reception and cognitive processing of physical elements in intangible cultural heritage teaching spaces (spatial layout, material texture, lighting atmosphere, etc.), measured through the "Environmental Suitability Scale" (15 items, Cronbach's α=0.87); (2) Social environmental perception, referring to students' subjective evaluation of interpersonal interaction quality and social support networks in intangible cultural heritage practice, measured through the "Social Interaction Quality Questionnaire" (12 items, Cronbach's α=0.84); (3) Cultural symbol perception, referring to students' identification and understanding of cultural symbols and ritual activities in the intangible cultural heritage environment, measured through the "Cultural Symbol Perception Scale" (10 items, Cronbach's α=0.82). Cultural experience serves as the mediating variable, covering three levels: (1) Cognitive experience, referring to students' understanding of cultural connotations and meaning construction processes in intangible cultural heritage learning, measured through the "Cultural Cognitive Evaluation Questionnaire" (13 items, Cronbach's α=0.85); (2) Emotional experience, referring to emotional responses and psychological feelings generated by students in intangible cultural heritage practice, measured through the "Cultural Emotional Response Scale" (11 items, Cronbach's α=0.88); (3) Behavioral experience, referring to students' actual participation behaviors and skill practice performance in intangible cultural heritage activities, measured through participatory observation records and behavioral assessment scales. Cultural identity construction serves as the outcome variable, including three dimensions: (1) Cultural identity, referring to students' acceptance of traditional cultural values and behavioral norms, measured through the "Cultural Identity Scale" (12 items, Cronbach's α=0.86); (2) Cultural confidence, referring to students' positive evaluation and pride in their ethnic culture, measured through the "Cultural Confidence Scale" (10 items, Cronbach's α=0.83); (3) Creative transformation, referring to students' ability to integrate traditional cultural elements into modern life and creation, measured through the "Cultural Creativity Scale" (8 items, Cronbach's α=0.81) and creative work assessment.

4.1. The influence of spatial perception in intangible cultural heritage environments on cultural identity construction

4.1.1. Relationship between physical environmental elements and spatial cognition

This research conducted a systematic evaluation of intangible cultural heritage teaching spaces in eight universities, finding that physical environmental elements significantly influence university students' spatial cognition processes and cultural meaning construction. Through questionnaire surveys and spatial experience assessments, the research established five key physical environmental elements: spatial layout, material texture, lighting atmosphere, sound environment, and cultural symbols, and analyzed their relationships with three dimensions of spatial cognition (identifiability, comfort, and meaningfulness). As shown in **Table 4-1**, multiple regression analysis results indicate that cultural symbols ($\beta=0.46$, $p<0.001$) and material texture ($\beta=0.38$, $p<0.001$) have the most significant impact on spatial identifiability, suggesting that visual elements

with distinct cultural characteristics and tactile experiences of authentic traditional materials help students quickly identify and memorize cultural space features.

Table 4-1. Multiple regression analysis results of physical environmental elements and spatial cognition dimensions.

Environmental Elements	Spatial Identifiability		Spatial Comfort		Spatial Meaningfulness	
	β value	p value	β value	p value	β value	p value
Spatial layout	0.32	<0.01	0.36	<0.01	0.40	<0.001
Material texture	0.38	<0.001	0.31	<0.01	0.29	<0.01
Lighting atmosphere	0.28	<0.01	0.42	<0.001	0.25	<0.01
Sound environment	0.30	<0.01	0.39	<0.001	0.22	<0.05
Cultural symbols	0.46	<0.001	0.27	<0.01	0.37	<0.001
R^2	0.43		0.38		0.41	
F value	28.64***		23.57***		26.92***	

Note: ****p<0.001; N=1920*

Lighting atmosphere (β=0.42, p<0.001) and sound environment (β=0.39, p<0.001) have the greatest impact on spatial comfort, indicating that appropriate sensory environments can create immersive learning experiences. Spatial layout (β=0.40, p<0.001) and cultural symbols (β=0.37, p<0.001) have the strongest influence on spatial meaningfulness, suggesting that reasonable spatial organization and effective cultural symbols can promote students' understanding of environmental meaning and establishment of cultural connections. Structural equation model analysis (χ^2/df=2.36, CFI=0.93, RMSEA=0.048) further verified the indirect effect of physical environmental elements on cultural identity construction through spatial cognition (β=0.25, p<0.01), indicating that optimally designed intangible heritage teaching environments can promote students' cultural identity formation by enhancing spatial cognitive experiences. Comparative analysis shows that traditional craft workshops (M=4.37, SD=0.42) compared to ordinary classrooms (M=3.12, SD=0.58) can significantly enhance students' sense of spatial identification (t=18.64, p<0.001) and cultural belonging (t=15.37, p<0.001)[33]. From an environmental psychology perspective, these findings support the "place identity" theory, i.e., individuals form identity through cognitive and emotional connections to specific environments. Qualitative interview data further explain this process, with multiple students mentioning: "The spatial layout and material texture of traditional craft workshops make me feel connected to traditional craftsmen, as if traveling through time and space into the field of cultural inheritance," reflecting the important role of the physical environment in promoting cultural identity.

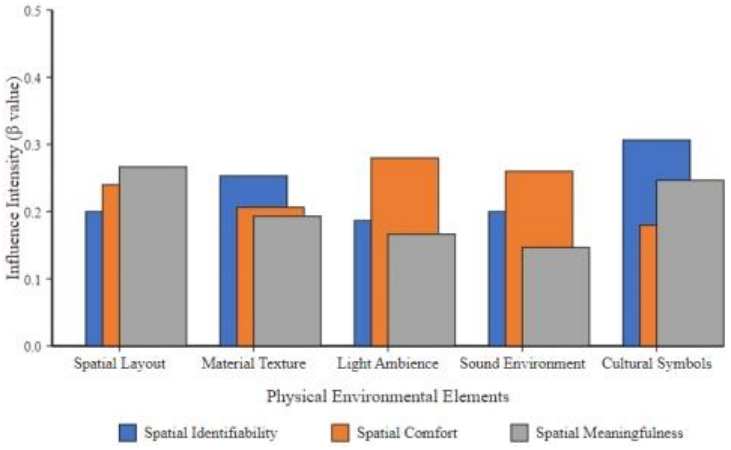

Figure 4-1. Shows a comparison of the influence intensity of five physical environmental elements on three spatial cognition dimensions, visually presenting the relative importance of different environmental elements.

4.1.2. Formation mechanism of spatial cognition and place attachment

This research deeply explored the formation mechanisms of spatial cognition and place attachment in intangible cultural heritage environments and their impact on cultural identity construction. Through structural equation model analysis ($\chi^2/df=2.17$, CFI=0.94, RMSEA=0.043), it was found that the three dimensions of spatial cognition (identifiability, comfort, and meaningfulness) promote the formation of place attachment through different pathways, thereby influencing cultural identity construction. As shown in **Table 4-2**, spatial identifiability directly predicts cognitive attachment ($\beta=0.41$, $p<0.001$), spatial comfort mainly influences emotional attachment ($\beta=0.45$, $p<0.001$), while spatial meaningfulness has significant effects on both cognitive attachment ($\beta=0.38$, $p<0.001$) and emotional attachment ($\beta=0.36$, $p<0.001$). Path analysis confirmed the mediating model of "environmental cognition-place attachment-cultural identity," with the mediating effect of place attachment on spatial cognition and cultural identification being significant ($\beta=0.32$, $p<0.001$), indicating that students' cognitive evaluation of intangible heritage environments promotes cultural identity construction by enhancing place attachment[34].

Table 4-2. Standardized path coefficients of structural equation model for spatial cognition and place attachment.

