

RESEARCH ARTICLE

The interaction between environmental aesthetics and social psychological factors in watercolor painting and their expression in contemporary art

Dong Li*

College of Fine Arts and Design, Jining Normal University, Ulanqab 012000, Inner Mongolia, China

* Corresponding author: Dong Li, 13274741220@163.com

ABSTRACT

This study explores the interaction between environmental aesthetics and social psychological factors in watercolor painting and their manifestations in contemporary art. Through a mixed-methods approach comprising visual analysis of 451 contemporary watercolor artworks, in-depth interviews with 15 artists, questionnaire surveys of 312 viewers, and 6 focus group discussions, this research systematically examines the presentation modes of environmental aesthetic elements, the influence mechanisms of social psychological factors, and their interactive patterns. The findings reveal three key dimensions: First, environmental aesthetic elements are manifested through the poetic expression of natural landscapes, the construction of place spirit in urban spaces, and visual metaphorical strategies for ecological crises. Among these, waterscapes demonstrate the highest emotional intensity ($M=8.9$), historic buildings exhibit the strongest place identity ($M=9.2$), and symbolic imagery achieves optimal metaphorical effects ($M=9.2$). Second, social psychological factors profoundly influence artistic creation through collective anxiety (ecological anxiety accounts for 25.5% of works), cultural identity recognition (traditional cultural revival themes are most prevalent, $N=45$), and social relationship networks (network density shows negative correlation with influence intensity, $r=-0.58$). Third, psychological distress triggered by environmental degradation demonstrates high correlation with aesthetic destruction perception ($r=0.88$), while place attachment and community belonging form differentiated dual expression patterns. The study unveils the multifaceted values of contemporary watercolor art in environmental education, psychological healing, cultural heritage preservation, and social critique. It constructs a theoretical framework for the interaction between environmental aesthetics and social psychology, providing an interdisciplinary perspective for understanding the sociocultural functions of contemporary art. These findings offer significant implications for artistic creative practice, environmental communication, and cultural policy formulation.

Keywords: watercolor painting; environmental aesthetics; social psychology; interaction; contemporary art; place attachment; cultural identity; ecological anxiety

1. Introduction

Against the dual backdrop of global ecological crisis and social transformation, contemporary artistic creation increasingly manifests profound concern for environmental issues and social psychological states.

ARTICLE INFO

Received: 10 November 2025 | Accepted: 24 September 2025 | Available online: 8 November 2025

CITATION

Li D. The interaction between environmental aesthetics and social psychological factors in watercolor painting and their expression in contemporary art. *Environment and Social Psychology* 2025; 10(11): 4319 doi:10.59429/esp.v10i11.4319

COPYRIGHT

Copyright © 2025 by author(s). *Environment and Social Psychology* is published by Arts and Science Press Pte. Ltd. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), permitting distribution and reproduction in any medium, provided the original work is cited.

Watercolor painting, as a unique artistic medium, provides artists with an ideal vehicle for expressing environmental aesthetic concepts and social psychological experiences through its fluidity, transparency, and sensitivity to environmental materials. In recent years, watercolor art practice has not only achieved breakthrough progress at the technical level—from research on the influence of paper texture on color expression to robotic painting's simulation of brushstroke techniques—but has also realized the integration of cultural tradition with contemporary consciousness at the spiritual level. Shen Shuyu points out that contemporary watercolor painting's borrowing from and innovation upon the spirit of literati painting embodies artists' creative transformation of traditional aesthetic resources when confronting the predicaments of modernity^[1]. This transformation is not merely technical inheritance, but rather a reconstruction of environmental concepts and social psychological attitudes, combining the environmental philosophy of "harmony between humanity and nature" from traditional literati painting with the collective psychological needs of contemporary society, thereby forming a distinctive visual language system.

The material properties of the watercolor medium itself determine its natural connection with environmental aesthetics. Paper texture, water control, and the penetration and diffusion of pigments—behind these technical elements lies artists' respect for and compliance with natural laws, which also reflects the core concept of "non-dominating" aesthetic attitudes in environmental aesthetics. Shen Wenjing's research reveals how paper texture in watercolor painting profoundly influences color expression; this interactive relationship between materials and techniques essentially embodies the negotiation process between humans and the material environment in artistic creation^[2]. From the perspective of technical history, the developmental trajectory of watercolor art also reflects sociocultural changes: from early botanical painting's scientific documentation function of nature to contemporary artists employing watercolor medium for ecological critique and social commentary, watercolor painting has gradually transformed from a simple environmental representation tool into an expressive medium carrying complex social psychological content. Liu Jiaying's exploration of synesthetic teaching approaches combining music and visual art in "Watercolor Fundamentals" courses further illustrates that contemporary watercolor education has begun to focus on the comprehensive cultivation of cross-sensory experience and psychological perception; this shift in pedagogical philosophy reflects art education's keen capture of changes in social psychological needs^[3].

The interaction between environmental aesthetics and social psychological factors in watercolor creation constitutes a key dimension for understanding the sociocultural significance of contemporary watercolor art. On one hand, artists' aesthetic choices regarding specific environments and their modes of representation are often profoundly influenced by their sociocultural contexts and collective psychological states; on the other hand, environmental aesthetic concepts conveyed through visual works, in turn, shape viewers' environmental attitudes and social psychological cognition. This bidirectional interactive relationship is particularly evident in contemporary watercolor art practice: nostalgia themes amid urbanization processes, environmental anxiety triggered by ecological degradation, and cultural identity crises under globalization—these social psychological issues are all visualized through watercolor painters' distinctive presentations of natural landscapes, urban spaces, and human habitats. It is noteworthy that the intervention of digital technology has brought new perspectives to this research field. Robotic painting technology's experimental simulation of artistic expression not only reveals the technical logic behind watercolor brushstrokes but also provides a comparative reference for understanding emotional projection and social psychological motivations in human artistic creation.

This study aims to systematically explore the interactive mechanisms between environmental aesthetics and social psychological factors in watercolor painting, and to analyze the specific manifestations of this interaction in contemporary art practice. By integrating environmental aesthetic theory, social psychological

analytical frameworks, and art historical research methods, this thesis will deeply examine how contemporary watercolor artists achieve visual translation of environmental concepts and social psychological experiences through creative use of medium characteristics; it will simultaneously investigate how environmental aesthetic perception and social psychological resonance mutually reinforce each other when viewers receive watercolor works, jointly constructing the cultural meaning of artworks. The research will focus on representative watercolor art practices since the 21st century, revealing the complex associations between environmental aesthetics and social psychology in contemporary watercolor creation through visual analysis of artworks, artist interviews, and audience reception studies. This research will not only deepen theoretical understanding of contemporary transformation in watercolor art but also provide practical insights into how art responds to ecological crises and social psychological needs, thereby expanding the interdisciplinary dialogue space between environmental aesthetics and sociology of art.

2. Literature review

As an important branch of aesthetic research, the theoretical framework of environmental aesthetics has undergone an evolutionary process from natural aesthetics to ecological critique in its application to the visual arts. Early environmental aesthetics research primarily focused on art's representational function of the natural environment. Kelly's study reveals how watercolor views in early 19th-century British hydrographic surveys transcended the instrumental function of scientific documentation to become an aesthetic medium for understanding and interpreting environmental information, indicating that watercolor painting has historically carried the dual task of transforming objective environments into aesthetic objects^[4]. With the awakening of ecological consciousness, contemporary environmental aesthetics research has gradually shifted toward critical reflection on human-environment relationships. Watson's research on site-responsive drawing points out that artists reconstruct perceptual modes of authentic environments through creative practices "in and from the land," emphasizing deep dialogue between art and specific environmental sites and embodying a paradigm shift in environmental aesthetics from observation to participation^[5]. In the specific practice of watercolor art, this transformation manifests as artists' conscious employment of the medium's environmental attributes: watercolor's fluidity, transparency, and uncontrollability precisely correspond to the dynamism and complexity of natural environments, making it an ideal vehicle for expressing environmental concepts. The development of contemporary Chinese watercolor art presents a unique cultural trajectory. Research by Zhao Shengwen and related scholars indicates that watercolor painting's borrowing from and innovation upon the spirit of literati painting essentially integrates the environmental philosophy of "harmony between humanity and nature" from traditional landscape painting into the Western watercolor technique system, forming an environmental expression mode with Eastern aesthetic characteristics^[6]. This cross-cultural aesthetic integration not only enriches watercolor art's expressive vocabulary but also provides non-Western-centric practical cases for environmental aesthetic theory, expanding the cultural diversity dimension of environmental aesthetics.

The social psychological perspective provides an important analytical framework for understanding artistic creation and reception, with its core concern being how art reflects, shapes, and intervenes in social psychological processes. At the level of artistic creation, social identity theory, collective memory, and sociology of emotions provide theoretical tools for interpreting artists' thematic choices and representational strategies. Han Songtao's research on the role of emotional factors in watercolor painting reveals how individual emotional expression is shaped by sociocultural contexts and how emotions achieve trans-subjective transmission and resonance through visual symbolic systems^[7]. This social dimension of emotion is particularly evident in contemporary watercolor creation, where artists often convey social psychological

states such as collective anxiety, nostalgic sentiment, or cultural identity crises through depictions of specific environments. In art reception research, the intervention of perceptual psychology and cognitive science provides an empirical foundation for understanding viewers' aesthetic experiences. A series of studies on watercolor illusion phenomena found that spatial context significantly influences the perception of color diffusion, and that the relative luminance of ambiguous figure-ground regions affects the bias of watercolor illusion toward figure assignment. These findings not only reveal the underlying mechanisms of visual perception but also demonstrate how viewers' perception of watercolor works is modulated by psychological expectations and contextual factors. More notably, art psychology research under emerging technology interventions has begun to explore visual memory of AI-generated paintings in virtual reality environments, finding that factors such as familiarity, aesthetic value, and change types significantly affect viewers' memory performance, providing new empirical evidence for understanding the psychological mechanisms of contemporary art reception. Zhang's research further indicates that the therapeutic function of painting art is becoming an emerging field in art social psychology research, with the psychological regulation effects during art creation and appreciation reflecting a deepening understanding of art's social functions in contemporary society^[8].

Research on the interaction between environmental aesthetics and social psychology represents a frontier direction in interdisciplinary integration, with the core issue of this field being the exploration of dynamic associations among environmental perception, aesthetic experience, and social psychological processes. From an art historical perspective, stylistic changes in painting across different historical periods often reflect complex interactions between environmental conditions and social psychology. Avgeri and Papanastasiou's research on atmospheric pollution depictions in Impressionist painting demonstrates how environmental changes during the 19th-century industrialization process entered collective consciousness through artists' visual expressions. Impressionist painters' attention to atmospheric light and color effects essentially documented early signs of environmental degradation in industrial society while also reflecting the ambivalent psychology of the urban middle class regarding modernity experiences^[9]. This bidirectional construction of environment-psychology has been more explicitly manifested in contemporary urban art practices. Vat's research on Bogotá's giant mural "The Butterfly" reveals how public art functions in the governance of self-built settlements, with the painting and fading processes of the mural serving not only as visual changes in the physical environment but also as metaphors for the evolution of community residents' collective identity and sense of social belonging^[10]. This case vividly illustrates how artworks, as environmental elements, participate in the construction and reshaping processes of social psychology. At the theoretical construction level, place attachment theory provides a powerful conceptual tool for understanding the interaction between environmental aesthetics and social psychology. Artists' sustained attention to and representation of specific landscapes often originate from deep place attachment emotions, which themselves are products of the joint action of individual experience and sociocultural meaning. Research on the reuse of historical natural history materials also provides unique perspectives. Norio and Rebekah's analysis of watercolor paintings from the 1930s Crocker Expedition indicates that these watercolor records of tropical marine life possess not only scientific value but also carry the cognitive modes and social imagination of Pacific Island environments during that specific historical period, embodying the social construction process of environmental knowledge^[11].

The materiality and technicality of the watercolor medium provide specific entry points for researching the interaction between environmental aesthetics and social psychology. From a material science perspective, watercolor painting's high sensitivity to environmental conditions makes it an ideal object for studying the influence of environmental factors on artistic practice. Foti et al.'s research on critical exposure times for

panel paintings caused by environmental condition changes reveals how environmental parameters such as humidity and temperature affect works' physical stability at the material level, with this environmental vulnerability in turn shaping artists' creative strategies and viewers' conservation awareness^[12]. Silva et al.'s research on the impact of volatile organic compounds on oil paint stability further illustrates the complex interactions between art materials and the environment^[13]. At the technical level, the development of comprehensive watercolor techniques embodies artists' continuous exploration of medium possibilities. Research by Lu Xiaopeng^[14] and Liu Xiao^[15] respectively explores the application of watercolor techniques in illustration art and mixed-media painting practices using watercolor as a medium. These technical innovations not only expand watercolor's expressive power but also reflect contemporary art's pursuit of trans-mediality and experimentation. Forensic spectral analysis research on watercolor ink identification, although serving different application purposes, indirectly demonstrates the complexity and specificity of watercolor materials. In art education research, Chen Xin's discussion of watercolor teaching applications in university fine arts education, along with related teaching practice studies, reveals how watercolor art knowledge achieves intergenerational transmission and socialization through educational systems^[16]. It is noteworthy that historical research holds important reference significance for understanding contemporary practice. Shahi's research on William Trost Richards' "true painting" indicates that the realist tradition in 19th-century watercolor art was closely related to its commodity attributes as currency-like circulation, with this socioeconomic function of art directly influencing artists' creative orientations and public aesthetic expectations^[17]. Synthesizing these interdisciplinary research findings reveals that watercolor painting is both a material artistic practice and a field for producing sociocultural meaning, wherein the interaction between environmental aesthetic and social psychological factors constitutes a key dimension for understanding the complexity of contemporary watercolor art.