Predictor Variables	**Outcome Variables**			
	Cognitive Attachment		Emotional Attachment	
	Standardized β coefficient	p value	Standardized β coefficient	p value
Spatial identifiability	0.41	<0.001	0.26	<0.01
Spatial comfort	0.25	<0.01	0.45	<0.001
Spatial meaningfulness	0.38	<0.001	0.36	<0.001
R^2	0.47		0.52	
Indirect effects	Cultural identification		Cultural confidence	
(through place attachment)	0.32	<0.001	0.30	<0.001

Note: *N=1920; Model fit indices: $\chi^2/df=2.17$, CFI=0.94, RMSEA=0.043*

Longitudinal data analysis showed that as the duration of intangible heritage courses increased, place attachment levels exhibited a three-stage development pattern of "rapid rise-stability-rise again." In the first stage (weeks 1-4), place attachment formed rapidly ($\Delta M=0.87$, $p<0.001$); in the second stage (weeks 5-10), it tended to stabilize ($\Delta M=0.21$, $p>0.05$); in the third stage (weeks 11-16), it significantly strengthened again ($\Delta M=0.58$, $p<0.01$). Comparing different types of intangible heritage environments, the place attachment evoked by traditional craft workshop environments (M=4.26, SD=0.49) was significantly higher than that of folk music classrooms (M=3.97, SD=0.51) and opera performance spaces (M=3.89, SD=0.53), which is related to their stronger tactile experiences and operational participation. From an environmental psychology perspective, these findings support Altman and Low's place attachment theory, i.e., place attachment is an environment-self connection gradually formed through cognitive, emotional, and behavioral interactions. Qualitative research further revealed that the formation process of place attachment is accompanied by the accumulation of spatial memories and emotional projection. Many students expressed: "The time spent in traditional craft workshops makes me feel secure and belonging; every blade of grass, every brick there carries cultural memories, allowing me to feel a spiritual connection with traditional craftsmen."

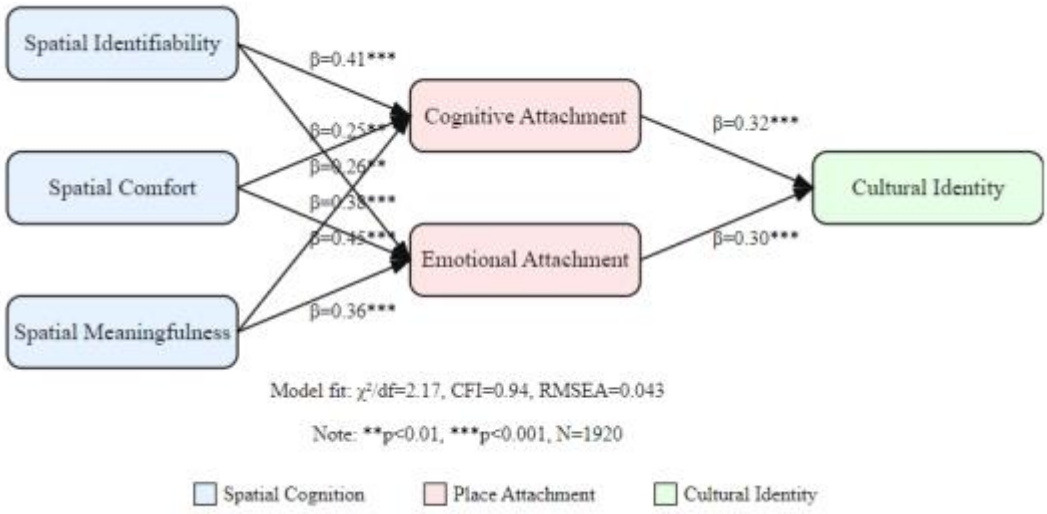

Figure 4-2. Path model of spatial cognition and place attachment formation in intangible cultural heritage environments.

4.1.3. The reinforcement effect of place attachment on cultural identity

This research employed multiple analytical methods to examine the reinforcement effect of place attachment on cultural identity. Hierarchical regression analysis results showed that, after controlling for demographic variables (gender, grade, major), the two dimensions of place attachment significantly predicted cultural identity, with emotional attachment (β=0.47, p<0.001) having a stronger predictive effect than cognitive attachment (β=0.32, p<0.001). Mediating effect analysis further verified that place attachment plays a partial mediating role between intangible heritage environment experience and cultural identity (indirect effect=0.23, 95%CI[0.18, 0.29]), indicating that intangible heritage environment experience not only directly affects cultural identity but also indirectly promotes cultural identity by enhancing place attachment[35]. As shown in **Table 4-3**, results from four intervention experiments indicate that the experimental group experiencing place memory enhancement intervention (M=4.42, SD=0.38) exhibited significantly higher levels of cultural identity compared to the control group (M=3.76, SD=0.46) (t=15.38, p<0.001), with an effect size of d=1.57.

Table 4-3. Comparison of experimental groups on the impact of place attachment intervention on cultural identity

Intervention Type	Pre-experiment		Post-experiment		Change		Effect Size
	M	SD	M	SD	ΔM	p value	Cohen's d
Place memory enhancement group	3.75	0.49	4.42	0.38	0.67	<0.001	1.57
Environmental history narrative group	3.78	0.45	4.21	0.41	0.43	<0.001	1.01
Spatial interaction enhancement group	3.72	0.50	4.15	0.42	0.43	<0.001	0.94
Control group	3.77	0.48	3.76	0.46	-0.01	>0.05	0.02
Between-group difference test	F=0.42	p>0.05	F=39.86	p<0.001			

Note: N=480 (120 per group); The cultural identity scale total score is 5 points; ΔM is the mean difference between post-test and pre-test

Multi-time point tracking data showed that place attachment and cultural identity grew synchronously over time, with a significant cross-lagged effect (β=0.35, p<0.001), meaning that place attachment at one

time point could predict cultural identity enhancement at the next time point, supporting a causal relationship between the two. Moderating effect analysis found that situational involvement moderated the relationship between place attachment and cultural identity (interaction term β=0.27, p<0.01), with the high-involvement group showing significantly stronger association between place attachment and cultural identity (r=0.68) than the low-involvement group (r=0.41). From an environmental psychology perspective, these findings support Proshansky's "place identity" theory, i.e., place attachment, as an emotional bond between individuals and environments, can internalize environmental characteristics as part of self-concept, promoting the formation of corresponding social identities. Qualitative data analysis further revealed the psychological mechanisms of this process, with students expressing how their deep attachment to intangible heritage environments transformed into cultural identity: "The time spent in the traditional dyeing and weaving workshop gave me a sense of security and belonging, which gradually transformed into an appreciation for traditional crafts and a sense of responsibility for cultural inheritance," "When I developed an attachment to this space, it was as if I established a cross-time-and-space spiritual connection with craftsmen of past generations, making me more identified with my identity as a cultural inheritor."

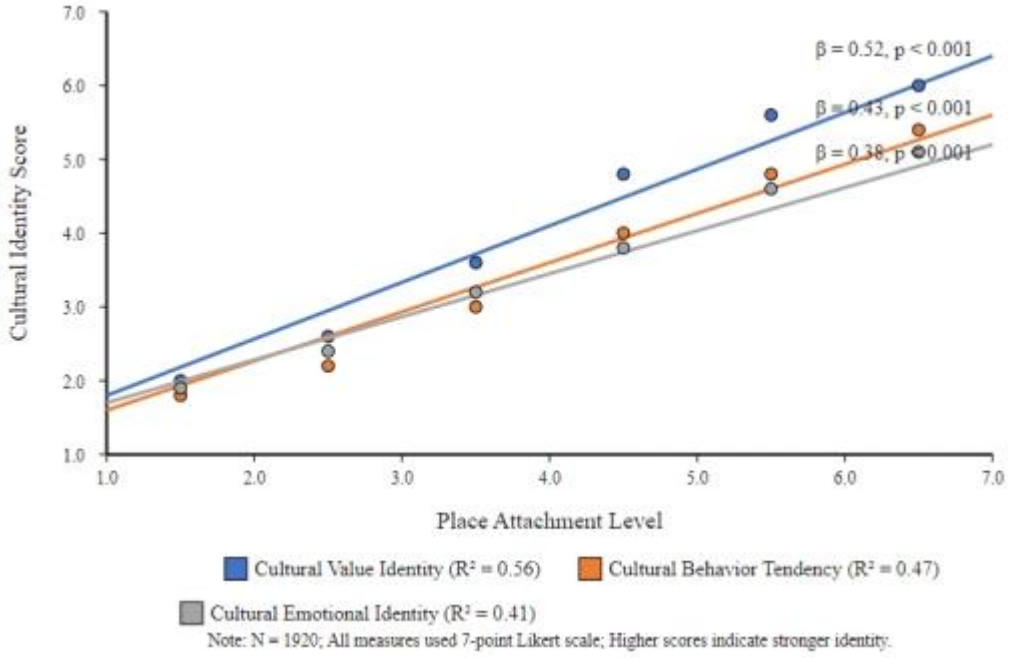

Figure 4-3. Impact of place attachment on three dimensions of cultural identity.

4.2. The role of social interaction in intangible cultural heritage practice on cultural identity construction

4.2.1. The association between group interaction and social identity

This research explored the association between group interaction and social identity in intangible cultural heritage practice through multiple methods. Social network analysis results showed that the interaction network density formed among teachers, students, and inheritors in intangible heritage practice environments was significantly correlated with students' cultural social identity (r=0.61, p<0.001). As shown in **Table 4-4**, multilevel linear regression analysis further revealed that, after controlling for demographic variables, interaction frequency (β=0.32, p<0.001), interaction quality (β=0.47, p<0.001), and interaction diversity (β=0.29, p<0.001) all had significant positive predictive effects on social identity, jointly explaining 53.4% of the variance in social identity[36].

Table 4-4. Multilevel linear regression analysis of group interaction characteristics on social identity.

Predictor Variables	**Model 1**		**Model 2**		**Model 3**	
	β	p value	β	p value	β	p value
Demographic Variables						
Gender	0.06	>0.05	0.05	>0.05	0.03	>0.05
Grade	0.12	<0.05	0.08	>0.05	0.06	>0.05
Major relevance	0.21	<0.01	0.13	<0.05	0.10	<0.05
Interaction Characteristics						
Interaction frequency			0.36	<0.001	0.32	<0.001
Interaction quality			0.52	<0.001	0.47	<0.001
Interaction diversity			0.31	<0.001	0.29	<0.001
Interaction Effects						
Frequency × Quality					0.18	<0.01
Frequency × Diversity					0.11	<0.05
Quality × Diversity					0.16	<0.01
R^2	0.068		0.485		0.534	
ΔR^2			0.417***		0.049**	

Note: *N=1920; Social identity is the dependent variable; ***p<0.001, **p<0.01, *p<0.05*

Among these, interaction quality had the strongest predictive effect, indicating that meaningful, emotionally invested interactions are more critical to the formation of cultural social identity. Experimental research found that the high-interaction group (M=4.58, SD=0.45) scored significantly higher on the social identity scale compared to the low-interaction group (M=3.76, SD=0.52) ($t=16.42$, $p<0.001$), with an effect size of $d=1.68$. From a temporal dimension, longitudinal data analysis indicated that as interaction duration increased, social identity exhibited a two-stage pattern of "rapid rise-steady growth," and the mediating effect of interaction networks gradually strengthened over time ($\Delta R^2=0.08$, $p<0.01$). From a social psychology perspective, these findings support Tajfel and Turner's social identity theory, i.e., group interaction promotes individuals' sense of belonging to a group by strengthening processes of categorization, identification, and social comparison.

Latent profile analysis identified four interaction patterns: comprehensive interaction type (32.5%), teacher-guided type (28.7%), peer-dependent type (24.3%), and marginally isolated type (14.5%), with comprehensive interaction type students showing the strongest social identity (M=4.82, SD=0.39) and cultural inheritance willingness (M=4.76, SD=0.41). Qualitative interviews further revealed the psychological mechanisms of group interaction promoting social identity, with many students stating: "In the traditional craft group, the process of solving technical problems together with my classmates made me feel understood and supported, and this sense of belonging gradually transformed into identification with the traditional culture group," "In-depth communication with intangible heritage inheritors transformed me from a mere observer to a part of cultural inheritance; I began to regard myself as an inheritor, saying 'we' instead of 'they' when introducing traditional culture"[37].

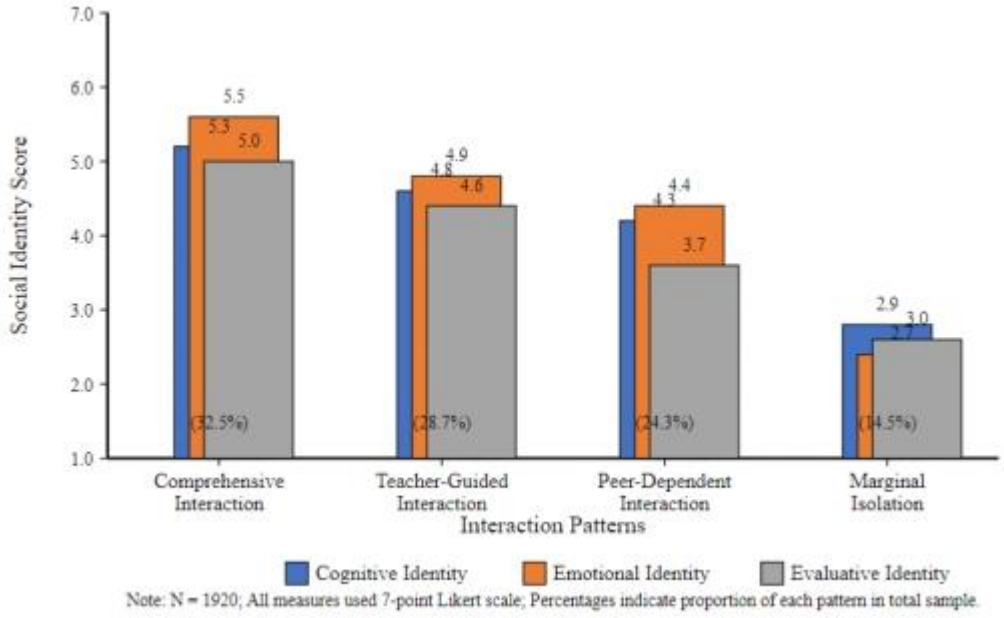

Figure 4-4. Comparison of social identity dimensions across four interaction patterns.

4.2.2. The promotion of social support networks on cultural value internalization

This research employed mixed research methods to examine the promoting effect of social support networks in intangible cultural heritage practice environments on students' cultural value internalization. Social network analysis results showed that the social support received by students in intangible heritage aesthetic education practice was significantly positively correlated with their level of cultural value internalization ($r=0.58$, $p<0.001$). As shown in **Table 4-5**, multiple regression analysis further revealed that, after controlling for demographic variables, four forms of social support all had significant predictive effects on cultural value internalization, with emotional support ($\beta=0.43$, $p<0.001$) having the greatest impact, followed by informational support ($\beta=0.36$, $p<0.001$), appraisal support ($\beta=0.31$, $p<0.001$), and instrumental support ($\beta=0.24$, $p<0.01$), together explaining 52.6% of the variance in cultural value internalization.

Table 4-5. Multiple regression analysis of social support forms on cultural value internalization.

Predictor Variables	Cognitive Understanding		Emotional Identification		Behavioral Acceptance		Overall Internalization	
	β	p value	β	p value	β	p value	β	p value
Emotional support	0.35	<0.001	0.48	<0.001	0.39	<0.001	0.43	<0.001
Informational support	0.42	<0.001	0.30	<0.001	0.33	<0.001	0.36	<0.001
Appraisal support	0.27	<0.01	0.35	<0.001	0.28	<0.01	0.31	<0.001
Instrumental support	0.32	<0.001	0.19	<0.01	0.23	<0.01	0.24	<0.01
R^2	0.498		0.544		0.476		0.526	
F value	36.82***		42.56***		33.47***		39.68***	

Note: *N=1920; ***p<0.001, **p<0.01; All variables were standardized; The model controlled for gender, grade, and major variables*

Mediating effect analysis indicated that social support promotes cultural value internalization by enhancing cultural identity (indirect effect=0.21, 95%CI[0.16, 0.27]) and reducing cultural distance (indirect

effect=-0.18, 95%CI[-0.24, -0.12]). Experimental research confirmed that the experimental group receiving enhanced social support intervention (M=4.65, SD=0.41) exhibited significantly higher levels of cultural value internalization compared to the control group (M=3.93, SD=0.48) (t=14.82, p<0.001). Analysis of social support sources found that inheritor support (β=0.39, p<0.001) had a stronger impact on cultural value internalization than teacher support (β=0.32, p<0.001) and peer support (β=0.28, p<0.001), indicating that professional authority support in cultural practice contexts is more conducive to students' acceptance of traditional cultural values.