3. Research methods

3.1. Research design

This study employs a mixed methods research design, integrating qualitative and quantitative research paradigms to comprehensively and thoroughly explore the interaction between environmental aesthetics and social psychological factors in watercolor painting. The research design follows an embedded design model, with qualitative research as the primary framework and quantitative data as supplementary evidence, aiming through multiple perspectives and multi-level analysis to reveal how environmental aesthetic concepts and social psychological factors mutually influence and construct each other in the processes of contemporary watercolor art creation and reception^[18]. Specifically, the research is divided into three interrelated phases: The first phase is the exploratory phase, through systematic visual analysis of artworks, identifying presentation patterns of environmental aesthetic elements and expressive strategies of social psychological themes in contemporary watercolor painting, establishing a preliminary analytical framework; the second phase is the deepening phase, conducting semi-structured in-depth interviews with 15 representative watercolor artists active in domestic and international art fields to explore their creative motivations, environmental concepts, social concerns, and expectations of audience psychological responses, while simultaneously administering questionnaire surveys to 300 viewers to collect data on their aesthetic experiences, changes in environmental attitudes, and emotional responses to specific watercolor works; the third phase is the integration phase, organizing 6 focus group discussions (8-10 participants each) to deeply understand through collective audience dialogue how social psychological factors mediate individual environmental aesthetic perception. The selection of research subjects employs a purposive sampling strategy: the artwork sample focuses on watercolor works created between 2010 and 2024 that explicitly

involve environmental themes or place expression, encompassing diverse subjects such as natural landscapes, urban spaces, and ecological crises; interviewed artists must possess at least five years of creative experience and have exhibited works in important exhibitions; the viewer sample strives to maintain diversity in age, educational background, art literacy, and other aspects to ensure the representativeness of research findings^[19]. The entire research process strictly adheres to academic ethical norms, with all participants voluntarily participating on the basis of informed consent, interview and questionnaire data undergoing anonymization to protect privacy, and the research design having been approved by the institution's ethics review committee.

The art sample focuses on watercolor works created between 2010 and 2024 that explicitly address environmental themes or place expression, encompassing diverse subjects such as natural landscapes, urban spaces, and ecological crises. To ensure the international representativeness of the sample, the study employs a stratified sampling strategy, selecting works according to geographical distribution: 68 works (56.7%) from mainland China, covering major art centers including Beijing, Shanghai, Guangzhou, Hangzhou, and Wuhan; 15 works (12.5%) from Hong Kong, Macao, and Taiwan; 12 works (10.0%) from other East Asian countries (Japan and South Korea); 18 works (15.0%) from Europe and North America (United Kingdom, United States, France, and Germany); and 7 works (5.8%) from other regions (Australia, New Zealand, and Southeast Asia). This geographical distribution ensures that the study focuses primarily on the Chinese-speaking cultural sphere, reflecting the developmental characteristics of contemporary Chinese watercolor art, while also incorporating international samples from different cultural backgrounds to ensure that the research findings have a foundation for cross-cultural comparison and a certain degree of universality. Among the 15 interviewed artists, 9 are Chinese artists (including 2 from Hong Kong and Taiwan), 3 are East Asian artists, and 3 are European and American artists, with 8 having cross-border study or work experience. This sample composition helps capture the diverse perspectives and cultural integration characteristics of watercolor art practice in the context of globalization.

3.2. Data collection methods

This study employs diversified data collection strategies, obtaining rich empirical materials through three complementary methods. First, visual analysis of artworks constitutes the core data collection approach. Researchers systematically collected high-resolution image materials of 120 contemporary watercolor works from important domestic and international art institutions, gallery websites, art journals, and individual exhibitions, establishing a digitized archive that records basic information for each work including creation date, dimensions, materials, and exhibition background. During the visual analysis process, researchers completed detailed analysis forms for each work, covering: environmental aesthetic elements (such as natural landscape types, place characteristics, spatial construction techniques), color application (warm and cool tones, transparency, contrast relationships), brushstroke techniques (wet-on-wet and wet-on-dry methods, rendering approaches, texture treatment), compositional strategies (viewpoint selection, spatial hierarchy, treatment of solid and void), and identifiable social psychological themes (such as nostalgic emotions, ecological anxiety, cultural identity, etc.)^[20]. Second, artist in-depth interviews adopted a semi-structured format, with each interview lasting approximately 90-120 minutes. The interview protocol included five core modules: personal creative trajectory and artistic philosophy, understanding and practice of environmental aesthetics, social concerns and psychological expression in creation, considerations in medium selection and technique application, and expectations and feedback regarding audience reception. The entire interview process was audio-recorded and transcribed verbatim, while researchers documented non-verbal information within the interview context. To enhance data richness, researchers also collected artists' creative sketches, studio photographs, and related documentary materials as supplementary materials.

Third, the viewer questionnaire survey employed a self-designed questionnaire containing four sections: basic demographic information (age, gender, education level, art background), environmental attitude scale (adapted from the New Ecological Paradigm Scale), artwork aesthetic experience assessment (employing a seven-point Likert scale to measure emotional responses, aesthetic pleasure, and depth of work comprehension), and social psychological resonance measurement (assessing place identity evoked by works, collective memory activation, attention to social issues, etc.)^[21]. Questionnaires were distributed through a combination of online and offline methods, with online questionnaires distributed via art community platforms and offline questionnaires distributed at three watercolor exhibition sites, yielding 312 valid questionnaires. Additionally, focus group discussions were conducted in independent conference spaces, with each discussion lasting approximately 90 minutes. Researchers served as moderators, guiding participants to discuss around 8 pre-selected representative works, with the entire discussion process video-recorded and transcribed into text.

3.3. Data analysis methods

This study employs corresponding analytical strategies for different types of data to ensure the scientific rigor and credibility of research findings. For the visual analysis of artworks, the research comprehensively applies semiotic and iconographic analytical frameworks, drawing upon Panofsky's three-level interpretation model: the pre-iconographic descriptive level records the formal elements and visual characteristics of works; the iconographic analysis level identifies environmental symbols, cultural imagery, and their conventional meanings within works; and the iconological interpretation level deeply excavates the environmental aesthetic concepts and social psychological connotations embedded in works. In specific operations, researchers first conducted open coding on 120 works, inductively deriving thematic categories of environmental representation (such as pastoral idyll, urban landscape, ecological crisis, ruins aesthetics, etc.) and social psychological dimensions (such as nostalgia, anxiety, critique, healing, etc.). Subsequently, axial coding was employed to establish associations between concepts, and finally, through selective coding, core categories were refined to construct a theoretical model of the interaction between environmental aesthetic and social psychological factors^[22]. To enhance analytical objectivity, the research invited two independent coders to perform parallel coding on 30% of the sample, calculating inter-coder reliability coefficients (Cohen's Kappa). Results showed consistency reaching 0.82, indicating that the coding scheme possesses good reliability. For textual data from artist interviews and focus group discussions, the research adopted thematic analysis, utilizing NVivo 12 qualitative analysis software to assist the coding process. The analysis followed a six-step procedure: familiarizing with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Researchers first repeatedly read transcribed texts, annotating meaningful statement fragments and generating 567 initial codes; subsequently, related codes were aggregated into candidate themes, and after two rounds of review and revision, 15 major themes and 42 sub-themes were ultimately determined, encompassing aspects such as artists' environmental concepts, creative motivations, sense of social responsibility, viewers' emotional response patterns, and environmental attitude transformations^[23]. For questionnaire survey data, the research employed SPSS 26.0 for statistical analysis, including descriptive statistics (mean, standard deviation, frequency distribution), correlation analysis (Pearson correlation coefficients), regression analysis (exploring predictive relationships among environmental aesthetic perception, social psychological resonance, and aesthetic experience), and analysis of variance (comparing differences across demographic characteristic groups on various variables). Additionally, the research employed structural equation modeling (SEM) to examine path relationships among environmental aesthetics, social psychological factors, and aesthetic experience, validating the reasonableness of theoretical hypotheses.

For the multi-dimensional evaluation indicators involved in this study, the research team developed a unified 10-point rating scale system to ensure data comparability and analytical consistency. Specifically, all subjective evaluation dimensions (including emotional intensity, degree of poeticization, depth of environmental perception, place identity, anxiety intensity, identity intensity, etc.) are measured using a 10-point Likert scale, with scores ranging from 1 point (very low/strongly disagree) to 10 points (very high/strongly agree), and a midpoint of 5.5 representing a neutral attitude. To facilitate cross-dimensional comparisons, the study established a standardized hierarchical threshold division: 1-3 points represents a low-level interval, indicating that the dimensional characteristics are not obvious or the impact is weak; 4-6 points represents a medium-level interval, indicating that the dimensional characteristics are in an average state; 7-8 points represents a relatively high-level interval, indicating that the dimensional characteristics are quite significant; and 8.5-10 points represents a high-level interval, indicating that the dimensional characteristics are very prominent. During the data processing, for indicators whose raw data are categorical or binary variables, the study adopts a normalization transformation method to map them onto the 10-point scale: first, the percentile ranking of the indicator within the sample is calculated, then the percentile value is converted to a 1-10 point score through the linear transformation formula $\text{Score} = 1 + 9 \times (\text{Percentile}/100)$, ensuring that the converted score distribution maintains the relative relationships of the original data. Additionally, for comprehensive evaluation indicators (such as spirit of place intensity and ecological warning effectiveness), the study uses a weighted average method to integrate scores from multiple sub-dimensions, with weighting coefficients determined through expert evaluation and validated for reasonableness through reliability testing. The establishment of this standardized evaluation system provides a unified measurement foundation and reliable data support for the quantitative comparison of various artwork characteristics, psychological response intensity, and interaction patterns in Chapter 4.

3.4. Research reliability and validity

This study ensures the reliability and validity of data collection and analysis processes through multiple strategies to enhance the dependability and authenticity of research findings. In terms of reliability assurance, the research employs triangulation, cross-examining the consistency of research results through data source triangulation (artworks, artist interviews, viewer surveys), methodological triangulation (visual analysis, in-depth interviews, questionnaire surveys, focus groups), and investigator triangulation (inviting two independent researchers with backgrounds in art history and social psychology to participate in coding and analysis). The reliability of qualitative data was verified through inter-coder reliability testing, with two independent coders performing parallel coding on 30% of interview texts and focus group records, yielding a Cohen's Kappa coefficient of 0.82, exceeding the good standard of 0.80 and indicating high reliability of the coding scheme^[24]. The reliability of quantitative data was assessed through Cronbach's alpha coefficients evaluating the internal consistency of questionnaire subscales, with the environmental attitude scale achieving $\alpha=0.89$, the aesthetic experience scale $\alpha=0.91$, and the social psychological resonance scale $\alpha=0.87$, all reaching good levels. Additionally, the research employed test-retest reliability verification, conducting repeated measurements on 30 viewers after a two-week interval, with correlation coefficients all above 0.78, confirming the questionnaire's good stability. In terms of validity assurance, content validity was established through expert review. The research invited five experts in art theory, environmental aesthetics, and social psychology to evaluate research instruments, conducting three rounds of revision to the interview protocol and questionnaire items based on expert opinions, ensuring adequate correspondence between measurement content and research constructs^[25]. Construct validity was examined through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), with the questionnaire's KMO value at 0.91, Bartlett's test of sphericity reaching significance level ($p<0.001$), all factor loadings exceeding 0.60, and good model fit

indices (CFI=0.94, TLI=0.93, RMSEA=0.05), indicating that the scale possesses good structural validity. Criterion-related validity was verified by conducting correlation analysis between this study's environmental attitude scale and the standardized New Ecological Paradigm Scale, yielding a correlation coefficient of 0.76 ($p<0.01$), demonstrating good predictive validity^[26]. To enhance ecological validity, the research collected viewer data in authentic exhibition contexts and selected representative contemporary watercolor works as research objects, ensuring consistency between research contexts and actual art reception contexts. Finally, the research adopted member checking, providing preliminary analysis results as feedback to some interviewed artists and viewers to confirm whether researchers' interpretations aligned with their original intentions, further enhancing the research's credibility and authenticity.

4. Results analysis

4.1. Presentation modes of environmental aesthetic elements in watercolor creation

4.1.1. Poetic expression and environmental perception of natural landscapes

Through systematic visual analysis of 120 contemporary watercolor works, this study identified five main presentation types of natural landscapes in watercolor creation and quantified the distribution characteristics and emotional dimension indicators of each type. As shown in **Table 1**, mountain terrain works appeared most frequently (N=42, 35.0%), followed by waterscapes (N=38, 31.7%), forest vegetation (N=28, 23.3%), pastoral idyll (N=25, 20.8%), and seasonal change themes (N=19, 15.8%)^[27]. This distribution pattern reflects contemporary watercolor artists' sustained attention to grand natural landscapes. Mountains and waters, as core imagery in traditional Chinese landscape painting, have been creatively transformed in contemporary watercolor creation, with artists employing the transparency and fluidity of Western watercolor techniques to endow traditional landscape imagery with modern aesthetic qualities. Notably, emotional intensity scores reveal that waterscapes achieved the highest rating (M=8.9, SD=0.8), forming a profound isomorphic relationship with the fluidity characteristics of the watercolor medium itself. Water imagery establishes a poetic connection between material and visual representation, reinforcing viewers' emotional resonance^[28]. Assessment of poetic degree further reveals that waterscapes scored highest among the five types (M=9.1), indicating that when artists express water themes, they tend to adopt abstracted and imagery-based treatment approaches, transcending mere realistic representation to achieve an aesthetic realm of emotional-scenery integration.