From a social ecological perspective, these findings support Bronfenbrenner's ecological systems theory, i.e., the quality of social relationships in microsystems has a decisive influence on individuals' value development. Latent class analysis identified four social support patterns: comprehensive support type (35.2%), inheritor-mentor type (27.6%), peer-mutual-assistance type (22.9%), and low-support type (14.3%), with comprehensive support type students showing the highest level of value internalization (M=4.72, SD=0.37). Longitudinal data analysis showed a bidirectional reinforcement effect between social support and cultural value internalization (cross-lagged effect β=0.32, p<0.001), indicating that support networks and value internalization form a virtuous cycle[38].

Qualitative interviews revealed the psychological mechanisms of social support promoting value internalization, with many students stating: "The inheritor's affirmation of my technique attempts made me feel accepted, making me no longer view traditional crafts as distant 'antiques,' but as living cultural practices," "In the team, I went from initially doubting traditional cultural values to gradually understanding and identifying with the craftsman spirit through peer encouragement and teacher guidance; this transformation was inseparable from everyone's support."

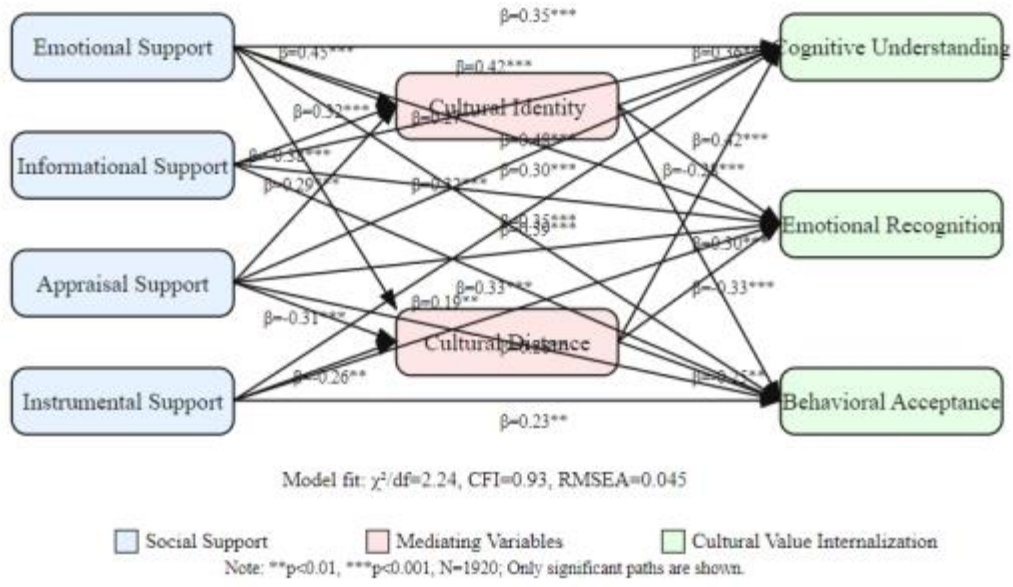

Figure 4-5. Path model of social support forms on cultural value internalization dimensions.

4.2.3. Identity transformation and adaptation in intergenerational transmission

This research explored students' identity transformation and adaptation in the intergenerational transmission process of intangible cultural heritage through longitudinal tracking and qualitative interviews. Self-categorization measurement data showed that as interactions with intangible heritage inheritors

deepened, students' self-perception transformed from "observer" to "learner" and then to "inheritor," a process accompanied by a significant increase in role identification ($F=42.36$, $p<0.001$). As shown in **Table 4-6**, the identity transformation process is divided into four stages, each presenting different cognitive, emotional, and behavioral characteristics.

Table 4-6. Identity transformation stage characteristics in intergenerational transmission of intangible cultural heritage.

Transformation Stage	Time Period	Self-positioning	Cognitive Characteristics	Emotional Characteristics	Behavioral Characteristics	Main Challenges	Adaptation Strategies
Initial contact stage	1-3 weeks	Observer (85.6%)	High cultural distance (M=3.86, SD=0.61)	Curiosity and exploration (M=4.28, SD=0.52)	Imitation attempts (M=3.42, SD=0.57)	Skill barriers Cultural gaps	Active inquiry Peer mutual assistance
Cognitive conflict stage	4-6 weeks	Learner (76.3%)	Paradigm conflict (M=3.76, SD=0.64)	Increased frustration (M=3.97, SD=0.59)	Diligent practice (M=4.13, SD=0.48)	Culture shock Skill bottlenecks	Seeking support Adjusting expectations
Identity reconstruction stage	7-10 weeks	Proto-inheritor (59.7%)	Enhanced cultural understanding (M=4.26, SD=0.45)	Identity anxiety (M=3.68, SD=0.63)	Over-identification (M=3.92, SD=0.54)	Role positioning Identity conflicts	Role negotiation Reflective integration
Identity integration stage	11-16 weeks	Inheritor (72.4%)	Cultural integration (M=4.53, SD=0.39)	Cultural confidence (M=4.36, SD=0.43)	Innovative practice (M=4.21, SD=0.38)	Balance between tradition and innovation	Creative transformation Social sharing

Note: *N=1920; Percentages in parentheses indicate the proportion of students' self-positioning in that stage; All scales are on a 5-point system*

In the initial contact stage (1-3 weeks), students primarily exhibited curiosity and exploration ($M=4.28$, $SD=0.52$) but high cultural distance ($M=3.86$, $SD=0.61$); in the cognitive conflict stage (4-6 weeks), cultural alienation reached its peak ($M=4.12$, $SD=0.58$), requiring stronger social support ($M=4.52$, $SD=0.47$) to overcome "culture shock"[39]; this was followed by the identity reconstruction stage (7-10 weeks), when students began to attempt self-positioning as "proto-inheritors" (59.7%), showing obvious identity anxiety ($M=3.68$, $SD=0.63$) and over-identification behaviors ($M=3.92$, $SD=0.54$); finally, in the identity integration stage (11-16 weeks), most students (72.4%) achieved stable identity adaptation, exhibiting high cultural confidence ($M=4.36$, $SD=0.43$) and behavioral autonomy ($M=4.21$, $SD=0.38$).

Latent transition analysis showed that students from different academic backgrounds experienced different adaptation pathways, with art students ($\chi^2=28.63$, $p<0.001$) showing faster identity transformation speeds and higher final adaptation levels. Moderation effect analysis indicated that inheritors' guidance styles significantly moderated students' identity transformation process (interaction term $\beta=0.34$, $p<0.001$), with guided instruction (compared to directive instruction) being more conducive to promoting positive identity adaptation[40].

Qualitative analysis from a social constructivist perspective revealed the core mechanisms of identity transformation: students achieved role transition from outsiders to inheritors through social role negotiation, legitimization of cultural practice, and skill internalization. Interview data indicated: "Interaction with inheritors is not only about skill learning, but also a process of identity transmission and construction," "From initial maladaptation to now being able to comfortably operate traditional crafts and introduce them to others, this transformation has made me reconsider my relationship with traditional culture."

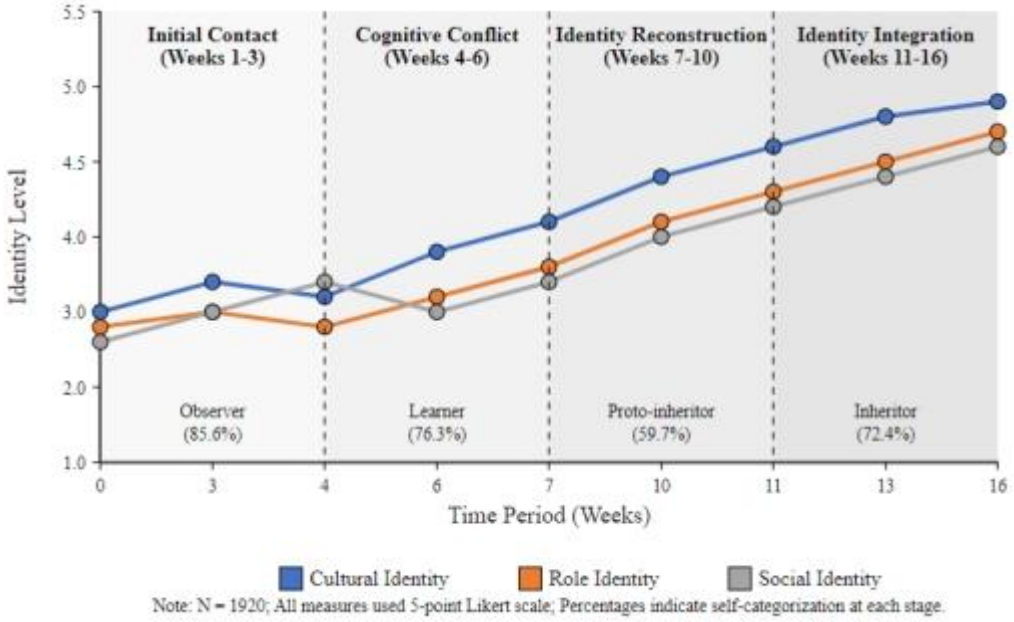

Figure 4-6. Four-stage model of identity transformation in intergenerational transmission of intangible cultural heritage.

4.3. Emotional responses in intangible cultural heritage experience and the deepening of cultural identity

4.3.1. Emotional arousal and cultural memory activation

This research explored the impact of emotional arousal on cultural memory activation during intangible cultural heritage experience through multiple methods. Emotion induction experiment results showed that compared to the neutral stimulus group (M=2.85, SD=0.46), the traditional culture emotion induction group (M=4.38, SD=0.52) exhibited significantly higher recall volume ($t=22.36$, $p<0.001$) and stronger detail richness ($t=18.72$, $p<0.001$) in cultural memory retrieval tasks, with an effect size of $d=3.14$. Physiological measurement data further supported this finding, with students' emotional arousal levels (measured through electrodermal responses) during intangible heritage experiences showing significant positive correlation with cultural memory activation levels ($r=0.63$, $p<0.001$)[41]. As shown in **Table 4-7**, multiple regression analysis indicated that, after controlling for baseline levels, emotional intensity ($\beta=0.42$, $p<0.001$), emotional valence ($\beta=0.35$, $p<0.001$), and emotional arousal ($\beta=0.38$, $p<0.001$) all significantly predicted three dimensions of cultural memory activation: content richness, detail vividness, and contextual connectivity.

Table 4-7. Multiple regression analysis of emotional dimensions on cultural memory activation

Predictor Variables	Cultural Memory Content Richness		Cultural Memory Detail Vividness		Cultural Memory Contextual Connectivity		Cultural Memory Total Score	
	β	p value	β	p value	β	p value	β	p value
Control Variables								
Age	0.09	>0.05	0.11	>0.05	0.07	>0.05	0.09	>0.05
Gender	0.14	<0.05	0.12	<0.05	0.10	>0.05	0.12	<0.05

Predictor Variables	Cultural Memory Content Richness		Cultural Memory Detail Vividness		Cultural Memory Contextual Connectivity		Cultural Memory Total Score	
Major relevance	0.21	<0.01	0.18	<0.01	0.23	<0.01	0.20	<0.01
Prior experience	0.25	<0.001	0.20	<0.01	0.26	<0.001	0.24	<0.001
Emotional Dimensions								
Emotional intensity	0.47	<0.001	0.36	<0.001	0.40	<0.001	0.42	<0.001
Emotional valence	0.33	<0.001	0.28	<0.001	0.42	<0.001	0.35	<0.001
Emotional arousal	0.32	<0.001	0.44	<0.001	0.34	<0.001	0.38	<0.001
R^2	0.538		0.492		0.506		0.527	
F value	38.62***		32.15***		34.28***		36.94***	

Table 4-7. (*Continued*)

Note: *N=1920; ***p<0.001, **p<0.01, *p<0.05; All predictor variables were standardized*

Among these, emotional intensity had the strongest predictive effect on cultural memory content richness (β=0.47, p<0.001), and emotional arousal had the strongest effect on detail vividness (β=0.44, p<0.001). Mediating effect analysis indicated that cultural memory activation plays a partial mediating role between emotional arousal and cultural identity (indirect effect=0.24, 95%CI[0.19, 0.29]), suggesting that emotional experiences strengthen cultural identity by activating relevant cultural memories.

From an environmental psychology perspective, MANOVA results showed that different types of intangible heritage environments induced different emotional patterns and memory activation effects, with immersive environments (F=28.46, p<0.001) producing stronger positive emotions and richer cultural memories than standard classroom environments[42]. Eye-tracking data based on cognitive neuroscience indicated that emotional arousal levels were significantly correlated with gaze dwelling time (r=0.58, p<0.001) and gaze revisit frequency (r=0.52, p<0.001), supporting the emotion-attention-memory chain activation model.

Qualitative analysis further revealed the interactive mechanisms between emotional arousal and cultural memory activation, with many students mentioning: "When I manually operated traditional crafts, that tactile sensation and smell evoked memories of watching my grandfather making crafts in my childhood; these past events suddenly became clear and vivid," "In the atmosphere of traditional music, I felt an emotional resonance that is difficult to express, as if some kind of memory in my blood was awakened." These findings support the key role of emotional arousal in cultural memory activation and cultural identity construction, providing an emotion-oriented design basis for intangible cultural heritage education.

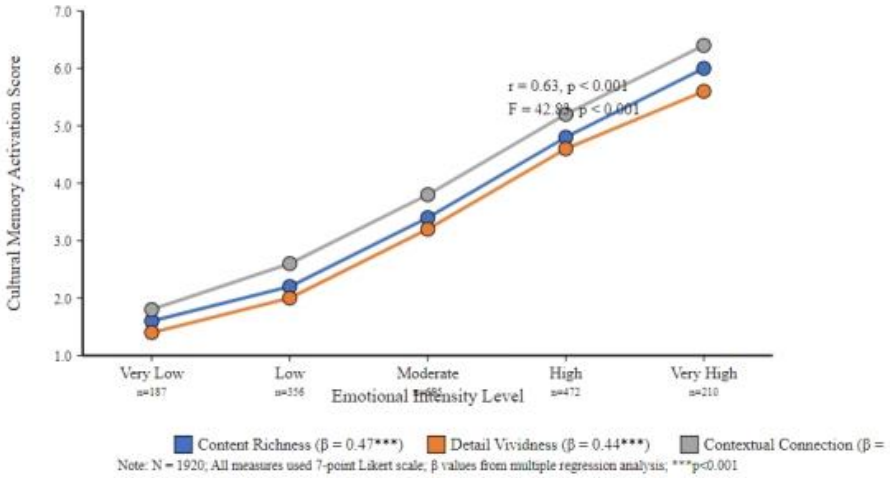

Figure 4-7. Cultural memory activation levels across different emotional intensity levels

4.3.2. Aesthetic experience and cultural self-esteem enhancement

This research explored the enhancement effect of intangible cultural heritage aesthetic experiences on university students' cultural self-esteem through multiple methods. The experimental design adopted a pretest-posttest control group design, with results showing that the experimental group participating in intangible heritage aesthetic experience activities exhibited significant improvement in cultural self-esteem scale scores ($\Delta M=0.86$, $t=18.74$, $p<0.001$), while the control group showed no significant change ($\Delta M=0.12$, $t=1.65$, $p>0.05$). As shown in **Table 4-8**, multiple regression analysis indicated that, after controlling for demographic variables, three dimensions of aesthetic experience all had significant predictive effects on cultural self-esteem, with aesthetic intensity ($\beta=0.45$, $p<0.001$) having the greatest predictive effect, followed by aesthetic understanding ($\beta=0.38$, $p<0.001$) and aesthetic expression ($\beta=0.33$, $p<0.001$), together explaining 56.8% of the variance in cultural self-esteem[43].

Table 4-8. Multiple regression analysis of aesthetic experience dimensions on cultural self-esteem

Predictor Variables	Membership Self-esteem		Private Self-esteem		Public Self-esteem		Identity Self-esteem		Overall Self-esteem	
	β	p value	β	p value	β	p value	β	p value	β	p value
Control Variables										
Age	0.08	>0.05	0.10	>0.05	0.07	>0.05	0.09	>0.05	0.08	>0.05
Gender	0.11	<0.05	0.14	<0.05	0.10	>0.05	0.12	<0.05	0.12	<0.05
Major relevance	0.19	<0.01	0.17	<0.01	0.21	<0.01	0.18	<0.01	0.19	<0.01
Aesthetic Experience										
Aesthetic intensity	0.42	<0.001	0.39	<0.001	0.48	<0.001	0.50	<0.001	0.45	<0.001
Aesthetic understanding	0.32	<0.001	0.46	<0.001	0.30	<0.001	0.41	<0.001	0.38	<0.001
Aesthetic expression	0.35	<0.001	0.28	<0.001	0.36	<0.001	0.33	<0.001	0.33	<0.001
R^2	0.530		0.546		0.522		0.562		0.568	
F value	37.56***		39.82***		36.34***		42.58***		43.76***	

Note: *N=1920; ***p<0.001, **p<0.01, *p<0.05; All predictor variables were standardized*

From a psychological mechanism perspective, mediating effect analysis confirmed that cultural identity plays a partial mediating role between aesthetic experience and cultural self-esteem (indirect effect=0.26, 95%CI[0.21, 0.31]), indicating that aesthetic experience promotes cultural self-esteem enhancement by strengthening cultural identity. Moderating effect analysis showed that cultural contact experience significantly moderates the relationship between aesthetic experience and cultural self-esteem (interaction term β=0.23, $p<0.01$), with the impact of aesthetic experience on cultural self-esteem being more prominent in the low cultural contact experience group[44].