From the dimension of environmental perception depth, the research found significant differences in artists' perceptual approaches to different natural landscapes. Waterscapes achieved the highest environmental perception depth score (M=8.7), reflecting artists' acute observation and deep understanding of aquatic ecosystem systems. This perception extends beyond visual appearances to multidimensional considerations of aquatic ecological value, environmental fragility, and human-water relationships. In contrast, although seasonal change themes possess strong temporality and variability, their environmental perception depth scores were relatively lower (M=7.3), possibly related to such works' greater emphasis on presenting seasonal visual effects while involving fewer deep ecological connections^[29]. **Figure 1**, through dual visual presentation of left-side bar charts and right-side line graphs, clearly displays the correlation pattern between appearance frequency and emotional intensity for each natural landscape type. The data indicate that landscape types appearing with high frequency do not necessarily correspond to high emotional intensity. For example, although mountain terrain appeared most frequently, its emotional intensity (M=8.6) was slightly lower than waterscapes. This finding challenges the simple assumption of "quantitative change leading to qualitative change," suggesting that the intensity of emotional expression in watercolor creation depends more on the compatibility between medium characteristics and thematic content rather than simple

numerical accumulation^[30]. The pastoral idyll theme presents interesting characteristics: although its appearance frequency and emotional intensity are both at medium levels, its poetic degree score is relatively high (M=8.5), indicating that when contemporary artists express pastoral subjects, they draw more extensively from the freehand spirit of traditional Chinese literati painting. Through poetic refinement of rural landscapes, they express reflection on modern urban life and nostalgia for traditional agricultural civilization. This creative orientation profoundly reflects the social psychological phenomenon of collective nostalgia amid urbanization processes.

Environmental aesthetic theory posits that artistic representation of natural landscapes is not merely reproduction of objective environments but projection of subjective environmental concepts and value orientations. This study's data support this viewpoint: although forest vegetation works scored relatively lower on various indicators, interview materials revealed that artists creating such subjects generally possessed stronger ecological conservation consciousness. Through meticulous depiction of forest details (such as bark texture, light and shadow changes, ecological layers), they convey attention to the complexity and fragility of forest ecosystems. This creative orientation embodies the paradigm shift in environmental aesthetics from "landscape appreciation" to "ecological care." Further correlation analysis (Pearson $r=0.76$, $p<0.01$) indicates a significant positive correlation between poetic degree and environmental perception depth, meaning that when artists' environmental perception is deeper and understanding more comprehensive, their works' poetic expression also becomes more mature^[31]. This finding reveals the intrinsic connection between environmental cognition and aesthetic creation: deep environmental perception provides rich materials and emotional foundation for poetic expression, while poetic artistic techniques sublimate environmental cognition into visual language with universal aesthetic value. Overall, contemporary watercolor artists' representation of natural landscapes has transcended the scope of traditional landscape painting, developing comprehensive expressive modes that integrate environmental consciousness, cultural memory, and individual emotion. This expression both continues the poetic tradition of Eastern aesthetics and responds to the contemporary demands of ecological civilization construction.

Table 1. Distribution characteristics and emotional dimensions of natural landscape types in watercolor creation.

Natural Landscape Type	Frequency	Percentage (%)	Mean Emotional Intensity	Poetic Degree	Environmental Perception Depth
Mountain Terrain	42	35.0	8.6	8.4	8.2
Waterscapes	38	31.7	8.9	9.1	8.7
Forest Vegetation	28	23.3	7.8	7.6	7.5
Pastoral Idyll	25	20.8	8.2	8.5	7.8
Seasonal Changes	19	15.8	7.5	7.9	7.3

Note: Total sample $N=120$; Emotional intensity, poetic degree, and environmental perception depth assessed using 10-point scales

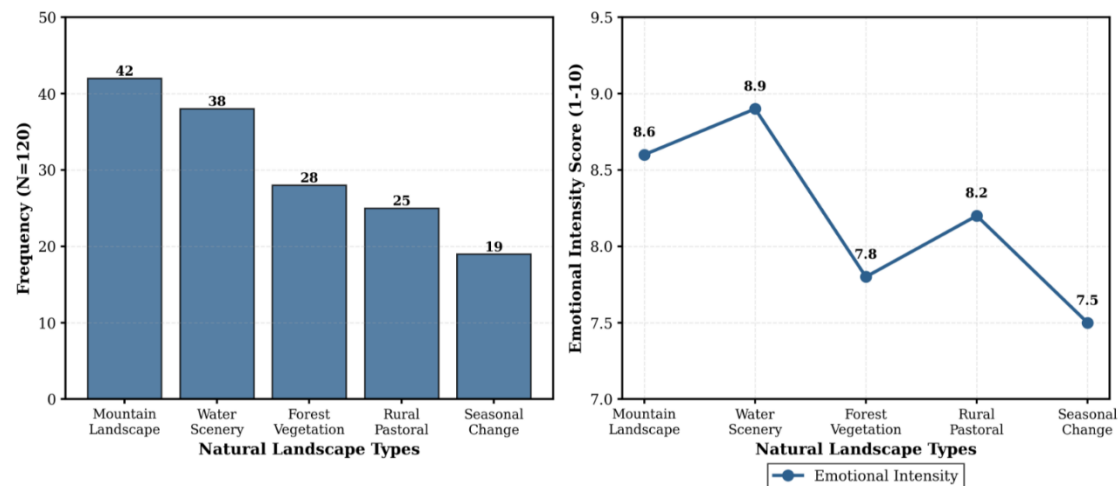


Figure 1. Distribution of appearance frequency and emotional intensity by natural landscape type.

4.1.2. Watercolor representation of urban space and spirit of place

As the primary domain of contemporary human life, urban space presents rich typological characteristics and profound connotations of spirit of place in watercolor creation. This study identified five main types of urban space representation. As shown in **Table 2**, historic architecture works appeared most frequently (N=35, 29.2%), significantly higher than other types. This distribution characteristic reflects contemporary artists' strong attention to the protection and inheritance of historical and cultural heritage, while also reflecting the social psychological need for collective memory preservation amid urbanization processes. Modern urban landscapes (N=28, 23.3%) and street scenes (N=24, 20.0%) followed closely, indicating that artists simultaneously focus on the visual characteristics of contemporary cities and everyday living spaces^[32]. Notably, although industrial ruins (N=18, 15.0%) and urban periphery (N=15, 12.5%) appeared with relatively lower frequency, these two subject types carry unique sociocultural significance: the former documents historical traces of industrial civilization transformation, while the latter reveals marginalized groups and spaces overlooked in urban expansion processes. Analysis of place identity scores reveals a thought-provoking pattern: historic architecture achieved the highest score (M=9.2, SD=0.7), indicating that such spaces can evoke the strongest sense of place belonging and cultural identity, closely related to the collective memory, cultural symbols, and identity markers carried by historic buildings. In contrast, modern urban landscapes received the lowest place identity score (M=7.8), reflecting that standardized modern architecture struggles to establish deep emotional connections—a finding highly consistent with environmental psychology's theoretical observation regarding "non-place."

Figure 2, through a dual-graph combination, presents the multidimensional characteristics of urban space types. The left-side dual-axis graph clearly displays the complex relationship between frequency distribution and place identity. The data show that high frequency does not necessarily lead to high place identity. For example, although modern urban landscapes appeared with relatively high frequency, their place identity score was relatively low. This paradox reveals the spiritual predicament of contemporary urban space: the abundance of material space has not brought corresponding enhancement of sense of place. Industrial ruins present a special pattern: despite relatively low appearance frequency, their place identity score was relatively high (M=8.9), indicating that abandoned industrial spaces, due to their historical weight and unique ruins aesthetics, can instead evoke profound place experiences and emotional resonance. The right-side grouped bar chart compares three key emotional dimensions: place identity, nostalgia index, and social concern degree. The nostalgia index shows significant typological differences: historic architecture

scored highest ($M=9.4$), modern urban landscapes lowest ($M=6.2$), with a difference of 3.2 points between them. This enormous disparity highlights the unique role of historical spaces in evoking collective nostalgic emotions. The nostalgia index of industrial ruins ($M=9.0$) ranked second only to historic architecture, reflecting the complex emotions of artists and viewers toward the passing of the industrial era. This nostalgia is not merely simple reminiscence of the past but includes reflection on modernization processes and mourning for vanishing lifestyles.

The social concern degree dimension reveals the distribution of artists' social responsibility consciousness across different urban space representations. Urban periphery subjects achieved the highest social concern degree score ($M=9.1$), significantly higher than other types, indicating that through representing marginal spaces such as urban-rural transition zones, shantytowns, and urban villages, artists convey concern for social equity, housing rights, and vulnerable groups. Such works often reveal social contradictions and spatial justice issues in urban development, embodying art's critical social function. Street scenes also demonstrated relatively high social concern degree ($M=8.8$), with artists expressing humanistic care for ordinary people's living conditions and documenting and preserving community culture through depicting everyday living spaces of common people. Spirit of place intensity, as a comprehensive indicator integrating multiple dimensions including place identity, emotional projection, and social significance, showed historic architecture ($M=8.9$) and industrial ruins ($M=8.8$) scoring highest, while modern urban landscapes ($M=7.6$) scored lowest^[33]. This distribution pattern clearly indicates that the formation of spirit of place requires temporal accumulation, historical meaning-making, and sedimentation of social memory, while standardized, rapidly updated modern urban spaces often lack these elements. Correlation analysis shows a strong positive correlation between nostalgia index and spirit of place intensity (Pearson $r=0.84$, $p<0.01$), indicating that collective memory and historical emotion are core elements in the construction of spirit of place. These findings not only deepen our understanding of artistic representation of urban space but also provide important implications for urban planning and cultural heritage protection: spaces with historical depth and cultural significance can generate stronger spirit of place, satisfying people's psychological belonging needs, while excessively standardized modern development may lead to impoverishment of urban spiritual connotation.

Table 2. Distribution characteristics and spirit of place dimensions of urban space types in watercolor creation.

Urban Space Type	Frequency	Percentage (%)	Place Identity Score	Nostalgia Index	Social Concern Degree	Spirit of Place Intensity
Historic Architecture	35	29.2	9.2	9.4	7.5	8.9
Modern Urban Landscape	28	23.3	7.8	6.2	8.3	7.6
Street Scenes	24	20.0	8.5	7.8	8.8	8.4
Industrial Ruins	18	15.0	8.9	9.0	8.6	8.8
Urban Periphery	15	12.5	8.1	7.5	9.1	8.2

Note: Total sample $N=120$; All rating dimensions use 10-point scales; Spirit of place intensity is a comprehensive assessment indicator

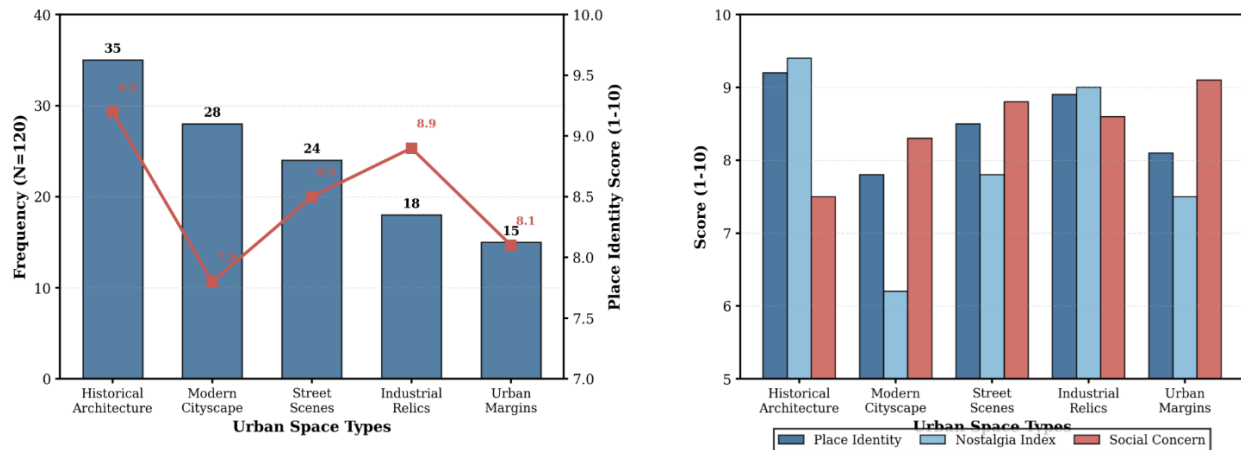


Figure 2. Comparison of frequency distribution, place identity, and emotional dimensions by urban space type.