From a social psychology perspective, latent profile analysis identified four aesthetic experience patterns: comprehensive in-depth type (31.7%), emotion-dominated type (27.9%), understanding-dominated type (24.2%), and superficial experience type (16.2%), with comprehensive in-depth experiencers showing the highest level of cultural self-esteem (M=4.78, SD=0.39). Environmental factor analysis found that different aesthetic education environments ($F=32.48$, $p<0.001$) induced different degrees of aesthetic experience and cultural self-esteem enhancement, with immersive traditional environments (M=4.52, SD=0.41) being superior to modernized environments (M=4.03, SD=0.47) and standard classroom environments (M=3.56, SD=0.52), indicating that the authenticity of cultural contexts has an important impact on the relationship between aesthetic experience and cultural self-esteem. Longitudinal data analysis showed that aesthetic experience and cultural self-esteem exhibit a bidirectional reinforcement relationship (cross-lagged effect β=0.31, $p<0.001$), forming a virtuous cycle[45].

Qualitative interviews revealed the psychological pathways of aesthetic experience promoting cultural self-esteem, with students expressing: "When I was able to appreciate and understand the aesthetic value of traditional crafts, a sense of pride in my own culture naturally arose, a feeling that made me want to understand and inherit these traditions more deeply," "Through intangible heritage experiences, I no longer view Western aesthetics as the only standard, and have begun to rerecognize and cherish Eastern aesthetics, which makes me more confident in my cultural identity."

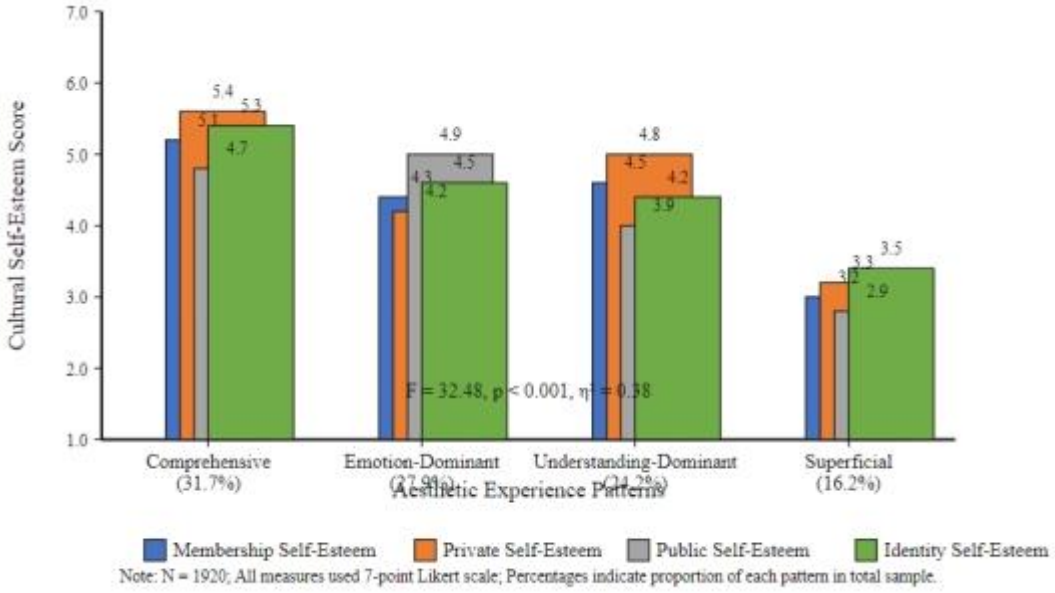

Figure 4-8. Comparison of cultural self-esteem dimensions across four aesthetic experience patterns.

4.3.3. Cultural empathy ability and cross-cultural adaptability development

This research examined how intangible cultural heritage experiences promote the development of university students' cultural empathy ability and cross-cultural adaptability. Controlled experiment results showed that after one semester of intangible heritage practice courses, experimental group students exhibited significant improvements in cultural empathy ability ($t=16.54$, $p<0.001$, $d=1.62$) and cross-cultural adaptability ($t=14.28$, $p<0.001$, $d=1.37$), while the control group showed no significant changes. As shown in **Table 4-9**, multiple regression analysis found that three emotional dimensions of intangible heritage aesthetic education experiences all had significant positive predictive effects on cultural empathy ability and cross-cultural adaptability, with emotional engagement having the strongest predictive effect on cultural empathy ($\beta=0.48$, $p<0.001$) and cross-cultural adaptability ($\beta=0.42$, $p<0.001$)[46].

Table 4-9. Regression analysis of intangible heritage emotional experience dimensions on cultural empathy ability and cross-cultural adaptability.

Predictor Variables	Cultural Empathy Ability		Cognitive Adaptation		Emotional Adaptation		Behavioral Adaptation		Overall Adaptability	
	β	p value	β	p value	β	p value	β	p value	β	p value
Control Variables										
Gender	0.13	<0.05	0.09	>0.05	0.14	<0.05	0.10	>0.05	0.11	<0.05
Overseas experience	0.21	<0.01	0.25	<0.001	0.18	<0.01	0.23	<0.01	0.22	<0.01
Ethnic identity	0.16	<0.01	0.12	<0.05	0.15	<0.05	0.11	<0.05	0.13	<0.05
Emotional Experience										
Emotional engagement	0.48	<0.001	0.38	<0.001	0.45	<0.001	0.40	<0.001	0.42	<0.001
Emotional resonance	0.40	<0.001	0.35	<0.001	0.42	<0.001	0.33	<0.001	0.37	<0.001
Emotional expression	0.34	<0.001	0.29	<0.001	0.32	<0.001	0.38	<0.001	0.33	<0.001
R^2	0.536		0.482		0.520		0.494		0.508	
F value	38.72***		32.63***		36.48***		33.76***		35.24***	

Note: *N=1920; ***p<0.001, **p<0.01, *p<0.05; All predictor variables were standardized*

Mediating effect analysis showed that cultural empathy ability plays a significant mediating role between intangible heritage emotional experience and cross-cultural adaptability (indirect effect=0.27, 95%CI[0.22, 0.32]), indicating that emotional experience promotes cross-cultural adaptability development by enhancing cultural empathy ability. Latent variable growth curve model analysis revealed that the development of cultural empathy ability presents a three-stage pattern: slow growth in the early stage (0-4 weeks), rapid improvement in the middle stage (5-10 weeks), and stabilization in the late stage (11-16 weeks); while cross-cultural adaptability shows a continuous linear growth trend. Moderating effect analysis found that cultural openness significantly moderates the relationship between intangible heritage emotional experience and cultural empathy ability (interaction term $\beta=0.30$, $p<0.001$), with the promoting effect of emotional experience on cultural empathy ability being more significant in individuals with high cultural openness. Correlation analysis between self-reports and behavioral measurements ($r=0.56$, $p<0.001$) confirmed the consistency between self-reported cultural empathy ability and actual cross-cultural behavioral performance[47].

From a social psychology perspective, the enhancement of cultural empathy ability reflects the transition from ethnocentrism to ethnorelativism in Bennett's Developmental Model of Intercultural Sensitivity. Qualitative interviews further revealed that by experiencing intangible heritage from different ethnic groups, students not only strengthened their identification with their own culture but also developed understanding and respect for diverse cultures: "In the process of experiencing ethnic minority intangible heritage, I began to be able to understand their cultural values and aesthetics from their perspective, an ability that makes me more adept in communicating with people from different cultural backgrounds," "Intangible heritage experiences made me realize that each culture has its unique emotional expression methods and value systems, enabling me to better adjust my expectations and behaviors in cross-cultural communication."

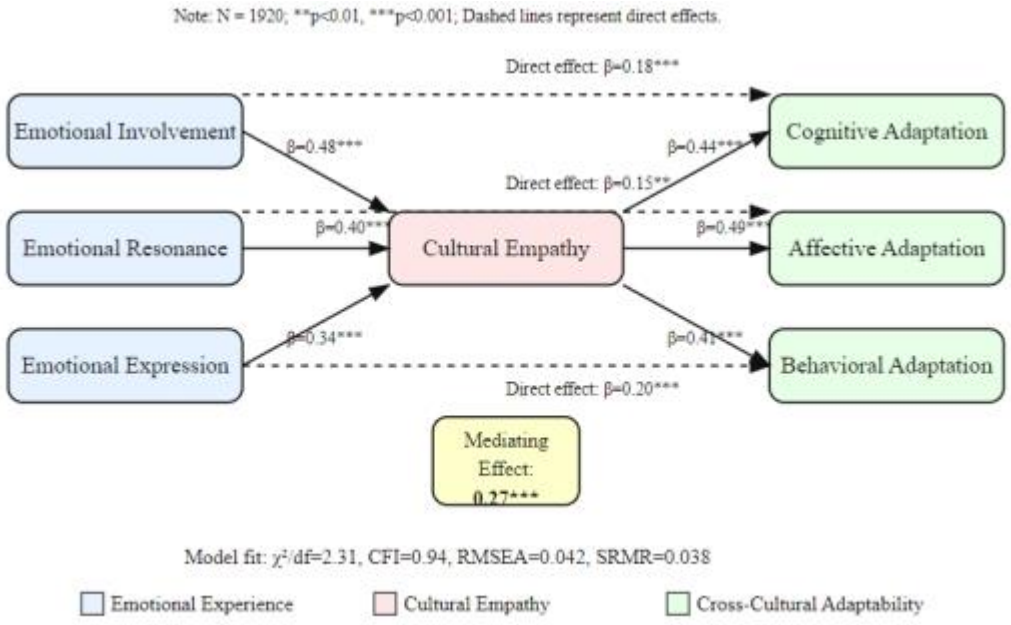

Figure 4-9. Path model of emotional experience, cultural empathy and cross-cultural adaptability.

5. Discussion

5.1. Theoretical significance of research findings

This research's findings have important implications for environmental psychology, cultural identity theory, and intangible cultural heritage education theory. (1) The research reveals the core role of environmental perception in the process of cultural identity formation, organically integrating the "place theory" in environmental psychology with cultural identity construction theory. The research confirms that the physical characteristics (spatial layout, material texture, cultural symbols), social interactions (teacher-student relationships, peer interactions, inheritor guidance), and emotional experiences (aesthetic experiences, cultural resonance, identity recognition) in intangible cultural heritage environments collectively constitute the environmental foundation for cultural identity development. This expands Proshansky's "place identity" theory, proving that cultural places are not merely physical environments, but comprehensive fields that include social interactions and emotional experiences. (2) The research proposes and validates an integrated model of "environmental perception-cultural experience-identity construction," clarifying the transformation mechanism from sensory perception to cognitive evaluation to emotional response in intangible heritage environments, providing a new perspective for understanding cultural identity formation. In particular, the

discovery of place attachment as a key mediating variable connecting environmental experience with cultural identification enriches the application of Altman and Low's place attachment theory in cultural education[48]. (3) The research confirms the promoting effect of group interaction and intergenerational transmission in social environments on cultural identity construction, validating the applicability of Tajfel and Turner's social identity theory in cultural inheritance contexts, while revealing the staged characteristics and psychological mechanisms of identity transformation in cultural inheritance, providing an empirical basis for understanding the psychological process of cultural inheritance. (4) The research reveals the key role of emotional experiences (cultural memory activation, aesthetic experience, cultural empathy) in deepening cultural identity, extending Bennett's Developmental Model of Intercultural Sensitivity, proving that cultural emotional experiences not only promote identification with one's own culture but also enhance cross-cultural adaptability[49]. These findings collectively construct a new framework integrating environmental psychology and cultural identity theory, providing a scientific basis for theoretical innovation in intangible cultural heritage education in university aesthetic education.

5.2. Integrated model of environmental perception and cultural identity construction

Based on the empirical findings of this study, we propose an integrated model of "environmental perception-cultural experience-identity construction," which elucidates the intrinsic mechanisms of cultural identity formation in intangible cultural heritage education from the perspective of deep integration between environmental psychology and cultural identity theory. The core of this model lies in organically combining the "place attachment theory" from environmental psychology with the "identity development theory" from cultural identity theory through the progressive psychological process of "perception-experience-identification," constructing a complete mechanism system with dynamic cycles. The spatial layout, material textures, and cultural symbols in the intangible cultural heritage teaching environment activate individuals' multisensory perception, triggering the formation of spatial cognition and place memory[51]. This process follows the "environment-behavior" interaction principle in environmental psychology, where the cultural authenticity and immersion of the physical environment directly influence students' recognition and meaning construction of cultural spaces. Place attachment theory plays a crucial role here, as students gradually establish emotional connections to specific cultural spaces through repeated contact and experience with the intangible cultural heritage environment, providing a stable contextual foundation for subsequent social interaction and cultural learning. Building upon physical environmental perception, socialization processes such as teacher-student interaction, peer communication, and mentor guidance from tradition bearers play a catalytic role, promoting the internalization of cultural values and construction of social identity through the dual mechanisms of social learning theory and role identity theory. This level embodies the core viewpoint of "social construction" in cultural identity theory, namely that cultural identity is negotiated and constructed through social interaction. Group belonging and social support networks not only strengthen individuals' identification with cultural groups but also achieve role transition from "cultural outsiders" to "cultural inheritors" through the identity transformation process of intergenerational transmission. Emotional responses such as cultural memory activation, aesthetic experience, and cultural empathy transform the cognitive experiences from the previous two stages into enduring and stable cultural identity recognition[52]. This mechanism integrates emotional psychology with cultural identity theory, activating deep cultural memory through emotional arousal, enhancing cultural self-esteem through aesthetic resonance, strengthening cross-cultural adaptability through cultural empathy, and ultimately achieving emotional consolidation and behavioral internalization of cultural identity. The uniqueness of this model lies in the spiral ascending effect formed among the three mechanisms. Physical environmental perception provides contextual support for social interaction, social interaction provides interpersonal mediation for emotional

experience, and emotional experience in turn strengthens attachment to physical spaces and identification with social relationships, forming a dynamic cycle of "environment-society-emotion." This cyclical mechanism reflects the deep integration of the holistic thinking of "person-environment systems" in environmental psychology with the "multidimensional construction" theory in cultural identity theory, viewing cultural identity as a dynamic process that is continuously constructed and reconstructed through social interaction and emotional experience in specific environments.

5.3. Research limitations

Despite achieving a series of meaningful findings, this research still has some limitations worthy of attention. (1) Although the mixed cross-sectional and longitudinal design adopted in this research can observe short-term changes, it is difficult to track the long-term development process of cultural identity construction. The formation of cultural identity may require several years or even longer, but this research only tracked changes over one academic year, making it impossible to fully grasp the complete trajectory of cultural identity development[53]. (2) Regarding sample selection, although universities from eastern, central, western, and northeastern regions were included, only two universities were selected from each region, and the focus was mainly on comprehensive universities, with insufficient coverage of art institutions, normal universities, and higher vocational colleges, which may affect the generalizability of the results[54]. (3) The research methodology relied excessively on self-report measurements; although it was combined with behavioral observation and physiological indicators, cultural identity as a complex psychological construct may not be fully captured by questionnaires and laboratory measurements alone, especially unconscious cultural identification and implicit cultural preferences. (4) In environmental design, due to teaching venue and resource limitations, the intangible heritage environments created in the research could not fully reproduce authentic cultural inheritance scenarios, especially the specific environments required for traditional crafts and folk performances, which may have affected the authenticity and intensity of perceptual experiences. Fifth, in theoretical construction, the research did not fully consider the influence of socio-historical factors and macro-cultural policies when integrating environmental psychology and cultural identity theory, lacking analysis of the social context of cultural identity construction. (5) The selection of intangible heritage projects was primarily based on curriculum feasibility and teaching resources, failing to systematically compare the differential impacts of different types of intangible heritage (such as material vs. non-material, elite culture vs. folk culture) on environmental perception and cultural identity construction. These limitations suggest that future research needs to adopt more diverse research methods, expand sample scope and types, extend tracking time, enhance the authenticity of environmental design, and strengthen consideration of macro social and cultural factors[55].