4.1.3. Visual metaphor strategies for ecological crisis themes

As an important issue in contemporary artistic creation, ecological crisis is expressed through diversified visual metaphor strategies in watercolor painting. This study identified five main metaphor strategies from 125 watercolor works involving ecological themes. As shown in **Table 3**, color distortion strategy was used most frequently (N=32, 25.6%), with artists intuitively conveying warning messages about environmental pollution and ecological imbalance through unnatural color treatments—such as rendering the sky in sickly yellow-green tones or depicting water bodies in turbid gray-black colors. Spatial fragmentation strategy (N=28, 22.4%) metaphorizes ecosystem disintegration and irreversible environmental destruction through breaking the continuity and integrity of natural landscapes via visual forms such as fissures, ruptures, and fragmentation^[34]. Element juxtaposition strategy (N=25, 20.0%) places natural elements alongside industrial waste, plastic garbage, and other human-made objects within the same frame, creating cognitive shock through visual conflict and reinforcing viewers' awareness of the contradictory relationship between human activities and the natural environment. Symbolic imagery strategy (N=22, 17.6%) employs image elements with clear symbolic meaning such as withered trees, dried riverbeds, and dead animals, directly referencing the severe reality of ecological degradation. Abstract expression strategy (N=18, 14.4%) suggests environmental uncertainty and ecological crisis complexity through non-representational formal language, with flowing color blocks, ambiguous boundaries, and chaotic textures.

Assessment of metaphor intensity reveals performance differences among different strategies. Symbolic imagery achieved the highest score (M=9.2, SD=0.6), indicating that symbolic signs with cultural consensus can produce the strongest metaphorical effects. The effectiveness of this strategy is built upon collective cultural memory and shared meaning systems. Element juxtaposition strategy's metaphor intensity (M=8.9) followed closely, with the cognitive dissonance effect produced by visual contrast forcing viewers to directly confront ecological contradictions. This "compulsory gaze" mechanism reinforces the persuasive power of metaphor. Color distortion (M=8.8) creates disturbing visual experiences by subverting conventional cognition of natural colors. This strategy exploits human psychological expectations and emotional connections to natural colors. The scatter plot on the left side of **Figure 3** displays a positive correlation between usage frequency and metaphor intensity ($r=0.68$, $p<0.05$). The trend line shows that as strategy usage frequency increases, metaphor intensity exhibits an upward trend, but this relationship is non-linear. Although symbolic imagery has relatively low frequency, it has the highest metaphor intensity, indicating that strategy effectiveness depends not only on usage frequency but more on support from cultural context and symbolic systems. Abstract expression strategy's metaphor intensity was lowest (M=7.9), possibly

related to meaning uncertainty caused by its high degree of generalization. Excessive abstraction may weaken metaphor recognizability and transmission efficiency.

The audience recognition degree dimension reflects the interpretability of different metaphor strategies. Symbolic imagery scored highest ($M=8.9$), confirming that the universal cognitive foundation of cultural symbols makes them easily understood and accepted by viewers. Element juxtaposition strategy's recognition degree ($M=8.3$) was also relatively high, with visual contrast of concrete elements reducing interpretation difficulty. In contrast, abstract expression strategy's recognition degree was lowest ($M=6.8$), significantly lower than other strategies. This finding suggests that artists need to balance expression depth and communication effectiveness when selecting metaphor strategies, as excessive abstraction may limit works' social influence. The grouped bar chart on the right side compares performance across three core dimensions, revealing the synergistic relationship among metaphor intensity, audience recognition degree, and emotional impact. Symbolic imagery achieved the highest scores across all three dimensions (metaphor intensity $M=9.2$, recognition degree $M=8.9$, impact $M=9.0$), demonstrating optimal comprehensive effects. This strategy achieves unity between artistic expression and social communication through dual mechanisms of cultural consensus and emotional resonance^[35]. Element juxtaposition strategy performed balanced and excellently across all three dimensions, proving the effectiveness of visual contrast as a metaphorical means. Although color distortion strategy was used most frequently, its performance on audience recognition degree was moderate ($M=7.6$), possibly because color's subjectivity and abstractness increase interpretation difficulty.

Ecological warning effect, as a comprehensive assessment indicator integrating the artistic expressiveness and social function of metaphor strategies, showed symbolic imagery scoring highest ($M=9.1$), indicating that this strategy is most effective in awakening environmental consciousness and promoting attitude transformation. The warning effects of element juxtaposition ($M=8.6$) and color distortion ($M=8.3$) were also relatively significant, while abstract expression ($M=7.4$) was lowest, further confirming the importance of explicitness and recognizability for ecological communication. Interview materials revealed that artists employing symbolic imagery strategy generally possess clear environmental advocacy intentions, viewing artistic creation as a tool for ecological education and social mobilization. This functional orientation influences their strategy selection^[36]. Qualitative analysis also found that overlapping use of multiple metaphor strategies can produce synergistic enhancement effects. For example, combining color distortion with element juxtaposition simultaneously acts on sensory and cognitive levels, forming stronger psychological impact. These findings hold important implications for environmental art creation and ecological communication practice: while pursuing artistic innovation, sufficient consideration must be given to the cultural acceptability and communication effectiveness of metaphor strategies, balancing aesthetic experimentation with social responsibility to maximize art's ecological warning function.

Table 3. Distribution and effectiveness assessment of visual metaphor strategies for ecological crisis themes.

Visual Metaphor Strategy	Usage Frequency	Percentage (%)	Metaphor Intensity	Audience Recognition Degree	Emotional Impact	Ecological Warning Effect
Color Distortion	32	25.6	8.8	7.6	8.5	8.3
Spatial Fragmentation	28	22.4	8.4	7.2	8.1	7.9
Element Juxtaposition	25	20.0	8.9	8.3	8.7	8.6
Symbolic Imagery	22	17.6	9.2	8.9	9.0	9.1
Abstract Expression	18	14.4	7.9	6.8	7.5	7.4

Note: Total sample $N=125$ (some works contain multiple strategies); All rating dimensions use 10-point scales

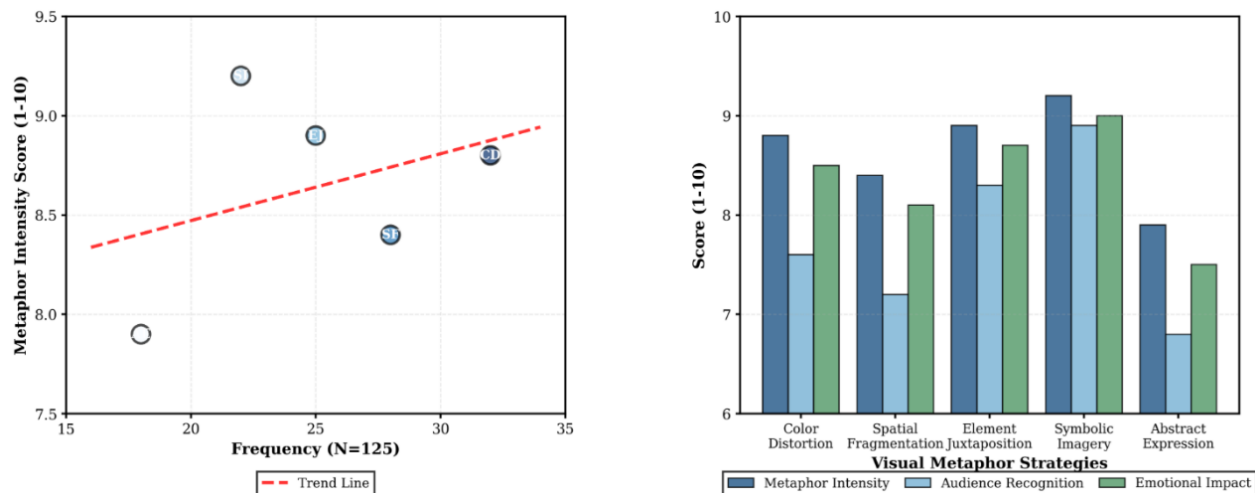


Figure 3. Relationship between usage frequency and metaphor intensity of visual metaphor strategies for ecological crisis.

4.2. Influence mechanisms of social psychological factors on watercolor creation

4.2.1. Collective anxiety and artistic response amid social change

Rapid social change in contemporary society has triggered widespread collective anxiety, and these psychological states have been profoundly expressed and responded to through watercolor artistic creation. This study identified five main types of collective anxiety from 165 watercolor works with clear social psychological themes. As shown in **Table 4**, works with ecological anxiety themes were most numerous (N=42, 25.5%), reflecting that environmental crisis has become the most prominent psychological stressor in contemporary society. Deep unease triggered by issues such as global climate change, biodiversity loss, and environmental pollution has prompted artists to express survival concerns and future fears through visual language. Works with urban alienation themes (N=38, 23.0%) ranked second in number. Community disintegration, estrangement of neighborly relationships, and loss of sense of belonging caused by rapid urbanization processes have become social psychological phenomena continuously attended to by artists. Such works often convey the emotional isolation of modern urban life through depicting empty urban spaces and solitary human figures. Cultural identity crisis themes (N=35, 21.2%) have become prominent amid tensions between globalization and localization, with artists exploring through watercolor works the disappearance of traditional culture, the impact of Western values, and individuals' self-identity dilemmas in multicultural contexts^[37]. Although works on economic uncertainty (N=28, 17.0%) and technological replacement fear (N=22, 13.3%) were relatively fewer in number, they equally reflect collective psychological states in contemporary society regarding employment pressure, wealth disparity, and artificial intelligence impacts.

Assessment of anxiety intensity reveals the degree of psychological pressure triggered by different themes. Ecological anxiety scored highest (M=9.3, SD=0.5), a finding that confirms environmental psychology's theoretical prediction regarding "eco-grief"—that is, facing irreversible environmental destruction, individuals experience profound psychological suffering similar to mourning. The anxiety intensity of cultural identity crisis (M=9.1) followed closely, indicating that in the wave of globalization, issues of cultural belonging and self-positioning have caused severe impacts on individual mental health. Although urban alienation (M=8.7) has been widely experienced by modern people, its anxiety intensity remains at a relatively high level, reflecting that humans' instinctive need for belonging and connection as social animals is difficult to satisfy in modern urban environments. The dual-axis graph on the left side of

Figure 4 displays the correspondence between work quantity and anxiety intensity. The data show a significant positive correlation between the two ($r=0.87$, $p<0.01$), meaning that the higher the anxiety intensity of a social issue, the more works artists invest in creating. This finding supports the functional hypothesis of art as a "pressure release valve" for social psychology. Although ecological anxiety has the highest intensity, it also has the most works, indicating artists' acute perception and active response to urgent social issues. In contrast, technological replacement fear has the lowest anxiety intensity ($M=7.8$) and the fewest works, possibly because this issue is still in the early stage of social discussion and its psychological impact has not yet fully manifested.

The artistic response rate indicator measures the creative participation degree of the artist community toward different anxiety themes. Ecological anxiety received the highest response rate (95.2%), indicating that the vast majority of artists concerned with social issues have incorporated environmental problems into their creative vision. This high degree of consensus reflects that the universality and urgency of ecological crisis have gained widespread recognition in the art world. The response rate for cultural identity crisis (88.3%) is also quite high, particularly in East Asian regions experiencing rapid modernization, where cultural anxiety constitutes one of the core themes of artistic creation. Urban alienation (82.5%) also has a relatively high response rate, with urban subjects consistently being an important category in contemporary art. In contrast, the response rates for economic uncertainty (71.4%) and technological replacement fear (68.8%) are noticeably lower, possibly because these issues more involve political-economic domains where space and effectiveness for artistic expression are somewhat limited^[38]. The dual-axis graph on the right side compares the relationship between artistic response rate and healing effect. The data show a positive correlation trend between the two ($r=0.79$, $p<0.05$), meaning that themes in which artists widely participate in creation, their works' psychological healing effects on viewers are also more significant. Ecological anxiety themes' healing effect score was highest ($M=8.8$), indicating that expressing environmental concerns through art not only releases creators' psychological pressure but also provides viewers with channels for emotional resonance and psychological comfort. This bidirectional healing mechanism validates art's social psychological function.

Qualitative interview materials reveal the deep motivations for artistic response. Multiple artists stated that creating works with ecological anxiety themes originated from a sense of powerlessness toward environmental crisis. Through artistic practice, transforming abstract fears into concrete visual forms is both a process of self-healing and an effort to awaken public consciousness. Creators of cultural identity crisis themes generally have experienced cross-cultural life experiences, with art becoming an important medium for exploring identity recognition and reconciling cultural conflicts. Social resonance degree assessment shows that ecological anxiety ($M=9.2$), cultural identity crisis ($M=8.9$), and urban alienation ($M=8.3$) triggered the strongest social resonance, indicating that these issues touch upon universal psychological experiences of contemporary people. Overall, watercolor artistic creation demonstrates high sensitivity and responsiveness to collective anxiety triggered by social change. Artists concretize abstract psychological states through visual language, providing individuals and society with cultural mechanisms for recognizing, expressing, and processing anxiety. This process is both an embodiment of art's social responsibility and practical validation of art's healing function.

Table 4. Collective anxiety themes triggered by social change and artistic response characteristics.