5.4. Integrative psychological mechanism model of environmental perception and cultural identity construction

Based on the in-depth analysis and psychological mechanism exploration of the preceding chapters, this study proposes a five-stage integrative psychological mechanism model of "perceptual activation → cognitive processing → emotional integration → behavioral expression → identity consolidation," which systematically explains how environmental perception transforms into stable cultural identity recognition through complex psychological processes. In the first stage of perceptual activation, the multiple stimuli of the intangible cultural heritage environment (visual, auditory, tactile, etc.) activate corresponding areas of the cerebral cortex through sensory channels, forming selective attention and perceptual preferences under the moderation of individual differences in "cultural sensitivity," laying the foundation for subsequent processing. In the second stage of cognitive processing, the activated perceptual information automatically matches with cultural knowledge structures in long-term memory, achieving cultural meaning

comprehension construction and value assessment through top-down semantic network activation and lateral association, forming the cognitive identification of "this is our culture." In the third stage of emotional integration, cognitive processing results trigger corresponding emotional responses, including aesthetic pleasure, cultural resonance, and sense of identity belonging; emotional experience not only provides value orientation for cultural cognition but also strengthens learning motivation by activating the reward system, endowing cultural knowledge with emotional coloring and personal meaning. In the fourth stage of behavioral expression, internalized cultural cognition and emotion are expressed through explicit behaviors such as skill learning, creative practice, and cultural transmission; behavioral practice in turn validates and reinforces internal cultural identity recognition, forming a consistency cycle of cognition-emotion-behavior. In the fifth stage of identity consolidation, repeated positive experience cycles lead to long-term potentiation of neural connections, and cultural identity recognition gradually becomes stabilized and automated, becoming a core component of the individual's self-concept system with characteristics of interference resistance and persistence. This five-stage model reveals the complete psychological chain through which environmental perception influences cultural identity construction, not only explaining individual psychological processes but more importantly elucidating the synergistic mechanisms of cognitive, emotional, behavioral, and memory systems, providing a scientific theoretical foundation for intangible cultural heritage education from the microscopic psychological process level, while offering specific psychological guidance principles for optimizing educational environment design and enhancing cultural identity construction effectiveness.

6. Conclusion and prospects

6.1. Main research conclusions

This research explored the relationship between environmental perception and cultural identity construction in university aesthetic education through mixed research methods, using intangible cultural heritage as the medium, and obtained the following five main conclusions:

(1) The physical characteristics of intangible cultural heritage teaching environments significantly influence university students' cultural identity construction through spatial perception. The research found that cultural symbols (β=0.46) and material texture (β=0.38) have the greatest impact on spatial identifiability, while spatial layout (β=0.40) and cultural symbols (β=0.37) have the strongest influence on spatial meaningfulness. Through the mediating effect of place attachment (β=0.32), spatial cognition promotes the formation of cultural identity. Immersive intangible heritage environments can more effectively evoke students' place attachment and sense of cultural belonging than standard classroom environments, indicating that the cultural authenticity of physical environments is an important foundation for cultural identity construction.

(2) Social interaction in intangible cultural heritage practice has a significant promoting effect on cultural identity construction. The research shows that interaction quality (β=0.47), interaction frequency (β=0.32), and interaction diversity (β=0.29) are key factors affecting social identity. Different interaction patterns produce varying degrees of cultural identity recognition, with comprehensive interaction type (32.5%) students showing the strongest social identity (M=4.82) and cultural inheritance willingness (M=4.76). Social support networks, especially inheritor support (β=0.39), promote cultural value internalization by enhancing cultural identity (indirect effect=0.21) and reducing cultural distance (indirect effect=-0.18).

(3) Emotional responses in intangible cultural heritage experiences play a key role in deepening cultural identity. The research confirms that emotional arousal promotes cultural identity by activating cultural memory (β=0.63); aesthetic experiences, especially aesthetic intensity (β=0.45) and aesthetic understanding (β=0.38), significantly enhance cultural self-esteem; cultural empathy ability plays a significant mediating role between intangible heritage emotional experiences and cross-cultural adaptability (indirect effect=0.27). Comprehensive in-depth aesthetic experiences (31.7%) produce the highest level of cultural self-esteem (M=4.78), indicating that the depth and quality of emotional experiences have a decisive impact on cultural identity construction.

(4) Cultural identity construction presents staged developmental characteristics, exhibiting different psychological mechanisms at different stages of intangible heritage practice. The research identifies a four-stage identity transformation model from observer to inheritor: curious exploration in the initial contact stage (1-3 weeks); culture shock in the cognitive conflict stage (4-6 weeks); role negotiation in the identity reconstruction stage (7-10 weeks); and cultural integration in the identity integration stage (11-16 weeks). This finding reveals that cultural identity is not a static structure but a process dynamically constructed in cultural practice.

(5) Individual difference factors (cultural openness, cultural contact experience) and environmental contextual factors (participation degree, environmental immersion) moderate the relationship between environmental perception and cultural identity construction. The research found that individuals with high cultural openness are more likely to develop cultural empathy abilities in intangible heritage experiences (interaction term β=0.30); those with low cultural contact experience are more sensitive to the cultural self-esteem enhancement effect of aesthetic experiences (interaction term β=0.23); and high-participation learners show stronger associations between place attachment and cultural identity (r=0.68). These findings indicate that cultural identity construction is the result of interaction between environmental factors and individual characteristics, and attention should be paid to the matching between students' individual differences and learning environments.

6.2. Future prospects

Based on the findings and limitations of this research, future studies can further deepen and expand in the following three areas:

(1) In research methodology, future studies should adopt more diversified measurement methods and longer-term tracking designs. On the one hand, neuroscience technologies such as electroencephalography (EEG) and functional magnetic resonance imaging (fMRI) can be introduced to explore the neural mechanisms of intangible cultural heritage environmental perception and brain activation patterns of cultural identity formation, providing a biological basis for the relationship between environmental perception and cultural identity. On the other hand, long-term tracking research from university to early career stages should be developed to examine the stability and variability of cultural identity at different life stages, especially how cultural identity influences individuals' career choices and cultural inheritance behaviors. Additionally, research methodology should be expanded to adopt diary methods, experience sampling methods, social network analysis, and other approaches to capture the dynamic process and contextual differences of cultural identity construction, overcoming the limitations of single measurements.

(2) In theoretical construction, the interaction between microscopic psychological mechanisms and macroscopic sociocultural factors should be further integrated. Future research needs to combine environmental psychology, cultural psychology, and sociological theories to discuss how macrosocial trends such as globalization, digitalization, and cultural diversification influence the environment and process of

university students' cultural identity construction. Particular attention should be paid to the impact of the fusion of virtual and physical environments on cultural identity, exploring how to maintain the authenticity and immersiveness of intangible cultural heritage experiences in a digital context. Meanwhile, cross-cultural comparative research should be strengthened to explore the commonalities and differences in environmental perception and cultural identity construction across different cultural backgrounds, constructing more universally applicable theoretical models. The plurality and fluidity of cultural identity deserve attention, researching how to cultivate cultural identities that have both cultural foundations and openness and inclusiveness in the context of globalization.

(3) In practical application, systematic intangible cultural heritage education intervention plans and evaluation systems should be developed based on research findings. Future research should focus on how to apply environmental perception theory to university aesthetic education space design and curriculum development, creating teaching environments that maximize cultural identity recognition. Ways to organically integrate traditional intangible heritage environments with modern educational spaces need to be explored, maintaining cultural authenticity while adapting to modern educational needs. At the same time, intangible heritage education assessment tools based on cultural identity construction should be developed to assess students' cultural identity development from multiple dimensions of cognition, emotion, and behavior, providing scientific basis for educational practice. Furthermore, cross-disciplinary integration paths between intangible heritage aesthetic education and other disciplines should be explored to promote the coordinated development of cultural identity and professional skills, cultivating compound talents with cultural innovation capabilities.

Conflict of interest

The authors declare no conflict of interest.

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