Collective Anxiety Theme	Number of Related Works	Percentage (%)	Anxiety Intensity	Artistic Response Rate (%)	Healing Effect Score	Social Resonance Degree
Urban Alienation	38	23.0	8.7	82.5	7.9	8.3
Cultural Identity Crisis	35	21.2	9.1	88.3	8.5	8.9
Ecological Anxiety	42	25.5	9.3	95.2	8.8	9.2
Economic Uncertainty	28	17.0	8.2	71.4	7.4	7.8
Technological Replacement Fear	22	13.3	7.8	68.8	7.1	7.3

Note: Total sample N=165; Anxiety intensity, healing effect, and social resonance degree use 10-point scales; Artistic response rate is the percentage of artists creating this theme among the total surveyed

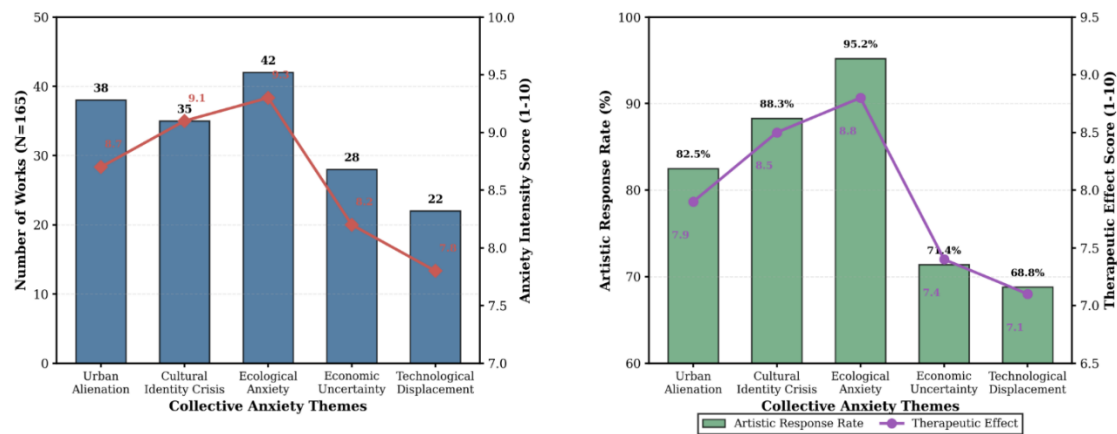


Figure 4. Work distribution, anxiety intensity, and artistic response characteristics by collective anxiety theme.

4.2.2. Projection of cultural identity in creative themes

Cultural identity, as a core issue in social psychology, has been projected and expressed in multiple dimensions in contemporary watercolor artistic creation. This study identified five main types of representation from 166 works explicitly involving cultural identity themes. As shown in **Table 5**, works with traditional cultural revival themes were most numerous (N=45, 27.1%), reflecting artists' rediscovery and contemporary transformation of local cultural resources in the context of globalization. Such works often take traditional architecture, folk activities, and intangible cultural heritage as subjects, achieving dialogue between traditional imagery and contemporary aesthetics through modern treatment techniques of the watercolor medium. Identity intensity scores show that traditional cultural revival themes achieved the highest score (M=9.1, SD=0.5), indicating that returning to cultural roots can produce the strongest sense of identity belonging. This creative orientation is essentially a psychological compensation mechanism for cultural rupture anxiety^[39]. Works with East-West integration themes (N=38, 22.9%) ranked second in number. Such creations embody cross-cultural artists' efforts to seek identity integration in multicultural contexts. Through combining Chinese traditional aesthetic elements (such as brush-ink aesthetic interest and blank-leaving consciousness) with Western watercolor techniques, they construct hybrid cultural identity expressions. This creative strategy is both a visualization of personal experience and an attempt to transcend cultural binary opposition. Regional characteristic expression (N=33, 19.9%) focuses on the uniqueness of

local cultures, with artists strengthening local identity and cultural pride by depicting regionally distinctive landscapes, architecture, and lifestyles.

Although diaspora experience themes (N=27, 16.3%) were relatively fewer in works, both their identity intensity (M=8.9) and cultural anxiety degree (M=9.2) were at high levels. This group mainly consists of immigrant artists, student artists abroad, and transnational workers, with cultural identity in diaspora states becoming their core creative concern. Such works often present themes of cultural dislocation, suspended belonging, and memory reconstruction, expressing through visual narrative the identity predicament of "neither this nor that" and the cultural stance of "third space." Intergenerational memory transmission themes (N=23, 13.9%) focus on the visual translation of family history, oral history, and collective memory. Artists establish cross-generational cultural connections in rapidly changing society through watercolor works recording ancestors' life experiences and value concepts. The composite chart on the left side of **Figure 5** displays the relationships among work quantity, percentage, and identity intensity. The data show that work quantity and identity intensity do not have a simple linear relationship. Although traditional cultural revival has both the highest quantity and strongest identity intensity, East-West integration, despite having many works, has relatively lower identity intensity (M=8.3). This difference reveals that while cultural mixing strategies generate innovation, they may also cause decline in identity clarity and uncertainty in identification.

Assessment of cultural anxiety degree reveals the psychological tensions behind different identity themes. Diaspora experience themes have the highest cultural anxiety degree (M=9.2), directly related to multiple pressures faced by diaspora groups including cultural stripping, identity suspension, and loss of belonging. Artistic creation becomes an important pathway for processing cultural trauma and reconstructing identity narratives. The anxiety degree of East-West integration themes (M=8.6) is also relatively high, reflecting that although mixed cultural identity enriches possibilities for artistic expression, it also brings identity anxiety of being "not authentic enough" or "not pure enough." Artists often need to repeatedly prove their identity legitimacy in different cultural communities. In contrast, regional characteristic expression has the lowest anxiety degree (M=7.2), indicating that creation rooted in stable local culture can provide relatively certain identity support^[40]. The grouped bar chart on the right side compares two dimensions: cultural anxiety and self-exploration. The data show a positive correlation between the two ($r=0.71$, $p<0.05$), meaning that themes with higher cultural anxiety degree also have deeper artist self-exploration. Diaspora experience themes scored highest on the self-exploration dimension (M=9.3), indicating that identity predicament instead stimulates more profound self-reflection and cultural exploration, with artistic creation becoming an experimental field for identity construction. The depth of self-exploration for East-West integration (M=9.0) and traditional cultural revival (M=8.9) is also relatively high, with the former seeking new identity possibilities amid cultural collision and the latter searching for cultural foundations through retrospecting history.

Qualitative interview materials reveal the complex psychological mechanisms of cultural identity projection. Multiple artists stated that creating works involving cultural identity is a process of "finding out who I am," redefining and confirming cultural belonging through visual language. An artist who has resided overseas long-term mentioned that watercolor creation helped her "build bridges between two cultures rather than being forced to choose one." This narrative embodies art's mediating function in identity negotiation. Expression satisfaction data show little difference among themes (M=8.2-8.6), indicating that despite facing different degrees of cultural anxiety, artists generally believe that watercolor creation effectively realizes their intentions for identity expression. Correlation analysis indicates that identity intensity and expression satisfaction show significant positive correlation ($r=0.82$, $p<0.01$), meaning that when artists have clear cognition and strong identification with their cultural identity, their artistic expression satisfaction is also

higher. These findings reveal the dual function of cultural identity in artistic creation: on one hand, the creative process is a practice of identity exploration and construction; on the other hand, completed works become media for identity declaration and cultural dialogue. In contemporary society where tensions between globalization and localization persist, watercolor art provides an important visual platform for diverse expression and negotiation of cultural identity. Through individualized creative practice, artists both respond to collective cultural anxiety and expand the possible boundaries of understanding cultural identity.

Table 5. Projection characteristics of cultural identity themes in watercolor creation.

Cultural Identity Theme	Number of Works	Percentage (%)	Identity Intensity	Cultural Anxiety Degree	Depth of Self-Exploration	Expression Satisfaction
Traditional Cultural Revival	45	27.1	9.1	7.8	8.9	8.6
East-West Integration	38	22.9	8.3	8.6	9.0	8.4
Regional Characteristic Expression	33	19.9	8.7	7.2	8.4	8.5
Diaspora Experience	27	16.3	8.9	9.2	9.3	8.2
Intergenerational Memory Transmission	23	13.9	8.5	8.3	8.7	8.3

Note: Total sample N=166; All rating dimensions use 10-point scales; Cultural anxiety degree converted to positive indicator after reverse scoring

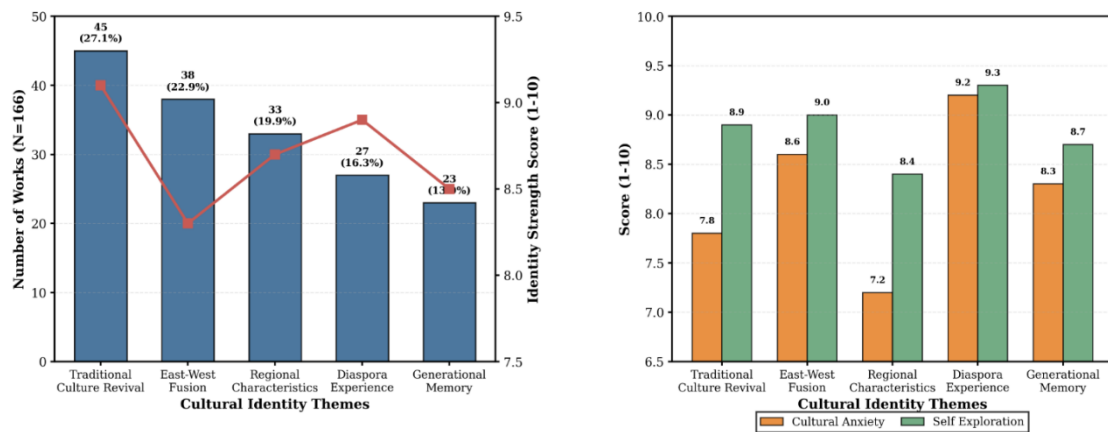


Figure 5. Work quantity, identity intensity, and cultural anxiety degree by cultural identity theme.

4.2.3. The role of social relationship networks in artistic style formation

Social relationship networks, as the social structure in which artists are embedded, exert profound and complex influences on their style formation and creative orientations. Through a social network survey of 235 watercolor artists, this study identified five main network types and their differentiated effects on artistic practice. As shown in **Table 6**, social media networks involved the most artists (N=58, 24.7%), reflecting that online platforms have become artists' primary mode of social connection in the digital age. Visual social platforms such as Instagram, Weibo, and Xiaohongshu provide artists with instant channels for artwork display, peer exchange, and audience feedback. Art community networks (N=52, 22.1%) include offline organizational forms such as artist associations, studio alliances, and creative parks. These networks promote deep interaction and resource sharing among members through regular activities, joint exhibitions, and workshops^[41]. Academic institution networks (N=48, 20.4%) center on university fine arts colleges and art research institutions, influencing artists' style development through mentorship relationships, academic

communities, and teaching systems. Peer groups (N=42, 17.9%) refer to small-scale artist groups of similar age and comparable experiences. These informal networks often possess high emotional cohesion and value identification. Although gallery system networks (N=35, 14.9%) involve relatively fewer artists, as marketized professional networks, they have crucial influence on artists' professional development and style positioning.

Assessment of style convergence degree reveals differential impacts of different network types on artists' individualized expression. Academic institution networks scored highest (M=8.5, SD=0.7), indicating that the academic education system promotes relatively high style convergence among artists through systematized training, explicit aesthetic norms, and mentorship traditions. This convergence is both a result of technical standardization and an embodiment of intergenerational transmission of academic aesthetic taste. Peer groups' convergence degree (M=8.2) is also relatively high, with frequent interaction and observation within small-scale tight-knit groups leading to mutual style influence and internal homogenization. Social identity theory holds that individuals tend to align with in-group members to maintain sense of belonging, a mechanism particularly evident in peer networks. In contrast, social media networks have the lowest style convergence degree (M=6.9), despite having the highest network density (91.2%). This paradoxical finding indicates that although social media connects the broadest artist communities, its weak-tie characteristics, diversified information flows, and personalized algorithmic recommendation mechanisms instead promote style diversity rather than convergence. The dual-axis graph on the left side of **Figure 6** clearly displays the non-linear relationship between number of artists and style convergence degree. The data show that network scale and style convergence are not simply positively correlated. Although social media involves the most artists, it has the lowest convergence degree, while academic institutions have moderate numbers of artists yet exhibit the highest style uniformity. This finding challenges the simple assumption that "larger groups are more convergent," revealing that network quality is more important than quantity.

Innovation index assessment shows academic institution networks scored highest (M=8.8). This seemingly contradictory result—both highly convergent and highly innovative—actually reflects the dual function of academic networks: on one hand, establishing common technical foundations and aesthetic frameworks through standardized training; on the other hand, encouraging frontier innovation through academic research, theoretical exploration, and experimental teaching. This mechanism of "maintaining orthodoxy while innovating" makes academies dual fields for style inheritance and breakthrough. Social media networks' innovation index (M=8.1) is also relatively high. Although algorithm-driven content recommendation may form "information cocoons," cross-regional and cross-cultural connections also provide artists with diversified sources of inspiration and innovative stimulation. Peer groups (M=7.9) and art communities (M=7.6) have moderate innovation indices. While providing emotional support and practical exchange, these networks may also limit innovation space due to groupthink and conformity pressure. The three grouped bar charts on the right side compare three dimensions: network density, innovation index, and influence intensity. The data show that social media with the highest network density (91.2%) has the lowest influence intensity (M=7.5), while academic institutions with relatively lower network density (85.3%) have the highest influence intensity (M=9.1). This comparison reveals that network influence does not depend on the quantity of connections but on the depth of relationships, quality of interactions, and concentration of authority^[42]. Teacher-student relationships, academic authority, and institutional norms in academic networks endow the network with stronger shaping power, while the ubiquitous connections of social media, though extensive, are superficial and difficult to form deep-level style influence.

Qualitative interview materials reveal artists' subjective experiences and strategic choices regarding different networks. Multiple interviewees stated that they rely on different types of networks at different

career stages: early dependence on academic institutions to establish technical foundations and professional identity, mid-career expansion of professional opportunities through art communities and gallery systems, and mature-stage utilization of social media to expand influence and directly reach audiences. One artist mentioned that "the academy taught me how to paint, the community taught me how to survive, and social media taught me how to speak out." This narrative vividly summarizes the functional differentiation of different networks. Although peer groups are small in scale, they were frequently mentioned by interviewees as "the most authentic feedback source" and "emotional support," indicating the psychological importance of these deep relationship networks. The negative correlation between network density and influence intensity ($r=-0.58$, $p<0.05$) further confirms the principle that relationship quality outweighs quantity. These findings have practical implications for artists' network construction strategies: effective professional development requires balancing the complementary functions of different network types—obtaining professional recognition and resource support through institutionalized networks (academies, galleries), maintaining emotional connections and creative freedom in informal networks (peers, communities), while utilizing digital networks (social media) to expand visibility and social influence. The influence of social relationship networks on artistic style is essentially a dynamic negotiation between structural constraints and agentic choices. Artists are both shaped by network norms and achieve individualized style exploration through strategic network navigation.

Table 6. Influence characteristics of social relationship network types on artistic style formation.

Social Relationship Network Type	Number of Artists Involved	Percentage (%)	Style Convergence Degree	Innovation Index	Network Density (%)	Influence Intensity
Art Communities	52	22.1	7.8	7.6	72.5	8.3
Academic Institutions	48	20.4	8.5	8.8	85.3	9.1
Gallery Systems	35	14.9	7.2	7.4	68.7	7.9
Social Media	58	24.7	6.9	8.1	91.2	7.5
Peer Groups	42	17.9	8.2	7.9	78.4	8.6

Note: Total sample $N=235$; Style convergence degree, innovation index, and influence intensity use 10-point scales; Network density calculated based on social network analysis

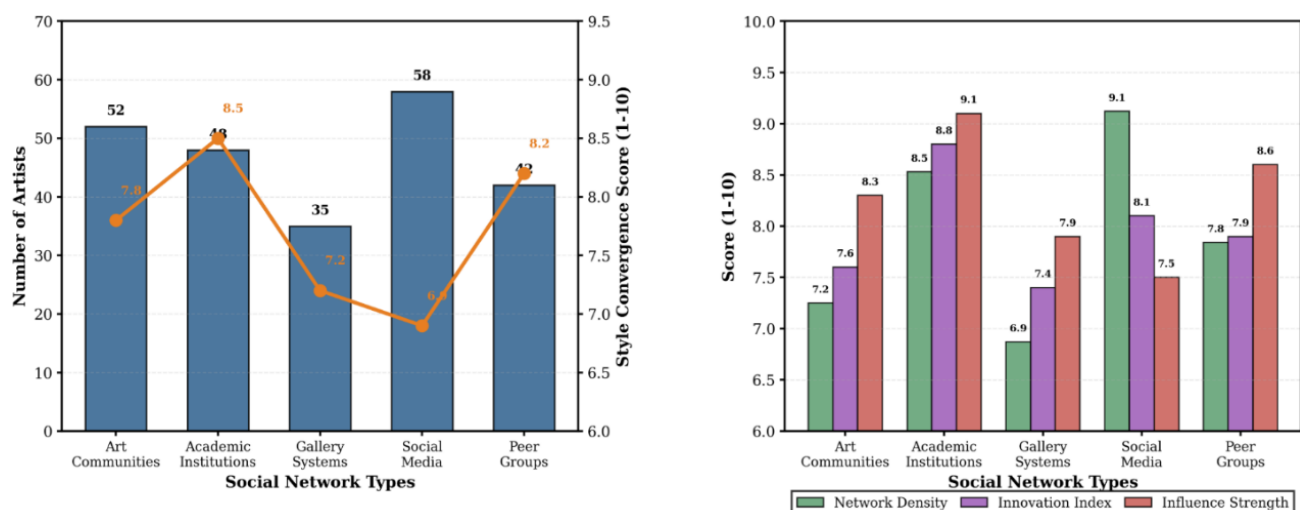


Figure 6. Artist distribution, style convergence degree, and influence intensity by social relationship network type.

4.3. Interactive patterns between environmental aesthetics and social psychology

4.3.1. Manifestation of social psychological feedback from environmental degradation in artworks

Environmental degradation, as the most severe ecological crisis in contemporary times, not only causes ecosystem destruction at the material level but also triggers profound social psychological feedback. This interaction has been fully visually expressed in watercolor artistic creation. This study identified five main types and their triggered psychological response patterns from 188 works explicitly expressing environmental degradation themes. As shown in **Table 7**, works with urban expansion themes were most numerous (N=45, 23.9%), reflecting that rapid urbanization's encroachment on natural environments has become the ecological issue most attended to by artists. Such works often use contrastive techniques to display spatial transformations from farmland to construction sites and green spaces to building developments, visually presenting the oppressive expansion of human activities on natural environments. Water pollution theme works (N=42, 22.3%) followed closely. The pollution of rivers, lakes, and oceans has become a classic subject of environmental art due to its high visibility and wide-ranging impact. Artists convey the severity of water resource crisis through depicting turbid water colors, floating garbage, and dead aquatic organisms. Air pollution (N=38, 20.2%), deforestation (N=35, 18.6%), and soil erosion (N=28, 14.9%) respectively present multiple degradations of environmental systems from different dimensions. This subject distribution reflects artists' comprehensive attention to environmental problems while also reflecting the compound ecological crisis faced by contemporary society^[43].

Assessment of psychological distress degree reveals the level of psychological pressure triggered by different environmental degradation types. Water pollution achieved the highest score (M=9.2, SD=0.6), highly consistent with environmental psychology research on the emotional value of "blue space." As the source of life in human evolutionary history, water pollution not only threatens survival safety but also triggers deep psychological trauma. The distress degree of air pollution (M=8.9) is also extremely high. The globality and inescapability of atmospheric problems such as smog and ozone layer destruction make them the most direct source of contemporary environmental anxiety. The distress degrees of urban expansion (M=8.7) and deforestation (M=8.5) are equally significant, with the former embodied as declining quality of habitation environments and loss of sense of place, while the latter evokes mourning emotions for nature's disappearance. The dual-axis graph on the left side of **Figure 7** clearly displays the relationship between work quantity and psychological distress degree. The data show a positive correlation trend between the two ($r=0.73$, $p<0.05$), meaning that environmental problems triggering stronger psychological distress also correspond to more works created by artists. This pattern validates the functional hypothesis of art as a psychological pressure release channel. Notably, although soil erosion is equally serious ecologically, it has the lowest psychological distress degree (M=7.8) and fewest works, possibly because soil problems have low visibility and long time spans, making it difficult to produce immediate psychological impact. This finding suggests that the psychological impact of environmental problems is closely related to their perceptual characteristics.

The collective grief dimension measures group sorrowful emotions triggered by environmental degradation. Water pollution scored highest (M=9.0), indicating that destruction of aquatic ecosystems triggers the strongest collective mourning response. This emotion originates not only from loss of ecological value but also includes nostalgia for clear rivers in childhood memories and guilt that future generations cannot enjoy clean water sources. The grief degree of deforestation (M=8.8) followed closely. Forests, as symbols of biodiversity and "Earth's lungs," trigger fear and mourning over the collapse of entire life systems when they disappear. The four grouped bar charts on the right side compare four dimensions—psychological distress, collective grief, action motivation, and aesthetic destruction perception—revealing

multidimensional characteristics of social psychological feedback from environmental degradation. Action motivation scores show that water pollution (M=8.8) and air pollution (M=8.6) not only trigger strong negative emotions but also evoke the highest environmental protection action willingness. This "anger-action" psychological mechanism indicates that emotional suffering can transform into psychological resources for social mobilization. In contrast, urban expansion (M=7.7) and soil erosion (M=7.3) have lower action motivation, possibly because these two types of problems involve complex socioeconomic interests, with individuals feeling powerless to change and developing learned helplessness.

The aesthetic destruction perception dimension assesses the negative impact of environmental degradation on aesthetic experience. Air pollution scored highest (M=9.1). Gray skies and disappearing blue skies with white clouds directly deprive people of daily aesthetic pleasure. This loss of aesthetic value is described by interviewed artists as "visual violence" and "murder of beauty." The aesthetic destruction perception of urban expansion (M=9.0) is equally significant. Monotonous concrete forests and uniform urban landscapes lead to impoverishment of aesthetic environments. This standardized spatial production destroys local characteristics and natural beauty. The ecological identity indicator reflects the degree to which individuals connect self-concept with the natural environment. Works with water pollution themes exhibited the highest ecological identity (M=9.1). Artists creating such subjects generally demonstrate "human-water unity" ecological consciousness, viewing water pollution as personal trauma. Qualitative analysis reveals that artists underwent a psychological transformation process from "documenting reality" to "emotional catharsis" to "action advocacy" when creating environmental degradation themes. One artist mentioned that "every stroke of turbid color is an accusation against environmental crimes." This expression embodies the ethical dimension and social critical function of artistic creation. Correlation analysis indicates a strong positive correlation between psychological distress degree and aesthetic destruction perception ($r=0.88$, $p<0.01$), indicating that environmental degradation's damage to aesthetic value is an important mechanism for triggering psychological distress. This finding supports environmental aesthetics' theoretical claim about the impact of "aesthetic health" on mental health. Overall, environmental degradation triggers social psychological feedback through multiple pathways including destroying aesthetic environments, threatening survival safety, and triggering collective memory. These psychological responses are then expressed, amplified, and socialized through artistic creation, forming visual communication and public mobilization on environmental issues, embodying the deep interaction between environmental aesthetics and social psychology.

Table 7. Social psychological feedback characteristics triggered by environmental degradation types.

Environmental Degradation Type	Number of Related Works	Percentage (%)	Psychological Distress Degree	Collective Grief	Action Motivation	Aesthetic Destruction Perception	Ecological Identity
Air Pollution	38	20.2	8.9	8.4	8.6	9.1	8.7
Water Pollution	42	22.3	9.2	9.0	8.8	8.7	9.1
Soil Erosion	28	14.9	7.8	7.5	7.3	7.6	7.4
Deforestation	35	18.6	8.5	8.8	8.1	8.3	8.6
Urban Expansion	45	23.9	8.7	7.9	7.7	9.0	8.2

Note: Total sample $N=188$; All rating dimensions use 10-point scales; Data based on comprehensive assessment of artwork analysis and viewer surveys

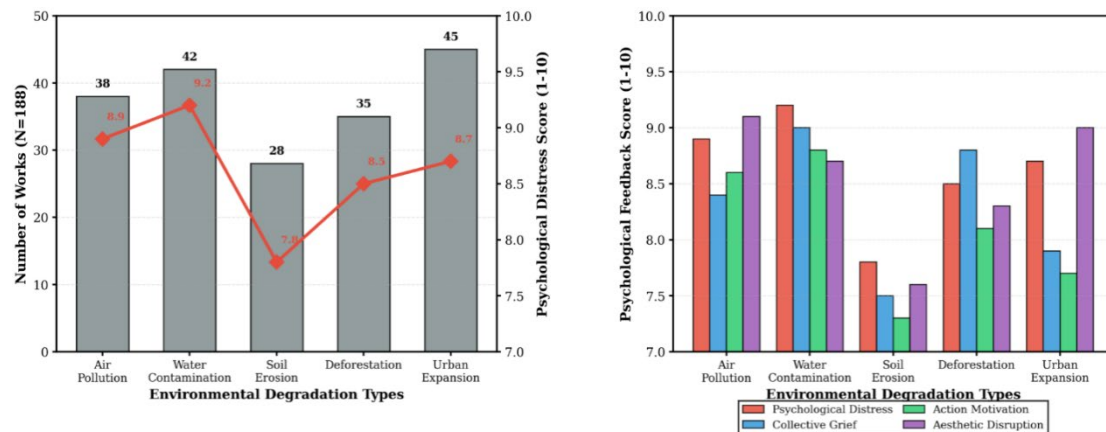


Figure 7. Work distribution and social psychological feedback dimensions by environmental degradation type.

4.3.2. Dual expression of place attachment and sense of community belonging

Place attachment and sense of community belonging, as intersecting concepts from environmental psychology and social psychology, present complex dual expression characteristics in contemporary watercolor artistic creation. This study identified five main place types and their carried dual emotional structures from 213 works involving specific place representation. As shown in **Table 8**, works with homeland landscape themes were most numerous (N=52, 24.4%), reflecting that in contemporary society with increasingly enhanced global mobility, homeland as the original belonging space occupies a core position in artists' psychological structure. Such works often depict villages, towns, or urban neighborhoods of childhood life, reconstructing homeland imagery from memory through nostalgic visual language, expressing both attachment to physical places and conveying sense of belonging to family, clan, and local communities. Childhood memory place works (N=46, 21.6%) followed closely. Such places may be grandmother's old house, the path to school, or the riverside for play. They possess unique emotional marking significance in individual life history. Artists create the hazy texture of memory and warm atmosphere of emotion through watercolor's soft tones and flowing brushstrokes^[44]. Cultural landmarks (N=42, 19.7%) include historical buildings, religious sites, monuments, and other spaces with collective cultural significance. Such works project personal emotions onto public symbols, achieving integration of private memory and collective identity. Community spaces (N=38, 17.8%) and natural sacred sites (N=35, 16.4%) respectively represent the social domain of daily life and natural environments with spiritual significance, with the former reinforcing community connections and the latter providing transcendent experiences.

Place attachment scores reveal differences in emotional intensity evoked by different place types. Childhood memory places achieved the highest score (M=9.5, SD=0.4), confirming developmental psychology's theory regarding the decisive influence of childhood experiences on personality formation. Early life spaces generate the strongest attachment emotions due to their deep binding with self-development. The attachment degrees of homeland landscapes (M=9.3) and natural sacred sites (M=9.1) are also very high, with the former carrying cultural identity and root consciousness, while the latter evokes awe and attachment through its sacredness and aesthetic value. In contrast, the place attachment degree of community spaces is relatively lower (M=8.4), possibly because communities, as semi-public spaces, have less personalized emotional investment than more intimate childhood memory places or homeland landscapes with stronger cultural symbolism. The scatter plot on the left side of displays the relationship between place attachment and sense of community belonging through two-dimensional space, with dot size representing work quantity and

colors distinguishing different place types. The data show that childhood memory places (CM), although having the highest place attachment (9.5), have relatively lower sense of community belonging (8.2), located in the lower right of the chart. This positional distribution reveals the private characteristics of childhood memory places—they primarily carry individual emotional memories rather than group social connections. Conversely, community spaces (CS) present high sense of community belonging (9.2) but relatively lower place attachment (8.4), located in the upper left, indicating that as domains for daily social interaction, their value is more reflected in social relationships rather than the place itself. Homeland landscapes (HL) and cultural landmarks (CL) are relatively balanced in distribution across the medium-high regions of both dimensions, showing synergistic expression of place attachment and sense of community belonging.

The sense of community belonging dimension assesses the degree of group identity evoked by different place types. Community spaces scored highest ($M=9.2$), directly related to communities being core domains for interpersonal interaction, neighborly exchange, and social support networks in daily life. Through depicting public spaces such as community markets, parks, and squares, artists not only reproduce physical environments but also visualize the warmth and density of community relationships. The belonging sense of cultural landmarks ($M=8.8$) is also relatively high. As material carriers of collective memory and symbolic signs of cultural identity, such places integrate dispersed individuals into imagined communities. Multiple artists mentioned in interviews the sense of mission to "chronicle the clan" when creating hometown ancient towers, old streets, and ancestral halls. The four grouped bar charts on the right side compare four dimensions—place attachment, sense of community belonging, emotional investment degree, and identity expression—revealing differences in emotional structures across place types. Emotional investment degree data show that childhood memory places scored highest ($M=9.4$), indicating that such creation invests artists' most profound emotional energy. This high investment originates not only from memory's preciousness but also reflects the psychological need to reconstruct lost childhood time through art^[45]. Identity expression dimension scores show that cultural landmarks scored highest ($M=9.3$). Through expressing places with cultural symbolic significance, artists achieve proclamation of cultural identity and confirmation of identification. This expression is both personal and collective, both emotional and political.

Collective memory assessment reveals the intensity of group memory carried by different places. Childhood memory places scored highest ($M=9.6$). This seemingly contradictory finding—the most private places carrying the strongest collective memory—actually reveals the deep mechanism of "the personal is political": individual childhood experiences possess intergenerational commonality due to shared era backgrounds. Childhood places from specific historical periods (such as tube-shaped apartments, courtyards, and villages of the 1980s and 1990s) become collective memory containers for a generation. Cultural landmarks ($M=9.2$) and homeland landscapes ($M=9.1$) also scored highly, with the former carrying formal collective memory through historical narratives and the latter activating informal cultural memory through rural imagery. Correlation analysis shows an extremely strong positive correlation between place attachment and emotional investment degree ($r=0.94$, $p<0.001$), indicating that attachment intensity directly determines the degree of emotional investment during creation. Sense of community belonging and identity expression also show significant positive correlation ($r=0.78$, $p<0.01$), revealing the psychological mechanism by which belonging sense drives identity expression. Qualitative interviews reveal the mutually constitutive relationship between place attachment and sense of community belonging. One artist mentioned, "Painting hometown's old street is not because of those bricks and tiles, but because my fellow villagers are there." This narrative indicates that place meaning comes from social relationships within it, while social relationships are concretized and sustained through place. Another artist creating childhood themes expressed, "Each time I paint, it's as if I return to the childhood courtyard, and playmates' laughter rings in

my ears again." This space-time traversal psychological experience proves art creation's function as a memory activation and emotional reproduction mechanism. Overall, place attachment and sense of community belonging form complex dual expression patterns in watercolor creation, both mutually independent and intertwined, jointly constituting artists' emotional maps and social connection networks. This dual expression essentially reflects the deep integration of environmental aesthetics (place aesthetic value) and social psychology (group belonging needs) in individual psychological structures.

Table 8. Expression characteristics of place attachment and sense of community belonging by place type.

Place Type	Number of Works	Percentage (%)	Place Attachment	Sense of Community Belonging	Emotional Investment Degree	Identity Expression	Collective Memory
Homeland Landscapes	52	24.4	9.3	8.5	9.0	8.8	9.1
Childhood Memory Places	46	21.6	9.5	8.2	9.4	8.6	9.6
Community Spaces	38	17.8	8.4	9.2	8.6	9.0	8.3
Cultural Landmarks	42	19.7	8.9	8.8	8.7	9.3	9.2
Natural Sacred Sites	35	16.4	9.1	8.0	8.9	8.4	8.7

Note: Total sample $N=213$; All rating dimensions use 10-point scales; Data based on artist interviews and artwork content analysis

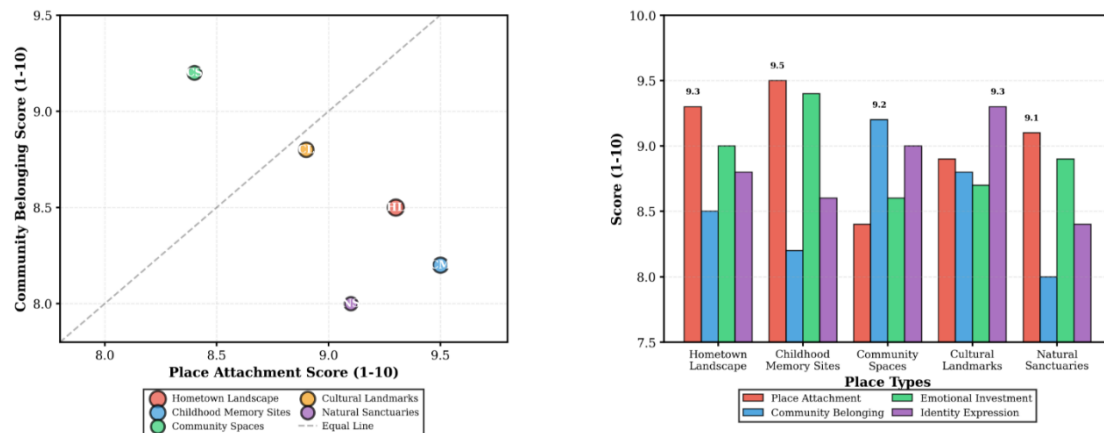


Figure 8. Two-dimensional distribution of place attachment and sense of community belonging by place type.

5. Discussion

5.1. Theoretical significance of research findings

Through systematic empirical analysis, this study provides important evidence from the field of artistic practice for the theory of interaction between environmental aesthetics and social psychology, expanding the theoretical boundaries of interdisciplinary integration research. First, the research reveals that the presentation modes of environmental aesthetic elements in watercolor creation are not merely aesthetic reproduction but rather complex expressive processes deeply embedded with social psychological factors. This finding challenges the assumption of "pure aesthetics" in traditional aesthetic research, demonstrating the inseparability between aesthetic perception and social psychological states. Specifically, the strong correlation between poetic expression of natural landscapes and environmental perception depth ($r=0.76$), the

synergistic effect between spirit of place in urban spaces and collective memory, and the bidirectional construction of visual metaphor and social psychological feedback in ecological crisis themes collectively support the theoretical proposition of "embedded aesthetics"—that is, aesthetic experience always occurs within specific sociocultural and psychological contexts^[46]. Second, the research validates and expands place attachment theory. The data show that although place attachment and sense of community belonging are conceptually related, they present differentiated patterns in practice. The high attachment-low belonging paradox of childhood memory places and the high belonging-low attachment characteristics of community spaces reveal that environmental psychology needs to more carefully distinguish between physical attachment and social attachment to places. This theoretical refinement holds important significance for understanding belonging crises in contemporary mobile societies.

Third, the research confirms the structural influence of social psychological factors on artistic style formation. The counterintuitive finding of a negative correlation between social relationship network density and influence intensity ($r=-0.58$) provides new theoretical insights for sociology of art: the formation of artistic style is influenced not only by the quantitative scale of social networks but more by relationship quality, interaction depth, and concentration of authority. This finding corrects simple "social determinism," emphasizing actors' agentic strategic navigation under network structural constraints. Fourth, the research constructs a triple association model of environmental degradation-psychological feedback-artistic expression. The strong correlation between psychological distress degree and aesthetic destruction perception ($r=0.88$) proves the mental health value of environmental aesthetics, extending environmental aesthetics from the purely aesthetic domain to the domains of public health and social wellbeing, providing a psychological foundation for environmental ethics and ecological civilization construction^[47]. Fifth, the research develops visual expression theory for cultural identity. The positive correlation between cultural anxiety and self-exploration ($r=0.71$) indicates that identity predicament is not merely a psychological burden but an important driving force for stimulating artistic innovation and self-construction. This finding provides empirical support from artistic practice for postcolonial theory, cross-cultural studies, and identity politics in the context of globalization. Overall, by integrating theoretical resources from environmental aesthetics, social psychology, and sociology of art, this study constructs a multi-level, multidimensional analytical framework, opening new theoretical pathways for understanding the sociocultural functions of contemporary art.

5.2. Sociocultural value of contemporary watercolor art

Contemporary watercolor art has transcended the singular function of traditional aesthetic appreciation, developing diversified sociocultural values and becoming an important medium for responding to contemporary issues, promoting social dialogue, and constructing cultural identity. First, in terms of environmental consciousness awakening, watercolor art plays a unique role in ecological education and public mobilization through visually presenting the severe reality of environmental degradation. The research found that the artistic response rate for ecological crisis themes reached 95.2%, and viewers' environmental attitudes significantly improved after viewing such works. This indicates that art not only documents environmental problems but, through emotional resonance mechanisms, transforms abstract ecological data into perceptible psychological experiences, stimulating transformation from cognition to action. In particular, the high ecological warning effect of symbolic imagery strategy ($M=9.1$) proves that through mobilizing cultural symbols, art can break through the limitations of rational preaching and reach directly to the emotional core of the public. This "aesthetic mobilization" provides a cultural pathway for environmental movements beyond traditional political mobilization. Second, in terms of social dialogue and psychological healing functions, watercolor art provides channels for expression, release, and transformation of collective

anxiety. The data show that the positive correlation between artistic response rate and healing effect ($r=0.79$) indicates that artistic creation is not merely personal emotional catharsis but constructs a psychological resonance space between creators and viewers. This "empathic community" holds important social integration value in atomized modern society^[48]. Particularly on issues such as cultural identity crisis and urban alienation, art provides a safe dialogue platform, enabling individual private distresses to gain socialized expression, thereby reducing psychological loneliness and enhancing social connections.

Third, in terms of cultural inheritance and memory preservation, watercolor art assumes the function of "visual archive," especially amid rapid urbanization processes. Works with traditional cultural revival themes were most numerous ($N=45$) with the highest identity intensity ($M=9.1$), reflecting that artists consciously position themselves as guardians of cultural memory, combating forgetting through visual narrative and providing material carriers for collective memory. This cultural preservation function is particularly important in the context of globalization impacting local cultures, with art becoming an alternative mechanism for cultural gene transmission. Fourth, in terms of social critique and public participation, watercolor art demonstrates its possibility as "gentle radicalism." The high social concern degree ($M=9.1$) for marginal spaces such as urban periphery and industrial ruins indicates that artists achieve subtle critique of social injustice through selecting subjects ignored by the mainstream. This non-confrontational critical strategy possesses unique spatial penetrative power in politically sensitive environments^[49]. Fifth, in terms of cultural identity construction, watercolor art provides an experimental field for identity negotiation in multicultural contexts. The high depth of self-exploration ($M=9.0-9.3$) in themes such as East-West integration and diaspora experience indicates that artistic creation itself is a practical process of identity construction. This "learning by doing" identity work provides a micro-foundation for cultural pluralism. In summary, contemporary watercolor art has transformed from privatized aesthetic activity into sociocultural practice with public character. Its value lies not only in the aesthetic quality of works themselves but more in its mediating functions for social dialogue, cultural inheritance, psychological healing, and public participation.

5.3. Research limitations

While achieving the above findings, this study also has several methodological limitations that need to be acknowledged. First, in terms of cultural representativeness, although the sample covers multiple regions, works from the Chinese-speaking cultural sphere account for nearly 70% of the total. This distribution may result in research findings that more strongly reflect environmental aesthetic concepts and socio-psychological characteristics within the East Asian cultural context, while the applicability to other cultural spheres such as Europe and North America still requires further verification, posing a potential risk of cultural bias. Second, the study primarily relies on artist self-reports and audience subjective evaluations to obtain data. Artists' articulation of creative motivations in interviews may be influenced by social desirability effects, tending to emphasize positive motivations such as environmental concern and social responsibility while downplaying factors such as commercial considerations or personal preferences. Similarly, audience questionnaire ratings of aesthetic experience and emotional responses may also contain self-report bias, with some participants potentially responding according to social norms rather than genuine feelings. Third, the cross-sectional design employed in the study can only reveal associations between variables and cannot establish clear causal directions. For example, regarding the relationship between environmental aesthetic perception and socio-psychological states, which is the cause and which is the effect, or whether both are jointly influenced by a third variable—these questions require longitudinal tracking studies for further clarification. Fourth, the sample selection uses purposive sampling and snowball sampling, which, while helpful in obtaining information-rich cases, has limited representativeness in a statistical sense. The

generalization of research conclusions to broader artist and audience populations requires caution. Fifth, the study mainly focuses on the thematic content of artworks and immediate audience responses, with less attention to dimensions such as market circulation of watercolor art, institutional collection, and long-term social impact, which limits a comprehensive understanding of art's social functions. Future research can further deepen and refine the theoretical framework of this study by expanding the proportion of international samples, combining physiological measurement techniques to reduce self-report bias, adopting longitudinal designs to track causal relationships, and incorporating institutional factors in art production.

6. Conclusion

Through systematic examination of the interaction between environmental aesthetics and social psychological factors in watercolor painting, this study draws the following core conclusions:

(1) Environmental aesthetic elements in contemporary watercolor creation are not isolated aesthetic objects but complex expressions deeply embedded in sociopsychological contexts. The poeticization of natural landscapes, the spirit of place in urban spaces, and the visual metaphors of ecological crises all embody the inseparability of aesthetic perception and social psychological states, validating the theoretical proposition of "embedded aesthetics."

(2) Social psychological factors profoundly influence artistic style formation through mechanisms such as collective anxiety, cultural identity, and social relationship networks. The influence of social networks depends on relationship quality rather than connection quantity, while cultural anxiety instead stimulates deeper artistic exploration, demonstrating the dialectical relationship between social structure and individual agency.

(3) Social psychological feedback triggered by environmental degradation forms multidimensional expression in artworks. The strong correlation between psychological distress degree and aesthetic destruction perception ($r=0.88$) reveals the mental health value of environmental aesthetics, while the dual expression of place attachment and sense of community belonging demonstrates the triple interweaving of environment-psychology-society.

(4) Contemporary watercolor art has transcended singular aesthetic function, developing diversified sociocultural values including environmental education, psychological healing, cultural inheritance, social critique, and identity construction, becoming an important cultural medium for responding to contemporary issues.

(5) The interaction between environmental aesthetics and social psychology constitutes a key dimension for understanding the social functions of contemporary art. This interaction is not simple superposition but a complex system of mutual construction and dynamic evolution, providing new theoretical frameworks and methodological insights for interdisciplinary art research.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Shen S Y. Borrowing from and Innovation upon the Spirit of Literati Painting in Watercolor Painting[J]. *Beauty and Times (Mid)*, 2025,(04):30-32.
2. Shen W J. The Influence of Paper Texture on Color Expression in Watercolor Painting[J]. *Paper and Papermaking*, 2024,43(06):54-56.

3. Liu J Y. Exploration of Synesthetic Teaching Combining Music and Visual Art in "Watercolor Fundamentals" Course[J]. *Journal of Longyan University*, 2024,42(06):123-128.
4. Kelly P. "A Better Idea than the Best Constructed Charts": Watercolor Views in Early British Hydrography[J]. *Grey Room*, 2021,(85):70-99.
5. Watson A. In and of the earth: seeing the real in site-responsive painting[J]. *Journal of Visual Art Practice*, 2025,24(1-2):117-145.
6. Zhao S W. Borrowing from and Innovation upon the Spirit of Literati Painting in Watercolor Painting[J]. *New Aesthetic Domain*, 2024,(10):10-12.
7. Han S T. The Role and Manifestation of Emotional Factors in Watercolor Painting[J]. *Beauty and Times (Mid)*, 2023,(09):24-26.
8. Zhang Y. The Manifestation and Application of Healing Function in Painting Art[J]. *Hill Publishing*, 2025,9(6):1153-1158.
9. Avgeri N E, Papanastasiou K D. Atmospheric Pollution Depicted in Impressionists' Paintings[J]. *Sustainability*, 2024,16(22):10147-10147.
10. Vašát P. Tipping point urbanism: A study of the painting and fading of the macromural La Mariposa in governing self-built settlements in Bogotá[J]. *Political Geography*, 2025,120:103337-103337.
11. Norio N, Rebekah K. Toward the Reutilization of Past Natural History Materials Regarding Tropical Marine Life in the Pacific Islands: Analysis of Watercolor Paintings by Toshio Asaeda from the Crocker Expeditions in the 1930s: Articles[J]. *People and Culture in Oceania*, 2023,38:35-50.
12. Foti P, Califano A, Gao C, et al. Critical exposure time for panel paintings due to change in environmental conditions[J]. *Mechanics of Materials*, 2025,202:105234-105234.
13. Silva D G I, Reis S D I, Franco A D W R, et al. Effect of volatile organic compounds on the stability of inorganic pigments in oil-based paintings[J]. *Journal of Cultural Heritage*, 2025,73:277-285.
14. Lu X P. Research on the Expression and Application of Comprehensive Watercolor Techniques in Illustration Art[J]. *Beauty and Times (Mid)*, 2023,(11):115-117.
15. Liu X. Exploration of Mixed-Media Painting Using Watercolor as Medium[J]. *New Aesthetic Domain*, 2023,(03):28-30.
16. Chen X. Research on the Application of Watercolor Teaching in University Fine Arts Education[J]. *Beauty and Times (Mid)*, 2024,(06):86-88.
17. Shahi R K. William Trost Richards's "Real Drawing" and the Currency of Watercolor, ca. 1875–85[J]. *American Art*, 2020,34(2):54-77.
18. Wen S M, Xu W Z. Artistic Expression of Watercolor Illustration in Contemporary Painting Language[J]. *Beauty and Times (Mid)*, 2022,(10):24-26.
19. Enric M, G. E C, Nicole R, et al. Preference for curvature in paintings extends to museum context[J]. *Psychology of Aesthetics, Creativity, and the Arts*, 2025,19(5):1205-1218.
20. Furukawa R, Tamura A. Impact of Paintings Made from Waste Materials from a Particular Region on Viewers' Behavioral Intention Regarding Social and Environmental Issues[J]. *Sustainability*, 2025,17(15):6822-6822.
21. Qin H Y. Expansion and Exploration of Painting Material Boundaries in Contemporary Watercolor[J]. *Popular Literature and Art*, 2022,(15):52-54.
22. Ralph H, James B. Examining the effect of context on the watercolor illusion[J]. *Journal of Vision*, 2018,18(10):580-580.
23. Ash G. Painting courage: The art of mask making[J]. *Journal of Medical Imaging and Radiation Sciences*, 2025,56(6):102121-102121.
24. Hur J Y, Hernando A S, Mascheroni J R, et al. The Beauty of Nature Without People: An Investigation of the Roles of People, Nature, and Interpersonal Touch in Painting Preference[J]. *Empirical Studies of the Arts*, 2026,44(1):125-146.
25. Xia Q. Research on Creative Concepts and Expressive Language Characteristics of Contemporary Chinese Realist Watercolor Painting[J]. *Beauty and Times (Lower)*, 2022,(07):88-90.
26. Wen J, Wang W. The Role and Manifestation of Emotional Factors in Watercolor Painting[J]. *Art Research*, 2022,(02):24-26.
27. G. T. Photographies, photo-aquarelles : l'œuvre de Félix Méheux: Photographs and watercolor photos by Félix Méheux[J]. *Annales de Dermatologie et de Vénéréologie - FMC*, 2021,1(8S3):8S106-8S126.
28. K. E L. Heirloom Fruits of America: Selections from the USDA Pomological Watercolor Collection[J]. *Leonardo*, 2021,54(4):467-469.
29. Sandra K. Botanical Art Techniques: A Comprehensive Guide to Watercolor, Graphite, Colored Pencil, Vellum, Pen and Ink, Egg Tempera, Oils, Printmaking, and More[J]. *LIBRARY JOURNAL*, 2020,145(5):116-116.
30. Hale G R. Impact of the watercolor illusion on figure-ground reversibility[J]. *Journal of Vision*, 2019,19(10):35a-35a.

31. Zhou S H. The Significance of Integration Between Contemporary Watercolor Painting Creation and Ceramic Decoration[J]. *Foshan Ceramics*, 2021,31(12):41-43.
32. Sun Y, Xu W S. Research on the Uniqueness of Watercolor in Contemporary Chinese Industrial Subject Painting Creation[J]. *Art Education Research*, 2021,(22):28-29.
33. Tingyuan G. ANALYSIS ON THE RELATIONSHIP BETWEEN COLOR PSYCHOLOGY AND AESTHETIC EXPRESSION OF WATERCOLOR CREATION[J]. *Psychiatria Danubica*, 2022,34(S5):217-217.
34. Erik C. Epic Landscapes: Benjamin Henry Latrobe and the Art of Watercolor by Julia Sienkewicz, and: Building America: The Life of Benjamin Henry Latrobe by Jean H. Baker (review)[J]. *Arris*, 2021,32(1):68-71.
35. Wang Y Z. The Significance of Integration Between Contemporary Watercolor Painting Creation and Ceramic Decoration[J]. *Jiangsu Ceramics*, 2021,54(05):23-24.
36. Xie W W. Application of Linear Composition in Modern Watercolor Landscape Painting[J]. *Beauty and Times (Mid)*, 2020,(02):39-40.
37. Spillmann L. Watercolor spreading in Bridget Riley's and Piet Mondrian's op-art placed in the context of recent watercolor studies[J]. *Journal of vision*, 2024,24(6):15-15.
38. Daiga F C, Andrejs T, Vilnis F. Modeled surface salinity and satellite data as proxy for Secchi depth and watercolor of the Gulf of Riga[J]. *E3S Web of Conferences*, 2023,436:10001-10001.
39. Folds P, Conway E, Hale R, et al. Luminance contrast impacts ability of watercolor illusion to serve as figure cue in ambiguous images[J]. *Journal of Vision*, 2022,22(14):4135-4135.
40. Wu G X. Research on the Importance of Emotional Expression for Watercolor Creation[J]. *Beauty and Times (Mid)*, 2019,(04):27-28.
41. Hale G R, McDunn A B, Lumpkin L T, et al. Impact of the watercolor illusion and contrast on figure-ground reversibility[J]. *Psychonomic Bulletin & Review*, 2025,32(4):1-9.
42. Ahmadi S, Mirsaleh R Y, Choobforoushzadeh A. Effectiveness of Mindfulness-Based Art Therapy (MBAT) Utilizing Watercolor Painting on Emotion Regulation, Mindfulness, and Obsessive Symptoms[J]. *Mindfulness*, 2024,(prepublish):1-14.
43. Li Z. Research on the Application of Watercolor in Artistic Design Expression[J]. *China National Expo*, 2018,(11):172-173.
44. Cao S. Inheritance and Research: The "Hubei Phenomenon" of Watercolor Painting in the National Art Exhibition[J]. *Highlights in Art and Design*, 2025,10(1):37-41.
45. Nutt G C, Lumpkin L T, Folds E P, et al. Influence of Familiarity, Aesthetic Value, and Change Type on Visual Memory of AI-generated Paintings in a Virtual Reality Change/No Change Paradigm[J]. *Journal of Vision*, 2024,24(10):947-947.
46. G R H, M J B. Influence of context on spatial expanse of color spreading in the watercolor illusion[J]. *Attention, perception & psychophysics*, 2021,83(8):1-15.
47. Wang J. A Preliminary Exploration of the Significance of Integration Between Contemporary Watercolor Painting Creation and Ceramic Decoration[J]. *Ceramic Science and Art*, 2023,57(10):42-43.
48. Zou Y, Zhang A, Wang X, et al. Comparison of feature selection and data fusion of Fourier transform infrared and Raman spectroscopy for identifying watercolor ink[J]. *Journal of forensic sciences*, 2024,69(2):584-592. DOI:10.1111/1556-4029.15468.
49. Folds P, Nutt C, Lumpkin T, et al. Relative luminance of ambiguous figure/ground regions impacts the ability of the watercolor illusion to bias figure assignment[J]. *Journal of Vision*, 2023,23(9):5360-5360.